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Herpetofauna of Sevastopol city (southwestern Crimea): species composition, zoogeographic analysis, landscape-zonal distribution, current status and protection

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This work summarizes information on the distribution and status of the populations of amphibians and reptiles of the city of Sevastopol. Data obtained over a quarter of a century were refined by a targeted herpetological examination of the entire territory of Sevastopol (over 1000 km^2) in 2018 and early 2019. Most species of amphibians and reptiles known in Crimea are recorded from the Sevastopol Region, with the exception of some taxa that inhabit only or mainly plains environments (*Pelobates vespertinus*, *Eremias arguta*, and *Lacerta agilis exigua*). Most taxa included in the Red Book of Sevastopol, to date, retain stable populations. Apparently, *Vipera renardi* has disappeared from the region. Analysis of the taxon chorotypes indicates a dominance of species of Mediterranean (sensu lato) origin. The mild climate of the southwestern part of the Crimean Peninsula determines the unique spatial distribution of the most thermophilic reptile species (*Mediodactylus danilewskii*, *Pseudopus apodus*, and *Zamenis situla*) and, in particular, their wide distribution on the northern macroslope of the Crimean Mountains and (or) the highest elevations in Crimea. The zoning of the territory of Sevastopol, according to herpetological data, made it possible to identify eight districts that differ clearly in species composition and population density of background and rare species. On a national scale, the territory of Sevastopol is important for the conservation of the genetic diversity of species such as *Triturus karelinii, M. danilewskii, Ps. apodus, Z. situla, Dolichophis caspius,* and *Elaphe sauromates*. Currently, the state of the populations of *T. karelinii, Emys orbicularis,* and

El. sauromates is most alarming. Scientifically important natural and some synanthropic (in the Khersonesos of Taurida) populations of *M. danilewskii*, as well as relic populations of the Crimean endemic *Lacerta agilis tauridica*, require close attention. The "Baydarskyi", "Cape Aya" and "Laspi" state regional wildlife sanctuaries play the most significant role in preserving the herpetofauna of the region, covering the upper part of the Chernaya River basin (Main Range) and the extreme southwestern part of the Southern Coast of Crimea, as well as the Mekenzievskoe Forestry in the foothills.

Keywords: amphibians, reptiles, population status, specially protected natural area, Crimean Peninsula.

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Introduction

In recent years, insufficient attention has been paid to the protection of the herpetofauna of Crimea. Despite the good state of knowledge of the herpetology of the peninsula, there have been no serious attempts to generalize data on the distribution and status of amphibian and reptile populations within the framework of regional reviews since the publication of a collective monograph on the conservation of biodiversity in the Eastern Crimea (Kotenko and Kukushkin, 2013; Kukushkin and Kotenko, 2013). Meanwhile, today the Crimean Peninsula is undergoing large-scale landscape transformations, as never before in its history, and information on details of the distribution of animal species becomes extremely relevant, since there is a high risk of losing many populations of rare species before they become known to science. This gap in knowledge is even reflected in the cadastral passports of specially protected natural territories, which may contain incomplete and sometimes erroneous information on herpetofauna. Accurate data on the ranges and state of species populations are also required for the preparation of a new edition of the Red Book of the Russian Federation, which will form the basis for the practical protection of the fauna of Crimea for the foreseeable future (Ilyashenko et al., 2018).

This publication is on the herpetofauna of Sevastopol, which has federal city status. The main objectives of our study:

– synthesis of all available information on the distribution of amphibians and reptiles in the territory of Sevastopol;

– zoning of the Sevastopol Region according to herpetological data, based on identified patterns in the distribution of species;

– assessment of the current state of the populations of all representatives of the herpetofauna (but, above all, the species included in the Red Book of the city of Sevastopol (2018));

– development of measures for their protection based on data on their biology, area of distribution in the region and representation in specially protected natural territories (SPNT).

Physical and geographical characteristics of the study area

Sevastopol occupies the extreme southwestern part of the Crimean Peninsula, bordering the Bakhchysarai District in the north and east, and the Yalta urban territory of the Republic of Crimea in the extreme southeast. In the south and west the region is bordered by the Black Sea. The length of the land border of Sevastopol is 106 km, and the sea border is 152 km. The territory of the city covers an area of 1079.6 km^2, including 216 km^2 of marine water area. Its extreme points: in the west, is Cape Khersones (N 44.58°, E 33.38°), in the north, Cape Lukull (N 44.82°, E 33.58°), in the south, Cape Sarych, also the most southerly point of Crimea as a whole (N 44.39°, E 33.74°), in the east, Mount Morcheka in the Ai-Petri upland (N 44.42°, E 33.90°). Urban areas are mainly on the Gerakleyiskyi Peninsula, bounded by Sevastopol Bay in the north, Balaklava Bay in the southeast and the eastern edge of the Sapun-gora Plateau in the east. The satellite town of Inkerman is located near the top of Sevastopol Bay, at the mouth of the Chernaya River, and the town of Balaklava is located on the shores of the Balaklava Bay.

The region that is the focus of our study lies entirely within the boundaries of the physical-geographical province of the Crimean Mountains and is characterized by a large variety of geomorphological, hydrographic, and climatic conditions (Atlas, 2003; Yena et al., 2004; Podgorodetskii, 1988). This territory has areas of plains and variously dissected mountainous terrain. All three ridges of the Crimean mountains originate here. The main ridge begins with the heights of Kaya-Bash, west of Balaklava Bay. The Inner and External Piedmont Ranges run, respectively, from the Inkerman heights (exposing Cretaceous and Paleogene beds,

including marls and nummulite limestones) and from the area of Cape Fiolent at the southern tip of the Gerakleyiskyi Peninsula (where Miocene (Upper Sarmatian) limestones overlie Jurassic volcanic rocks) (Krym…, 1969; Muratov, 1973; Yudin, 2009). The highest part of the Inner Piedmont Ridge corresponds to the highlands of the Mekenzievy Gory, the Kara-Koba and Shuldan-Burun Cuesta Ridges (up to 538 m above sea level). The External Piedmont Ridge reaches maximum elevations on the Mount Sapun-gora (231 m above sea level) and the Kara-Tau elevation above the right bank of the Belbek River (167 m above sea level). The Main Range is composed of rocks of Mesozoic age (mainly flysch of the Tauric Group, Upper Jurassic massive and bedded limestones and conglomerates, partly Jurassic magmatic rocks) and begins in the Balaklava upland, continuing in the eastern and southeastern directions up to the Ai-Petri upland, the southern cliffs of which form the natural southern border of the region. The elevation of the terrain rises to the south and east; maximum elevations barely exceed 1000 m above sea level: Chuvash-Koy – 1051 m, Tash-Bair – 1012 m. Extensive erosional-tectonic hollows with a low mountainous relief on the Lower Cretaceous clays (Baydarskaya, Varnutskaya, and Uzundzhinskaya) are recognized within the Main Range. The plain on the northwestern coast of Sevastopol is composed of Pliocene sediments: continental loams, sandstones and gravels of the Piedmont base.

The climate of most of the region is Sub-Mediterranean, dry, moderately hot with very mild winters (Atlas, 2003; Podgorodetskii, 1988; Ved', 2000). According to V. Köppen's updated classification of climate types, the southwestern Crimea is characterized by Cfa climate, that is warm temperate climate, fully humid, with hot summers (Köppen, 1938; Peel et al., 2007). On the Gerakleyiskyi Peninsula, the average perennial air temperature is 12–13 °C; the coldest month is February (2.6 °C), the warmest is July (22.4 °C). On the Southern coast between Aya and Sarych capes (Laspi Bay), the climate is nearly subtropical: average January temperature is about 5 °C; mean annual temperature is about 14 °C. The climate of the Baydarskaya Valley is montane, semiarid, warm with very mild winters; the average temperature of the coldest winter month is about 0.8–1.5 °C, the hottest is 20–21 °C, and the average annual temperature is about 10 °C. The climate of the highlands (Yayla) is humid, cool with moderately cold winters: average January temperatures are negative (to −2 °C), average July temperatures are about 17–18 °C, and the average annual temperature is 6–7 °C.

In general, the Sevastopol Region is characterized by a Mediterranean type of annual precipitation with the maximum in the autumn-winter period (Atlas, 2003; Ved', 2000). Precipitation is distributed unevenly across the region: 330–350 mm / year falls on the northwest coast, 450–500 mm/year in the foothills and on the Southern coast, and 500–1000 mm/year in the Main Range. The annual precipitation is everywhere below the total annual evaporation.

The region is relatively rich in surface and karst waters (Podgorodetskii, 1988). The Chernaya River Basin, the second largest of the Crimean rivers (with a length of slightly more than 40 km and a catchment area of 436 km^2), is almost entirely located within Sevastopol. Belbek River (the most water-rich in Crimea) flows over a fairly long stretch of foothills. To the north there are the lower sections of the valleys of the Kacha and (partly) Alma rivers, also originating on the northwestern slope of the Main Range and occupying, respectively, the places with the fourth and fifth highest water abundance in Crimea.

The climatic zonal conditions of southwestern Crimea (its position in the temperate zone on the border with the subtropical with a deficit of precipitation and high evaporation), along with geomorphological features (relatively low mountains, significant extension of the southwest corner of the Crimean Peninsula to the sea), determine dominance in the region of Subboreal southern semi-humid and semiarid landscapes (Bokov, 1999, 2004; Lychak, 1999). Some sections of the Southern coast can be attributed to the Mediterranean type of Subboreal southern semiarid forest-steppe landscape. Subboreal typical humid landscapes dominate at the highest peaks of the northwestern spurs of the Ai-Petri Yayla. Boreal humid landscapes characteristic of the high sections of the western yaylas (in particular, the central and eastern parts of the Ai-Petri) are virtually unrepresented in the Sevastopol Region.

At least 1400 species of higher vascular plants grow on the territory of Sevastopol (Seregin, 2008). The core of the regional flora forms an Ancient-Mediterranean geographical element (Garkusha et al., 2012). According to the botanical and geographical classification, the territory of Mountainous Crimea as a whole belongs to the Crimean-Novorossiysk province of the Euxine Subregion of the Mediterranean Region of the Palearctic (Didukh, 1992). According to Didukh's (1992) scheme of botanical-geographical zoning, southwestern Crimea, up to the mouth of the Alma River in the north, is assigned mainly to the Sevastopol and, in part, to the Bakhchysarai-Yalta geobotanical subregions of the Mountainous Crimean Region. The distribution of vegetation types in the region as a whole retains a belt character, but, in comparison with the central part of the Crimean Mountains, the vertical zonation is not so well pronounced. The vegetation cover is dominated by low-stemmed forests and shiblyaks of Oriental hornbeam (*Carpinus orientalis* Miller), downy oak (*Quercus pubescens* Willdenow) and sessile oak (*Q. petraea* (Mattuschka) Lieblein) in combination with steppes, savannoids and oreo-xerophytes (phryganoids, tomillars, and

tragacanthians). Forests with dominance of common hornbeam (*Carpinus betulus* Linnaeus), sessile oak, common ash (*Fraxinus excelsior* Linnaeus) and undergrowth, mainly formed by dogwood (*Cornus mas* Linnaeus) and smoke bush (*Cotinus coggygria* Scopoli) are confined to elevated areas. For the foothills, eastern prickly juniper (*Juniperus deltoides* Adams) woodlands are typical. European beech (*Fagus sylvatica* Linnaeus) and black pine (*Pinus nigra* subspecies *pallasiana* (Lambert) Hombloe) are relatively common, both on the northern and southern macroslopes, but they do not form large groups anywhere. A characteristic feature of the Sevastopol Region is the wide distribution of various variants of forests and woodlands with dominance or co-dominance of Greek juniper (*Juniperus excelsa* Marschall von Bieberstein). Large populations of Turkish pine (*Pinus brutia* Tenore), wild pistachio tree (*Pistacia mutica* Fischer and Meyer) and Greek strawberry tree (*Arbutus andrachne* Linnaeus) are also typical for the region, forming distinctive polydominant associations resembling Mediterranean maquis in some areas near Cape Aya (Yena, 1986; Yena and Yena, 1991). The types of vegetation characteristic of the Crimean Yayla (mountain meadow steppes) are relatively poorly represented in Sevastopol, due to the relatively low height of the mountains and the narrowness of the mountain plateaus. In the coastal strip between the Kacha and Alma rivers, small areas of true feather grass, fescues and grass steppes are preserved (Atlas, 2003). In general, the vegetation of the region is very patchy. To a certain extent, some plant species act as indicators of specific soil and (or) mesoclimatic conditions: strawberry tree, pistachios, butcher's-broom (*Ruscus aculeatus* Linnaeus), Crimean rockrose (*Cistus tauricus* Presl), goat's-thorn (*Astragalus arnacantha* Marschall von Bieberstein) and others (Yena and Yena, 1991; Firsov, 1990).

Southwest Taurica is known as one of the most significant centers of ancient Greek colonization in the Northern Black Sea region (Zubar', 1993). Anthropogenic impacts on the natural associations of the region have been significant since at least the 5th century BC. As early as the 4th–3rd centuries BC, the entire territory of the Gerakleyiskyi Peninsula, where such a large city (polis) as Khersonesos of Taurida had previously arisen, was completely assigned to farms and vineyards (Nikolaenko, 1999). In late antiquity and the early Middle Ages, large agricultural complexes were located in the area of Laspi Bay, Cape Sarych and other places (Firsov, 1990). In the epoch of late antiquity and in the Middle Ages, the region was consistently in the sphere of influence of the economies of the Roman, Byzantine and Trapezund Empires, the Principality of Theodoro, the Republic of Genoa and the Gothia Maritima, and the Ottoman Empire. After the entry of Crimea into the Russian Empire and the founding of the military port of Akhtiar (afterwards Sevastopol), the scale of the impact on the natural complex of the region reached a distinct new level. At present, the anthropogenic transformation of landscapes is most pronounced on the Gerakleyiskyi Peninsula and in the foothills, in river valleys and in areas with flat terrain, which were almost completely developed in the 20th century for orchards, vineyards, and cereal crops (Atlas, 2003). In the historical past, most of the region was covered in forest; the surroundings of Balaklava remained forested until the 17th century (Kadeev, 1970). As a result of intensive economic impact, the vegetation of the foothills and many sections of the Main Range eventually acquired a forest-steppe or even steppe character, large-trunked oak and juniper-oak forests in most of the territory were replaced by shiblyaks and phryganoid vegetation; xerophytization of landscapes was sharply marked (Cordova, 2007). Sparse shrub associations with dominance of Jerusalem thorn (*Paliurus spina-christi* Miller), yellow jasmine (*Jasminum fruticans* Linnaeus) or Chinese boxthorn (*Lycium barbarum* Linnaeus) occupy large areas in many places. At the same time, the state of vegetation in the middle mountain belt of the Main Range (above 600 m above sea level) in the modern period can be described as close to natural.

History of the study of the herpetofauna of the Sevastopol Region

The history of the study of the herpetofauna of the Crimean Peninsula and, in particular, the territory on which the city of Sevastopol was founded in 1783, dates back at least 235 years, to the studies of Karl-Ludwig Gablitz (1785) and Peter Simon Pallas (1793, 1794) (Pallas, 1999, 1831), who became pioneers of science in Crimea after its entry into the Russian Empire. The first mention of a reptile in Crimea is of "a small motley lizard (*Lacerta agilis* var.)", that "lives between stones on the highest coastal mountains, in the vicinity of Balaklava" (probably Lindholm's rock lizard, *Darevskia lindholmi* (Shcherbak, 1962)) (Gablitz, 1785, p. 195). Pallas described a new species of snake *Coluber ponticus* (now a synonym of the dice snake, *Natrix tessellata* (Laurenti, 1768)) from Sevastopol Bay and the estuary of the Biyuk-Ozen River (= Chernaya) "In porto Sevastopolitano et in sinubus Ponti Tauricam Chersonesum alluentis, etiain in sinubus profundioribus rivi Bijuk-osen, frequencies, aquis innatans, in terram raro exiens" (Pallas, 1831, p. 38). Karl Friedrich Kessler (1861), who visited Sevastopol in late August 1858 left extremely valuable evidence of the abundance in the estuary and reed floodplains at the mouth of the Chernaya River of the European pond turtle (*Emys orbicularis* (Linnaeus, 1758)) and two species of grass snakes (*N. tessellata* and *Natrix natrix* (Linnaeus, 1758)): "This place serves as a den for many turtles and snakes that hunt actively for frogs and fish. Turtles adhere more to the shore, where they are piled on humps and bask in the sun;

the snakes swim far into the bay itself and constantly expose their black (*Tropidonotus hydrus*) or yellow-striped (*Tropidonotus natrix*) heads from the water..." (Kessler, 1861, p. 176). He also pointed to the habitat "on dry, stony hills, in the vicinity of Sevastopol ..." of the "Tauric" lizard (Balkan wall lizard) *Podacris tauricus* (Pallas, 1814) (p. 177) and "*Lacerta muralis* Merr." (= *Da. lindholmi*) in the St. George Monastery area near Cape Fiolent (Kessler, 1861, p. 187).

Some information on findings of certain reptile species within the current territory of Sevastopol, including the Eurasian glass lizard *Pseudopus apodus* (Pallas, 1775), Caspian whipsnake *Dolichophis caspius* (Gmelin, 1789), and leopard snake *Zamenis situla* (Linnaeus, 1758) can be found in publications of other famous researchers of the 19th and early 20th centuries: M.G. Rathke, A.V. von Nordmann, Ya.V. Bedryaga, N.M. , A.M. Nikolsky and A.A. Brauner (Brauner, 1903, 1905; Nikolsky, 1891, 1905).Thus, by the beginning of the 20th century, the species composition of the herpetofauna of the extreme southwest of Crimea has been generally established, even including such rare and minor species in the region's fauna as the sand lizard (*Lacerta agilis* Linnaeus, 1758), the smooth snake (*Coronella austriaca* Laurenti, 1768) and the blotched snake, or Sarmatian ratsnake (*Elaphne sauromates* (Pallas, 1814)) discovered by A.A. Brauner in the Baydarskaya Valley up to 1906, inclusive (Dotsenko, 2003; Kalyabina-Hauf et al., 2004).

It is even more surprising that one of the most characteristic reptile species for Sevastopol is the Crimean thin-toed gecko (Danilewski's gecko) *Mediodactylus danilewskii* (Strauch, 1887) (Kukushkin, 2004a), found by A.A. Kushakevich in Crimea as early as 1863 (Nikolsky, 1891; Strauch, 1887), was not recorded by herpetologists until the middle of the 20th century, although, based on reports from other zoologists, its habitats were assumed to be around Balaklava (Puzanov, 1929) and the area of Laspi Bay (Tarashchuk, 1959). The first completely reliable information about this lizard in the territory of Sevastopol (in the ruins of the ancient town of Khersonesos settlement and on the buildings in Batiliman) was only received in 1958 (Shcherbak, 1960, 1966). Later, in the period from 1975 to 1986, N.N. Shcherbak undertook repeated counts of the gecko in Khersonesos (Shcherbak, 1988), and in 1971–1976, interesting long-term observations on the population of the Crimean gecko in Khersonesos were carried out by the Nikitsky Botanical Garden zoologist S.A. Sharygin, during his studies at N.I. Lobachevsky State University at Gorky, in the process of preparing the thesis "Ecology of the Crimean gecko *Gymnodactylus kotschyi* Str." (Sharygin, 1977, 1980, 1984). In 1979, A.V. Yena first discovered a place in Batiliman used for many years for communal egg clutches by geckos (Sharygin, 1983). In the early 1980s, when conducting an inventory of the fauna of Cape Aya preceding the creation of the state landscape sanctuary of the same name, Danilewski's gecko and blotched snake were first recorded there, in the natural biotopes of the Ayazma locality and in the adjacent territories (Molchanov et al., 1984). N.N. Shcherbak's and S.A. Sharygin's data on the distribution of amphibians and reptiles in Southern Crimea were summarized in a publication on the problems of protecting herpetofauna in the reserves of Ukraine and Crimea, which was very relevant at that time (Kotenko, 1987).

The monograph "Herpetologia Taurica" (Shcherbak, 1966), which still retains its value as a baseline study of the amphibians and reptiles of the Crimea, and contains all the data known at that time on the herpetofauna of Sevastopol. Note that N.N. Shcherbak cited the steppe viper, *Vipera renardi* (Christoph, 1861) for Sevastopol, both "according to literary data and other information" (from the vicinity of the Kacha settlement), and "according to collection materials" (for the region of the town of Inkerman, judging by the position of the point on the map) (Shcherbak, 1966, p. 215, textfig. 72). We were unable to establish a location for the collection specimens (if there are any) of *V. renardi* from the territory of Sevastopol, and this indication is currently considered to be a historical record (unconfirmed for the past 25 years) (Karmyshev, 1999; Mizsei et al., 2018). The few records of the steppe viper in the 1990s are located in the Bakhchysarai District, near the border with Sevastopol (Kukushkin, 2004b, 2009b).

In the 1990s and early 2000s Sevastopol served as a base for the research of the bathrachologist S.N. Litvinchuk (St. Petersburg) and herpetologist Yu.V. Karmyshev (Melitopol). The former made observations of Karelin's newt *Triturus karelinii* (Strauch, 1870) (Litvinchuk and Borkin, 2009), green toad (*Bufotes viridis* (Laurenti, 1768)) (Borkin et al., 2007; Litvinchuk et al., 2006) and Eastern tree frog (*Hyla orientalis* Bedriaga, 1890) (Stöck et al., 2012), while the latter collected valuable information on the population density and reproductive biology of the Eurasian glass lizard and blotched snake in the Mekenzievskoe forestry in the vicinity of Inkerman, and made interesting records of the leopard snake in the foothills (Karmishev, 1999; Karmyshev, 2001a, 2001b; Kukushkin and Karmyshev, 2002, 2008; Kukushkin and et al., 2013).

The prominent Ukrainian herpetologist Tatyana Ivanovna Kotenko (Kiev), who mainly studied the herpetofauna of the Steppe Crimea, searched for the steppe-runner *Eremias arguta* (Pallas, 1773), on the northern coast of Sevastopol (within the Nakhimov administrative district) in 2002, but without success. It should be noted that this lizard (as "*Eremias variabilis* Pall.") was indicated for Sevastopol only by a Moscow zoologist N.M. Kulagin (1890, p. 39). It was not recorded here subsequently, and at present it is

difficult to imagine where it might occur, since its typical habitats are absent in southwestern Crimea (at least, at present). Probably, there was a misunderstanding (for example, due to confusion with the Balkan wall lizard, or alternatively a population of *E. arguta* has long since disappeared due to the anthropogenic transformation of coastal landscapes. At present, the closest point to Sevastopol where this lizard is found is a sandy spit of Lake Bogayly located at the head of Kalamitsky Bay within the boundaries of the Saky District (Kotenko, 2002; pers. data). T.I. Kotenko also summarized some data on the European pond turtle in Sevastopol (Kotenko, 2004). We note that a significant proportion of the data obtained from the territory of Sevastopol was processed and taken into account by T.I. Kotenko and O.V. Kukushkin during the preparation of the third edition of the Red Book of Ukraine (Chervona kniga Ukrainy, 2009).

Throughout the 2000s, as well as in 2013, expeditionary investigations were carried out in Sevastopol by the Kiev batrachologist Yevgeny Pysanets (with the participation of Yu.V. Karmyshev, G.I. Mikitinets, O.N. Manuilova and O.V. Kukushkin). We especially note the interesting record of Karelin's newt by G.I. Mikitinets in the Belbek River Valley (Pysanets and Kukushkin, 2016; Suryadna and Pysanets, 2010).

In the period from 1996 to the present, systematic work on the study of all species of amphibian and reptile fauna of Sevastopol was carried out by the first author of this publication (O.V. Kukushkin). The most scientifically and environmentally significant data blocks have been obtained for the three most restricted species of herpetofauna: Danilewski's gecko (Bertrand et al., 2013; Kukushkin, 2004a, 2005a, 2005b, 2005c, 2005d, 2005f, 2006a, 2007, 2009a; Kukushkin and Sharygin, 2005) and –with the active participation of A.G. Trofimov – the leopard snake (Kukushkin, 2006b, 2008; Kukushkin and Tsvelykh, 2004; Kuzmin and Kukushkin, 2012) and Karelin's newt (Kukushkin and Kushchan, 2015; Kukushkin et al., 2016; pers. data). The distribution and individual aspects of the biology of true lizards (Lacertidae) were studied with the participation of E.Yu. Sviridenko (Kukushkin and Sviridenko, 2002; Sviridenko and Kukushkin, 2005) and I.V. Doronin (Doronin, 2012; Doronin et al., 2013; Kukushkin and Doronin, 2013). Data on the records of amphibians and reptiles in the karst cavities of the Mountainous Crimea were accumulated with the leading participation of I.S. Turbanov, a native of Sevastopol (Turbanov et al., 2019).

We used the data on the herpetofauna of the region in an extremely generalized form, as of 2016, when preparing the entries for the Red Book of Sevastopol (Krasnaya kniga..., 2018). Over the past decade, much attention has been paid to the study of the genetic structure and the establishment of relationship connections between populations of amphibians and reptiles of southwestern Crimea using molecular methods (Fritz et al., 2009; Jablonski et al., 2019a, 2019b; Jandzik et al., 2018; Kotsakiozi et al., 2018; Kukushkin et al., 2017b, 2018; Psonis et al., 2017, 2018; unpublished data by O.V. Kukushkin and O.A. Ermakov).

In general, three main stages can be recognized in the history of the study of the herpetofauna of Sevastopol: 1 – establishing the species composition (from the end of the 18th century to the middle of the 20th century), 2 – studying the main patterns of distribution and obtaining a general plan of information on the biology of species (from the middle of 20th century to before the beginning of the XXI century), 3 – the study of the details of the distribution and individual aspects of the biology of species, obtaining accurate information about the density of populations, the study of their genetic structure (from the beginning of the 21st century to the present).

Materials and methods

This report is based on the results of many years of research O.V. Kukushkin, A.G. Trofimov and I.S. Turbanov (1993–2019) and the analysis of literature data for the previous period. During a quarter-century of research, we observed in Sevastopol: several individuals (up to 10) of *C. austriaca*, up to 30 individuals (in each case) of *Elaphe sauromates* and *Natrix tessellata*, about 100 individuals (in each case) of *Lacerta agilis tauridica* and *Z. situla*, several hundred individuals (up to 250 in each case) of *T. karelinii*, *H. orientalis*, *Ps. apodus* and *Do. caspius* and, finally, several thousand individuals (at least 2000) of *M. danilewskii*. Some data on rare species of herpetofauna from the earlier period starting from 1989 were also used. In late April–early July 2018, commissioned by the General Directorate of Natural Resources and Ecology of the city of Sevastopol (Sevprirodnadzor) within the framework of preparation of the Final Report "On monitoring of the current status of wildlife objects listed in the Red Book of the city of Sevastopol, including monitoring of their habitats" (state contract dated 26.03.2018, No. 06/18), large-scale expeditionary work was carried out throughout the Sevastopol Region. The total length of the examined routes for the studied period amounted to 733 km (including about 5 km of coastal lines of inland water bodies were examined); 222 records of amphibians and reptiles of the Red Book of Sevastopol were registered. Each of the species was searched for deliberately, taking into account the experience of previous years. The exact location for each animal was recorded, indicating the geographical coordinates, in the WGS-84 system and applied to an electronic map of 1:200 000 scale, and the outlines of everyday routes were displayed. It was the first time that such a significant amount of targeted

data on amphibians and reptiles was collected in Sevastopol. A systematic survey of the region and the adjacent territories of the Republic of Crimea continued in October 2018 and March–June 2019, and in this case, when choosing expedition routes, the emphasis was on the least explored sections of the territory of Sevastopol. The total length of hiking trails during 2018 and 2019 amounted to about 1100 km.

In addition, when studying the distribution of species in the region, the catalogs of the main herpetological collections of Ukraine and Russia were used: published (Dotsenko, 2003; Pysanets, 2003; Pysanets et al., 2005; Suryadna and Pysanets, 2010; Vedmederya et al., 2007; Zinenko and Goncharenko, 2011) or kindly provided by us by the staff of these and other institutions (Zoological Museum of the National Museum of National History, National Academy of Sciences of Ukraine, Kiev; Zoological Museum of Moscow State University, Moscow; Zoological Institute of the Russian Academy of Sciences, Saint-Petersburg).

The taxonomic position of amphibians and reptiles is given, respectively, according to the databases of D. Frost (2018) and P. Uetz et al. (2018), as of April 22, 2019).

In establishing the chorotypes of amphibian and reptile species, the classification of A. Vigna Taglianti et al. (1999), developed primarily for the Middle East region, was used. In this case, the opinion of several other researchers was taken into account (Arslan et al., 2018; Eksilmez et al., 2017; Eser and Erismis, 2014; Jablonski et al., 2012; Petrov, 2007; Sindaco et al., 2000) and current views on the taxonomy and scope of taxa. Information on the sorting of species into zoogeographic groups is given based on materials for the Caucasus Isthmus and the southeast of the Balkan Peninsula (Mazanaeva and Tuniyev, 2011; Pulev, 2016).

In developing the scheme of herpetogeographic zonation of the Sevastopol Region and the categories of taxon abundance, the experience of other researchers was taken into account (Materialy k kadastru..., 2002; Duysebaeva, 2012; Kostin et al., 1999; Mazanaeva and Askenderov, 2014; Zinenko et al., 2014). We used a 5-point assessment of the abundance of a taxon: 0 – absent species (not detected in long-term studies); 1 – very rare species, known from individual finds; 2 –r are species (sporadically distributed species with a relatively high population density or widespread with a stably low density); 3 – common species (widespread species with a heterogeneous, but usually high population density); 4 – numerous species (almost ubiquitous, with a high population density). In addition, we used two more categories that are similar to the categories “1” and “0”: (?) – “controversial” (or “doubtful”) species (not detected during special searches, but their presence in the research area seems likely); (†) – supposedly extinct species: no records for at least 25 years, although they had previously been confirmed, or were indicated for a specific site by other specialists (the latter implies some probability of an erroneous identification).

When compiling a short version of the species distribution cadastre, we used the interactive map www.wikimapia.org and the public Internet resource “Google Earth” (https://earth.google.com). GPS-navigator Garmin 64 and multifunction navigation application Locus Map, version 3.35.2 (http://www.locusmap.eu) installed on a telephone were used to determine geographical coordinates and route tracking. The creation of contours of herpetogeographic areas of Sevastopol, their mapping and the calculation of the areas was carried out using the NextGIG QGIS version 19.2.0 software (http://nextgis.ru/nextgisqgis/). The total area of Sevastopol’s land territory, according to our data, amounted to 866.003 km^2 – against 863.6 km^2, according to the cadastral data. The discrepancy of 2.4 km^2 (which we consider insignificant) arose due to some ambiguities regarding the location of the southeastern border of the city, running along the southern cliffs of the Ai-Petri Yayla.

Categories of threat of extinction status, according to the standards of the International Union for Conservation of Nature (IUCN) and categories of the rarity status of species of amphibians and reptiles on the List of Fauna Recommended for Inclusion in the Red Book of the Russian Federation, are given according to Ilyashenko et al. (2018). Information on the global status of the taxon was obtained from the IUCN database (http://iucn.info/species2text.html), and in Europe, from published materials (Cox and Temple, 2009; Temple and Cox, 2009). For species living in the territory of Sevastopol, the categories of regional status were determined with IUCN guidance (2012) and than checked and corrected using an electronic tool developed in the Laboratory of Biodiversity Conservation and the Use of Biological Resources of the A.N. Severtsov Institute of Ecology and Evolution of the Russian Academy of Sciences (http://iucn.info/index_rl.html). The following criteria for the IUCN status categories were found to be applicable to the situation in the region: NE – Not Evaluated, LC – Least Concern; NT – Nearly Threatened; VU – Vulnerable; EN – Endangered; CR – Critically Endangered; RE – Regionally Extinct (IUCN, 2012).

The size of protected areas (SNPT) (values are rounded to the nearest integer) is given according to the Decrees of the Government of Sevastopol No. 56-PP dated 01.02.2018 “On Amending the Decree of the Government of Sevastopol “On Approving the List of Specially Protected Natural Territories of Regional Importance Located in the city of Sevastopol No. 417-PP dated May 25, 2015” and No. 66-PP dated February 8, 2018 “On the Establishment of the “Laspi” state nature landscape sanctuary of regional importance”. The boundaries of protected areas were

specified using the descriptions and cartographic material of the cadastral survey of the SPNT on the official website of "Sevprirodnadzor" (http://ecosev.ru/deyatelnost/osobo-okhranyaemye-prirodnye-territorii-sevastopolya/330-kadastry-sevastopolya).

When compiling the basic version of the distribution cadastre, we used data on 445 localities of amphibian and reptile species listed in the Sevastopol Red Book, information about which was collected by the authors until 2018, or obtained from literature sources: Karelin's newt (*T. karelinii*) – 40 sites, Eastern tree frog – 50 sites, European pond turtle – 15 sites, Danilewski's gecko – 40 sites, Eurasian glass lizard – 60 sites, Taurida's sand lizard (*Lacerta agilis tauridica* Suchow, 1926) – 15 sites, smooth snake – 9 sites, Caspian whipsnake – 100 sites, blotched snake – 26 sites, leopard snake – 66 sites, dice snake – 20 sites, steppe viper – 4 sites. In this case, not only records on the territory of Sevastopol, but also near its borders, in the territory of the Republic of Crimea, were taken into account.

The number of localities established during the expedition seasons of 2018 and the beginning of 2019 was 130 (partly they were completely new and significantly refined our knowledge about the distribution of species): *T. karelinii* –18 (about 150 adult individuals were observed and locally a large number of larvae), *H. orientalis* – 15 (12 individuals and a large number of larvae), *Em. orbicularis* – 4 (10 individuals), *M. danilewskii* – 20 (about 50 individuals), *Ps. apodus* – 40 (about 100 individuals, of which 5 were dead), *L. agilis tauridica* – 6 (15 individuals), *C. austriaca* – 1 (1 individual), *Do. caspius* – 13 (20 individuals, of which 4 were dead), *El. sauromates* – 3 (3 individuals), *Z. situla* – 4 (4 individuals, of which 1 died), *N. tessellata* – 3 (6 individuals). *V. renardi* was not found during the research.

In the framework of this work, we are not able to list all the localities even for rare representatives of the herpetofauna of the region, therefore, the generalized version of cadastre includes only 360 localities for 14 taxa (including *Pelophylax ridibundus* s. str. and *Da. lindholmi*): 86 sites for amphibians and 274 for reptiles (see Appendix). Such a number of sites was obtained by combining closely located localities (taking into account the geomorphology of the region), which is quite valid with a high density of records or a relatively uniform distribution of the species in studied areas. Moreover, due to objective difficulties of control over observance of nature protection legislation in the region and the long delays in preparing a new edition of the Red Book of the Russian Federation, which should include species living in Crimea (Iljashenko et al., 2018), the open access publication of exact sites for records of rare species indicating their precise coordinates is undesirable.

Results and discussion

Zoogeographic analysis of the herpetofauna of Sevastopol

According to the general biogeographical division of the Palearctic, the Crimean Peninsula is at the junction of two regions, the European nemoral (forested) and Scythian steppe regions, the border between which runs along the northern base of the Crimean mountains (Emelyanov, 1974). Respectively, the mountainous-forest Crimea belongs to the Euxinous mountain subregion, and the steppe Crimea belongs to the Western Black Sea lowland subregion. The structure of the Hesperian (Mediterranean-Macaronesian) evergreen subtropical region, according to this scheme, includes only the southwestern section of the Black Sea region (northwestern Anatolia, southeastern Balkans).

At the same time, according to herpetogeographic data, the entire territory of Crimea can be assigned to the Arid Mediterranean-Central Asian Subregion of the Palearctic. Moreover, the Mountainous Crimea belongs entirely to the Euxinian area of the Eastern-Mediterranean (Ponto-Aegean) district of the Mediterranean Province (as a separate South Crimean plot), while the flat-steppe part of the peninsula belongs to the Azov-Black Sea area of the Pontic district of a separate Steppe Province (Shcherbak, 1982, 1984). Note that this view of the position of Crimea in the zoogeographic system of the Palearctic is largely based on the ideas of zoologists of the 19th and first half of the 20th centuries (Puzanov, 1949) and will, most likely, be revised taking into account modern ideas about the taxonomy of the species inhabiting Crimea and the genesis of the herpetofauna of the Northern Black Sea Region, which has already been done on the basis of a study of the avifauna of the Caucasus (Belik, 2013).

According to our data and published data, 17 taxa of herpetofauna have been recorded in the territory of Sevastopol: 4 amphibian species (Caudata – 1 species, Anura – 3 species) and 13 reptile species (Testudines – 1 species, Sauria – 5 species, Serpentes – 7 species) (Table 1). Hence, there are records from Sevastopol of 80% of the species of amphibians known from the Crimean Peninsula, and 93% of the Crimean reptiles – in total 90% of the entire herpetofauna of Crimea (Kotenko, 2010). Essentially, there are no records for only one species each of Crimean amphibians and reptiles: Pallas' spadefoot toad *Pelobates vespertinus* (Pallas, 1771) (Pysanets and Kukushkin, 2016) and the Western steppe-runner. Among the taxa of lower order (subspecies) living in Crimea, there are definitely no records of Eastern sand lizard *Lacerta agilis exigua* Eichwald, 1831.

Analysis of chorotypes shows that taxa associated by their origin with the Mediterranean prevail in the region (Table 1). It is noteworthy that in accordance with views

of some researchers (Puzanov, 1949; Tuniyev, 1995), we assign Transcaucasia entirely to the Mediterranean zoogeographic region. Crimean endemic forms should be attributed to the Mediterranean Region in the broad sense (Shcherbak, 1984).

There are 6 taxa with an Eastern-Mediterranean (in the broad sense) chorotype (35%), 3 with the Crimean mountainous (including *V. renardi puzanovi* Kukushkin, 2009 with the Southern-European chorotype) (18%), two with the Turano-Mediterranean (12%), and with Europeo-Mediterranean, Turano-European, Turano-Europeo-Mediterranean, Central-asiatic-Europeo-Mediterranean and European – 1 species each (35% in total). The ranges of species absent in Sevastopol mainly lie outside the Mediterranean: the Eastern-European chorotype for *Pelobates vespertinus*, the Siberio-European for *L. agilis exigua* and the Centralasiatic-European for *Eremias arguta* (for the western subspecies of the steppe-runner inhabiting Crimea, *Er. arguta deserti* (Gmelin, 1789) – Eastern European).

By number of species (nine in total, i.e., 53%), representatives of the Mediterranean (sensu lato) zoogeographic group dominate in the region (Mazanaeva and Tuniyev, 2011; Pulev, 2016) (Table 1). The European zoogeographic group includes five representatives of herpetofauna (29%). Three more taxa (18%) are considered by us as part of the endemic Crimean group: Lindholm's rock lizard, Taurida's sand lizard and Puzanov's steppe viper. The latter, in addition to the territory of Crimea, is known from several localities of Right-Bank Ukraine, however, its main range is located in Crimea, suggests that *V. renardi puzanovi* should be included as a Crimean endemic (as a subendemic form). Zoogeographic groups for species absent in Sevastopol: European (*Pelobates vespertinus*, *L. agilis exigua*) and Turanian (*Er. arguta*).

We attribute eight species (47%) to the Sub-Mediterranean faunistic association, two (12%) to the Mediterranean one (the Danilewski's gecko and the leopard snake), and seven (41%) to the nemoral faunistic complex.

The zoogeographic analysis presented here does not take into account some valuable conclusions of recent taxonomic studies and, of course, gives a simplified picture of the genetic relationships of the herpetofauna of Sevastopol and Crimea in general, together with the neighboring regions. Nevertheless, it allows us to demonstrate the high proportion of Mediterranean and the relatively high proportion of endemic elements in the fauna of the studied region. These features of the herpetofauna are due to both the climatic conditions of the current epoch (mild marine climate with features of the Sub-Mediterranean) and the history of formation of the biota of the Crimean Peninsula as a whole.

General characteristics of the distribution of amphibians and reptiles in the region

Not all representatives of the herpetofauna of Sevastopol are equally widespread. General data on the ranges of amphibians and reptiles in the Sevastopol Region are presented in Table 2 and Fig. 1.

From the data in Table 2, it follows that the ranges of a number of species belonging to the nemoral faunistic complex (Taurida's sand lizard, smooth snake, and especially the steppe viper) at present only narrowly enter the territory of Sevastopol. The population density of these species is low or very low. It is noteworthy that all species with narrow ranges in the region are thermo-tolerant mesophiles, inhabiting landscapes with quite severe winters. Thus, the steppe viper in Crimea does not extend beyond the region with the isotherm of the coldest month 1° C and is completely absent on the southern macroslope of the Crimean Mountains, while the smooth snake and Taurida's sand lizard are known from a very small number of localities on the southern macroslope of the Main Range and, as a rule, do not descend below 300–500 m above sea level (Kotenko and Kukushkin, 2008; Kotenko et al., 2008; Kukushkin, 2004b, 2005e, 2013).

At the same time, the majority of representatives of the regional herpetofauna can be found almost everywhere. Thermophilic and relatively xerophilous species of the Sub-Mediterranean and, in part, Mediterranean faunistic complexes (Karelin's newt, marsh frog, Eurasian glass lizard, Balkan wall lizard, Lindholm's rock lizard, blotched snake, and leopard snake) and some nemoral taxa, including Eastern tree frog, green toad, European pond turtle, and grass snake are widespread in the region, although the numbers of these species in various types of landscapes can vary significantly. A relatively small range in the region is characteristic of dice snake (Sub-Mediterranean faunistic complex), which, on the one hand, has been the cause of the disappearance of a number of coastal populations, and on the other, may be due to a lack of data on this species in the foothills.

The Danilewski's gecko, the most thermophilic reptile species of Crimea, belonging to the Mediterranean faunistic complex, has a limited range. According to available data, its distribution is limited by the isotherm of the coldest month 2° C. But, unlike the thermotolerant taxa with narrow ranges in Sevastopol mentioned above, the gecko population density is usually high, and in some localities very high (Kukushkin, 2004a, 2009a).

A peculiar feature of the regional herpetofauna is the wide distribution of the most thermophilic representatives of the herpetofauna, such as the Danilewski's gecko, Eurasian glass lizard, and leopard snake, in the foothills and low mountains areas of the Main Range (i. e. away from the Southern coast). The Danilewski's gecko in the foothills lives only on the Gerakleyiskyi

Table 1. List of amphibian and reptile species of Sevastopol with indication of their chorotypes. Subspecies are shown for the sand lizard, represented in Crimea by two subspecies, and Puzanov's steppe viper, a subendemic for the Crimean Peninsula.

no.	Taxon (species, subspecies)	Chorotype	Zoogeographic group/faunistic complex
1	Karelin's newt – *Triturus karelinii*	Eastern-Mediterranean	Mediterranean/Sub-Mediterranean
2	Eastern tree frog – *Hyla orientalis*	Europeo-Mediterranean	European/nemoral
3	Green toad – *Bufotes viridis*	Turano-European	European/nemoral
4	Marsh frog – *Pelophylax* (*ridibundus*) complex (*Pelophylax* cf. *bedriagae*)	Eastern-Mediterranean	Mediterranean/Sub-Mediterranean
5	European pond turtle – *Emys orbicularis*	Turano-Europeo-Mediterranean	European/nemoral
6	Danilewski's gecko – *Mediodactylus danilewskii*	Eastern-Mediterranean	Mediterranean/Mediterranean
7.	Eurasian glass lizard – *Pseudopus apodus*	Turano-Mediterranean	Mediterranean/Sub-Mediterranean
8	Lindholm's rock lizard – *Darevskia lindholmi*	Mountainous Crimean	Crimean endemic/Sub-Mediterranean
9	Taurida's sand lizard – *Lacerta agilis tauridica*	Mountainous Crimean	Crimean endemic/nemoral
10	Balkan wall lizard – *Podarcis tauricus*	Eastern-Mediterranean	Mediterranean/Sub-Mediterranean
11	Smooth snake – *Coronella austriaca*	European	European/nemoral
12	*Caspian whipsnake* – *Dolichophis caspius*	Eastern-Mediterranean	Mediterranean/Sub-Mediterranean
13	Blotched snake – *Elaphe sauromates*	Turano-Mediterranean	Mediterranean/Sub-Mediterranean
14	Leopard snake – *Zamenis situla*	Eastern-Mediterranean	Mediterranean/Mediterranean
15	Grass snake – *Natrix natrix*	Centralasiatic-Europeo-Mediterranean	European/nemoral
16	Dice snake – *Natrix tessellata*	Turano-Europeo-Mediterranean	Mediterranean/Sub-Mediterranean
17	Puzanov's steppe viper – *Vipera renardi puzanovi*	Southern-European (Crimean)	Crimean endemic/nemoral

Table 2. Features of amphibian and reptile spatial distribution in Sevastopol city territory. The maximum heights of the species records in the whole Crimea are indicated in parentheses (by: Turbanov et al., 2019).

Taxon	Altitude range, m above sea level	Summarized distribution of the species in the region
Triturus karelinii	1–950 (1200)	The Main Range, forested areas of the Belbek River valley in the foothills, locally on the Southern Coast; centers of populations – periodically drying up water bodies with no fish
Hyla orientalis	15–950 (1230)	Almost everywhere in the foothills, along the Main Range, on the Southern Coast; northern range boundary needs to be clarified
Bufotes viridis	0–980 (1460)	Everywhere, although the size of the Southern Coast population is subject to significant fluctuations; the species has a tendency to synanthropization
Pelophylax (*ridibundus*) complex	0–900 (1150)	Virtually ubiquitous in all types of water bodies, but mixed populations of *Pe.* cf. *bedriagae* and *Pe. ridibundus* s. str. are identified mainly in canyons and forested gorges in the upper part of the Chernaya River basin
Emys orbicularis	0–450 (800)	Foothills, low mountain areas of the Main Range: usually in large water bodies with reedbeds, less commonly in rivers and small lakes; in the bays of Sevastopol disappeared along with the last remains of floodplains
Mediodactylus danilewskii	0.5–680 (680)	Natural and synanthropic populations on the Southern Coast and in Balaklava, mainly synanthropic populations, on the Gerakleyiskyi Peninsula; the highest occurrence in the mountains is on the Ilyas-Kaya Massif above Cape Sarych and at the top of Cape Aya; species shows pronounced tendency to synanthropization
Pseudopus apodus	0–500 (700)	Sufficiently heated areas of the foothills, Southern Coast, low mountain areas of the Main Range; the highest occurrences are known north of the village of Peredovoe in the Baydarskaya Valley and Mount Kalafatlar north of Cape Aya
Lacerta agilis tauridica	270–1050 (1500)	The main ridge (mainly Yayla and yayla-like habitats); an isolated population lives at abnormally low altitudes in the southern part of the Baydarskaya Valley; very rarely in the foothills and in forested areas of the Inner Inter-ridge Depression
Darevskia lindholmi	0–1050 (1300)	Widespread in the mountainous part of the territory, however, in the most arid coastal areas of the northwestern part of the Gerakleyiskyi Peninsula it is absent; as well is on the northwestern coast and foothills; species shows moderate tendency to synanthropization
Podarcis tauricus	0.5–950 (1200)	Almost everywhere except for high-stemmed forests and Ai-Petri Yaila east of the Shaitan-Merdven Pass, on the northern coast occurs very rarely; higest sites are on Mount Chuvash-Koy on the eastern fringes of the Baydarskaya Valley
Coronella austriaca	50–950 (1200)	Ai-Petri Yayla and its northwestern spurs, extremely rarely occurs in the foothills (Inner Range and Inner Inter-ridge Depression) and Baydarskaya Valley
Dolichophis caspius	0–900 (1200)	Almost everywhere, but more often in xeromorphic biotopes

Taxon	Altitude range, m above sea level	Summarized distribution of the species in the region
Elaphe sauromates	50–500 (600)	The foothills, except for the western part of the Gerakleyiskyi Peninsula, the low mountains of the Main Range, very rarely found in the upper part of the southern macroslope
Zamenis situla	0.5–700 (750)	Southern Coast, warmest areas of the foothills and the Main Range, reaches the upper limit of distribution on the Ai-Petri Yayla west of the Shaitan-Merdven Pass; shows pronounced tendency to synanthropization
Natrix natrix	0–850 (1030)	Almost everywhere, but very rarely in the Yayla
Natrix tessellata	0–400 (750)	Large stocked reservoirs of the Chernaya River basin, canyon of the Chernaya River; rarely in the river valleys in the foothills; a few coastal populations remain in the extreme northwest of the Gerakleyiskyi Peninsula
Vipera renardi puzanovi	20–60 (1070)	Supposedly, plains with steppe vegetation in the extreme northern part of the territory (interfluve of Kacha and Alma rivers)

Peninsula, and passes to the northern macroslope of the Main Range only in its extreme southwest, in the immediate vicinity of Balaklava (Kukushkin, 2004a). Eurasian glass lizard is widespread in the Kacha River valley in the limits of the Bakhchysarai District and reaches the northern boundary of its range in the Alma River valley (Kukushkin, 2003a, 2003b; pers. data). The leopard snake, in the west of the region, reaches at least the Belbek River valley and is widespread not only in the cuesta foothills (almost to the southern outskirts of Bakhchysarai in the north), but also in low mountain areas of the Main Range (Baydarskaya Valley) (Kukushkin and Kotenko, 2003; Kukushkin and Tsvelykh, 2004). On the Southern coast, outside the territory of Sevastopol, and on the South-Eastern coast of Crimea, these reptile species live exclusively on the southern macroslope (in addition, the Eurasian glass lizard is not currently found east of the border of the Alushta and Sudak urban territories). The transition of Mediterranean species to the northern macroslope of the Crimean Mountains indirectly characterizes Sevastopol as a territory with a uniformly mild climate, which, in turn, depends on the geographical position and orographic features of the region.

In connection with the above, we note that representatives of the Mediterranean faunistic complex (gecko and leopard snake) are petrophiles confined to rock outcrops and cliffs, and in Sevastopol reach the upper limit of their distribution in Crimea and live here at higher altitudes than even in Bulgaria (Petrov, 2007) (Table 2). The maximum elevation for more eurytopic species of the Sub-Mediterranean and nemoral faunistic complexes are usually lower than the "common Crimean" ones, but this is determined not so much by the climatic features of the locality as its actual heights – significantly lower than in the central part of the Main Range (this is especially noticeable in amphibians and lacertids), orohydrographic features of the area (for Karelin's newt, Eurasian glass lizard, and dice snake) or, probably, lack of information (for blotched snake).

The number of geckos in the upper part of Cape Aya in the section from Mount Kalafatlar to Mount Kush-Kaya is quite high even at altitudes of 500–660 m above sea level and, in any case, not lower than the values of population density we recorded in the altitude range 200–250 m above sea level (for example, in the rocks under the cliffs of the western part of the Ai-Petri Yayla or in the Choban-Tash Rocks over Cape Sarych) (Kukushkin, 2004a, 2009a; Turbanov et al., 2019).

On the other hand, the most mesophilic and "cold-resistant" mountain forms (smooth snake, Taurida's sand lizard) are not limited in their distribution to the highest mountain peaks and in some areas have populations at atypically low altitudes (Fig. 1, Table 2), which can be due to local climate characteristics, the presence of a food base (for smooth snake, an important factor is a high density of Lindholm's rock lizard or sand lizard populations) and the history of the formation of their ranges. The availability of food resources is a determining factor for a number of species with wider ranges in Sevastopol. Thus, the range of the European pond turtle is currently due to the presence of deep reservoirs with a large water area, and the range of the dice snake due to the abundance of fish (the main component of its diet) (Kotenko and Kukushkin, 2003).

Thus, in the extreme southwest of Crimea, vertical zonality affects the spatial distribution of representatives of the herpetofauna only to a small

extent and, therefore, cannot serve as the basis for interpeting a spatial (landscape-zonal) distribution of amphibians and reptiles, and for zoning the region according to herpetological data, in contrast to mountainous areas, with a harsher climate (Epova et al., 2013; Mazanaeva and Askenderov, 2014; Vozniychuk and Kuranova, 2008).

The richness of the herpetofauna of the mountain-forest part of the territory of Sevastopol contrasts with the extreme poverty of the herpetofauna of the steppe and floodplain areas of the northern coast of the Sevastopol Region, which we have not seen anywhere else in Crimea. This feature is manifested both in the very small number of species identified here and in their extremely small populations. The main, but probably not the only reason for this unusual phenomenon is, presumably, the almost total reclamation of the southernmost part of the Crimean steppe. It is also possible to assume that the extinction of reptiles characteristic of the most part of the Crimean plain including Eastern sand lizard and the steppe viper was due to climatic changes, while most species of the Sub-Mediterranean faunistic complex have not yet managed to occupy the vacant space for reasons that include the predominance here of man-made landscapes. This possibility is supported by the existence of isolated, clearly relict populations of *L. agilis exigua*, *V. renardi*, and *El. sauromates* on the Western coast of Crimea in the area of Yevpatoriya, Saky and the village of Nikolaevka of the Simferopol District, the alleged extinction of the steppe viper during the 1970–1990s on the Tarkhankut Peninsula and in some other areas of the Northwestern Crimea, as well as records in the late 1980s and the probable subsequent disappearance of the Eastern sand lizard on the shores of Bogayly Lake in the Saky region (Kotenko, 2007; Kukushkin, 2004b, 2005e, 2009b; Sviridenko and Popov, 2007). Oddly enough, we were also unable to find the Eastern tree frog in this region, which in the east of Crimea enters the steppe foothills along river valleys, at least up to N 45°08′, and in arid areas with sparse tree-shrub vegetation (Pysanets and Kukushkin, 2016; pers. data) gravitates toward human settlements. One way or another, the paucity of the herpetofauna of the Kacha-Alma interfluve and the narrow strip of the coast can be with good reason considered as a characteristic feature of the nature of the Sevastopol Region.

The complex topography, the influence of slope effects, the extremely high landscape-biotopic diversity of the territory, along with its significant anthropogenic transformation, the continuity of transitions of vegetation types and the attraction of many species of amphibians and reptiles to landscape ecotones compel us to search for patterns that would reflect the existing patterns of spatial distribution of amphibians and reptiles as objectively as possible, while remaining simple and logical.

Herpetogeographic zonation of the territory of Sevastopol

Based on the existing landscape zoning schemes (Yena et al., 2004; Podgorodetsky, 1988), taking into account geomorphology, prevailing vegetation types, and the distinctive climate of various parts of Sevastopol, we developed a herpetogeographic zonation scheme for the region, considering both the species composition of amphibians and reptiles, and generalized indicators of their abundance in different biotopes. Both “positive” (presence of species populations, their high abundance) and “negative” characteristics (absence of species or their low abundance) were taken into account. Despite the obvious schematic nature, zoning based on herpetological data combines landscape-belt and azonal-regional elements of the justification of territorial divisions, reflects the objectively existing patterns of the biotopic distribution of amphibians and reptiles and allows us to assess the species richness of the herpetofauna of different parts of the territory of Sevastopol.

We recognize the following herpetogeographic areas (Fig. 2):

1 – Gerakleyiskyi, shiblyak (166.976 km^2). This includes a plateau of the Gerakleyiskyi Peninsula from Cape Khersones to Mount Sapun-gora, and the Fiolent landslide coast. The predominant type of vegetation is very dry shiblyak in combination with arid light forests, petrophytic steppes and phryganoid vegetation.

Features of herpetofauna. Characteristic species: *B. viridis*, *M. danilewskii* (sporadically distributed, only synanthropic and hemisynanthropic populations are known), *Ps. apodus*, *Po. tauricus*, *Do. caspius*, *Z. situla*. The “marine” populations of *N. tessellata* and *N. natrix* (and, in the recent past, *Em. orbicularis*) also make the region unusual. Note that, with the exception of *N. tessellata*, European representatives of the genus *Natrix* are extremely rare in coastal situations (Baker, 2015; Fuentes and Escoriza, 2015). *Da. lindholmi* has a limited distribution within the region, and gravitates to the steep Southern coast and central regions of the Gerakleyiskyi Peninsula, characterized by better humidification conditions in comparison with its northwestern parts. *T. karelinii, L. agilis, C. austriaca* are completely absent, and *El. sauromates*, and now also *Em. orbicularis* are absent or extremely rare over a large part of the territory.

2 – Belbeksko-Chernorechenskyi, forest-steppe (“foothill forest-steppe”) (277.628 km^2). This region is the largest. It includes the cuesta foothills with Kara-Tau heights and Mekenzievy Gory Hills, the External and separate sections of the Inner Inter-ridge depression, coastal areas between Belbek and Kacha, the lower part of the Chernaya River valley. Heights are below 550 m above sea level. The predominant type of vegetation is low-stemmed oak forests and their derivatives (Piedmont forest-steppe).

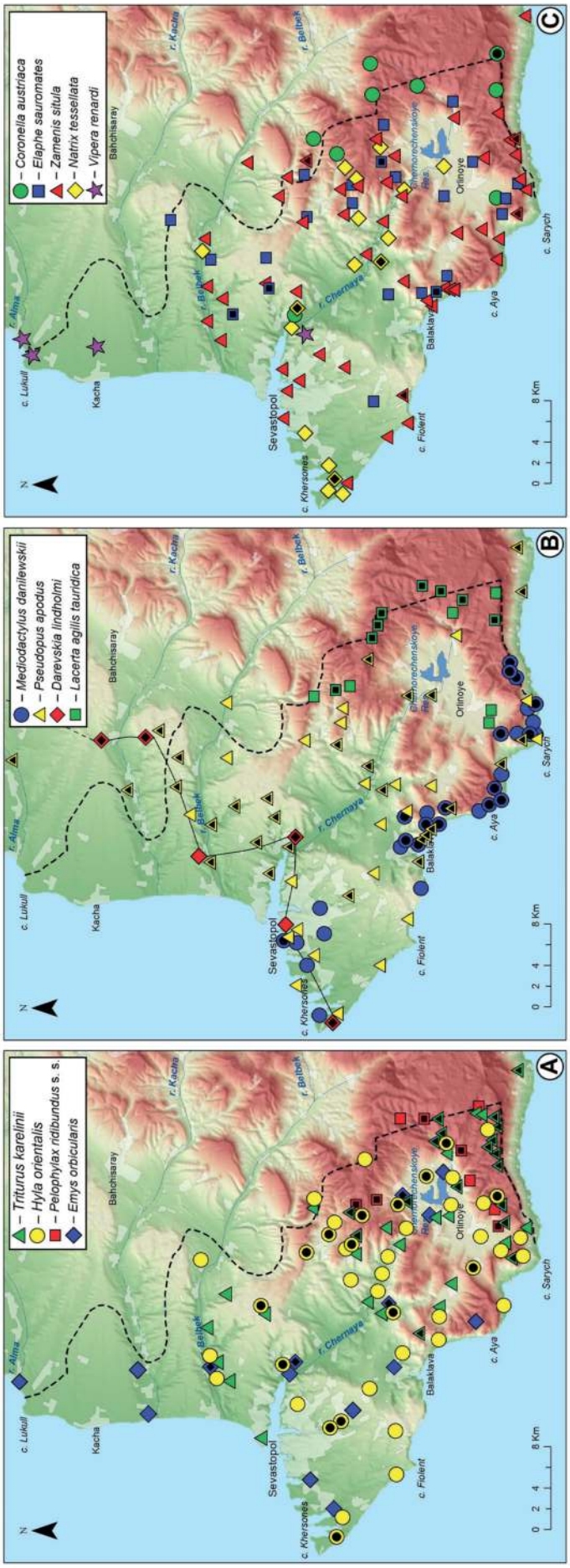

Fig. 1.Distribution of some amphibians and reptiles in Sevastopol and in adjacent territories of Republic of the Crimea: **A** – amphibians and turtles; **B** – lizards (only most western and northern points of the range are shown for *Darevskia lindholmi*); **C** – snakes. Icons with a filled center indicate the records confirmed in 2018 and/or 2019.

Features of herpetofauna. Characteristic species: *B. viridis*, *H. orientalis*, *Pe. (ridibundus)* complex, *Ps. apodus*, *Da. lindholmi*, *Po. tauricus*, *Do. caspius*, *El. sauromates*, *Z. situla*, *N. natrix*. There is no *M. danilewskii*, and *L. agilis* and *C. austriaca* are extremely rare (irregular encounters of single individuals of the latter); the abundance of *T. karelinii* is low.

3 – Verkhnechernorechenskyi, forest (265.3 km^2). This contains the southwestern section of the northern macroslope of the Main Range within the Baydarskaya, Varnutskaya and Uzundzhinskaya hollows with their mountainous surroundings, the Ai-Petri Yayla in the area west of the Shaitan-Merdven Pass, as well as the Inner Inter-ridge Depression in the area of the villages of Rodnoe and Chernorechye. Altitudes, as a rule, do not exceed 750 m above sea level. The predominant types of vegetation are forest-siblyak asociations, light juniper-oak forests and upland xerophytes.

Features of herpetofauna. Characteristic species: *T. karelinii*, *B. viridis*, *H. orientalis*, *Pe. (ridibundus)* complex[1], *Ps. apodus*, *Da. lindholmi*, *Po. tauricus*, *Do. caspius*, *El. sauromates*, *Z. situla*, and *N. tessellata*. The absence of *M. danilewskii*, the rarity of *L. agilis*, and especially *C. austriaca*, the sporadic distribution, and usually low abundance of *Ps. apodus* in the southeastern part of the district are characteristic. Compared to the previous region, the distribution of mesophilic forms (*T. karelinii, Em. orbicularis, N. tessellata*) is wider and their abundance is significantly higher, while populations of thermophiles such as *Ps. apodus* are more narrowly localized than in the foothill forest-steppe, and are confined to the warmest areas. *El. sauromates* is less common, while *Z. situla*, on the contrary, is found more often than in the Belbeksko-Chernorechenskyi region. This forested area also has a generally lower population density of *Do. caspius*. Thus, the differences between the second and third regions are more likely in quantitative characteristics than in the species composition of herpetofauna.

4 – Kokkozskyi, forest (beech) (19.354 km^2). This includes the most elevated part of the northern macroslope of the Main Range and partially the Inner Inter-ridge depression (north-western spurs of the Ai-Petri Yayla, upper reaches of the Ai-Todorskaya Valley). The altititude range is from 350–400 to 980 m above sea level. Since the “tongues” of the high-stemmed forest currently only slightly enter the territory of Sevastopol, the region splits into 2 sections: to the north- and southeast of the borders of the Verkhnechernorechenskyi District. The predominant type of vegetation: oak-hornbeam and hornbeam-beech forests, and forest glades.

Features of herpetofauna. Characteristic *species: T. karelinii, H. orientalis, Pe. (ridibundus)* complex (mixed populations of *Pe*. cf. *bedriagae* and *Pe. ridibundus* s. str. recorded at several points), *Da. lindholmi, Do. caspius,* and *C. austriaca* found in a small numbers. Lack of *Em. orbicularis, M. danilewskii, Ps. apodus,* and *Z. situla*, low abundance and sporadic distribution of *B. viridis, Po. tauricus, L. agilis,* and *El. sauromates*.

5 – Ai-Petrinskyi, mountain meadow (6.14 km^2). The smallest area, includes the Ai-Petri Yayla east of the Shaitan-Merdven Pass, its north-western spur Trapan-Bair Ridge, as well as the yayla-like habitats of some flat peaks, in particular, in the area of the Bechku Pass (Hamilskyi Pass) to the north of the Baydarskaya Valley. The height range is from 750 to 1050 m above sea level. Within the borders of Sevastopol, the region breaks up into two areas distant from each other. The prevailing type of vegetation is the mountain meadow forest steppe and oreo-xerophytes, in some places juniper woodlands are common.

Features of herpetofauna. Characteristic species: *B. viridis, H. orientalis, Da. lindholmi, L. agilis, C. austriaca.* Lack of *Em. orbicularis, M. danilewskii, Ps. apodus, El. sauromates, Z. situla,* and *N. tessellata*. A very low abundance of *T. karelinii, Pe. (ridibundis)* complex, *Po. tauricus, N. natrix,* and *Do. caspius* is usually observed. However, *Do. caspius*, like *Po. tauricus*, has a fairly large population in the area of the Bechku Pass at altitudes of 750–800 m above sea level.

6 – Baydarsko-Laspinskyi, forest (15.04 km^2). Contains the upper part of the southern macroslope of the Main Range from the Kamara-Bogaz Pass near Balaklava, the area of the Laspinskyi Pass (Kokiya-Bel Range), partially the Laspi hollow, the southern cliffs of the Baydarskaya Yayla to the wooded thrust fault of Mount Celebi in the vicinity of the Baydarskyi Pass. Altitudes from about 400 to 750 m above sea level. The predominant type of vegetation is light broad-leaved forests (oak, hornbeam, maple, ash, cherry dogwood, rarely beech and yew) and shiblyak-like associations.

Features of herpetofauna. Characteristic species: *H. orientalis, Da. lindholmi, Po. tauricus, Do. caspius,* and *Z. situla*. *M. danilewskii, Ps. apodus, L. agilis, C. austriaca,* and *N. tessellata* are absent. Low abundance and sporadic distribution of *T. karelinii, Pe. (ridibundis)* complex, *Em. orbicularis* (probably disappeared), *N. natrix,* and *El. sauromates* are observed.

7 – Balaklavsko-Kikeneizskyi, southern coastal (semi-subtropical) (33.484 km^2). Includes ridges forming the southern side of the Balaklavskaya Valley in the area south of the village of Blagodatnoe (actually located in the zone of the northern macroslope), the steep coast of the Main Range from the Karanskie

[1] Mixed settlements of two forms (actually species) of a marsh frog – the "Anatolian" *P.* cf. *bedriagae* and the "Central European" *P. ridibundus* s. str. were identified based on the results of molecular genetic analysis, almost exclusively in the upper part of the Chernaya River basin (Kukushkin et al., 2018).

Rocks to the Ilyas-Kaya Massif, inclusive, and the Baydaro-Kastropolskaya Wall of the Ai-Petri Yayla. On different plots, the upper boundary of the region runs along altitudes from 200 to almost 700 m above sea level. The predominant type of vegetation is: juniper, juniper-oak and pine woodlands (including on rocky cliffs), oak-hornbeam shiblyak, maquis-like and phryganoid associations.

Features of herpetofauna. Characteristic species: *M. danilewskii* (mainly natural populations), *Ps. apodus, Da. lindholmi, Po. tauricus, Do. caspius,* and *Z. situla*. All species are characterized by almost continuous distribution within the region. Absence or extreme rarity of *T. karelinii, Em. orbicularis, L. agilis, C. austriaca, El. sauromates,* and *N. tessellata*; relatively low abundance of *H. orientalis, B. viridis*, and *Pe. (ridibundus)* complex, *N. natrix*. We note here that *T. karelinii* appears in large numbers on the Southern coast in the area of the village of Opolznevoe, outside the territory of Sevastopol. *C. austriaca* goes on the edge of the Yayla over the Southern coast; blotched snake was recorded at the top of the Laspi amphitheater and in the area of the Kamara-Bogaz Pass – *de facto* on the upper border of the Southern coast region. Old records of *Em. orbicularis* at sea level in Batiliman and in the Ayazma locality, far from freshwater bodies, can probably be explained by migrations caused by drying of forest swamps near the summit of Cape Aya. There is information on a single record of *N. tesselata* in the settlement of Kastropol in the 1990s, which is extremely rare in the lower coastal zone of the southern macroslope (observed only once by M.M. Beskaravaynyi in the Nikitsky Botanical Garden, Yalta). We do not take into account such records in our lists due to their obviously random nature, the possibility of animals delivery by humans, or lack of information.

8 – Kachinsko-Alminskyi, steppe (82.081 km^2). Bounded by a plain coast north of the Kacha settlement and almost to the mouth of the Alma River (Kacha-Alma interfluve). The prevailing type of vegetation is feather grass and fescue steppes on low uplands, very patchily preserved. Over 95% of the area is occupied by vineyards, orchards and settlements.

Features of herpetofauna. Typical ubiquists are common: *B. viridis, Pe. (ridibundus)* complex, *Do. caspius*. The only area in which *V. renardi* is recorded. Extremely low abundance of *Po. tauricus* and apparently *Em. orbicularis*; low number of characteristic species mentioned at the beginning. All (or most) taxa characteristic of the mountainous forest areas of Crimea (*T. karelinii, H. orientalis, M. danilewskii, Ps. apodus, Da. lindholmi, Z. situla*) are absent.

Table 3 provides information on the spatial distribution and abundance of amphibians and reptiles in the territory of Sevastopol in accordance with the proposed scheme of herpetogeographic zonation.

To systematize data on the distribution of reptiles, ecologically closely related to the aquatic environment (European pond turtle, dice snake), and to identify species preferences in the use of spawning water bodies by amphibians, we used the following simple classification of intrazonal water bodies in the study area:

1. Large reservoirs and quarry lakes (Chernorechenskoe reservoir in the Baydarskaya Valley, Gasfortinskoe Lake, flooded quarries near the town of Inkerman).
2. Ponds – medium-sized artificial reservoirs, in some seasons – slow-flowing (everywhere, except for the lower belt of the southern macroslope).
3. Small forest ponds, including man-made, (diameter up to 10 m; in broad-leaved forests of the northern and southern macroslopes).
4. Vast bogs (everywhere, except for the Gerakleyiskyi Peninsula and the lower belt of the southern macroslope, more often in the Baydarskaya Valley and on the glades in the zone of high-stemmed forests).
5. Ephemeral reservoirs, puddles (everywhere, including anthropogenic landscapes).
6. Mountain rivers and streams with evorsion holes systems in the upper reaches (mainly, in the canyons and gorges within the mountainous surroundings of the Baydarskaya Valley).
7. Stable rivers (Chernaya River with some tributaries, Belbek, and Kacha rivers).
8. Coastal waters of the Black Sea – desalinated tops of bays with the remains of reed floodplains and estuaries (the northern coast of the Gerakleyiskyi Peninsula from Cape Khersones to Inkerman; at present, this type of habitats is almost destroyed).

A certain peculiarity is also inherent in the distribution on the territory of Sevastopol during some seasons of the year or during the entire period of activity of reptile and amphibian species ecologically related to water (Table 4).

The grass snake is found across the studied area, although the population density and total numbers of this snake in the region is low. Typical habitats of this snake (which is mainly batrachophagus) are lakes, ponds and streams. However, this species is also found in Sevastopol in several sea bays, e.g., in the bays of Solenaya, Kazachya, and Streletskaya. In steep slopes of the extreme western part of the Southern coast (for example, in the Ayazma locality), it is associated with springs with small puddles, sometimes inhabited by a small number of frogs; in the Besh-Tekne hollow on the Ai-Petri Yayla (the territory of the Yalta urban territory near the border of Sevastopol), this species was observed on a vast flooded area with meadow vegetation at an altitude of 1030 m above sea level. It should be noted that for the entire time of research, only once near the borders of Sevastopol (pond no. 250 in the vicinity of

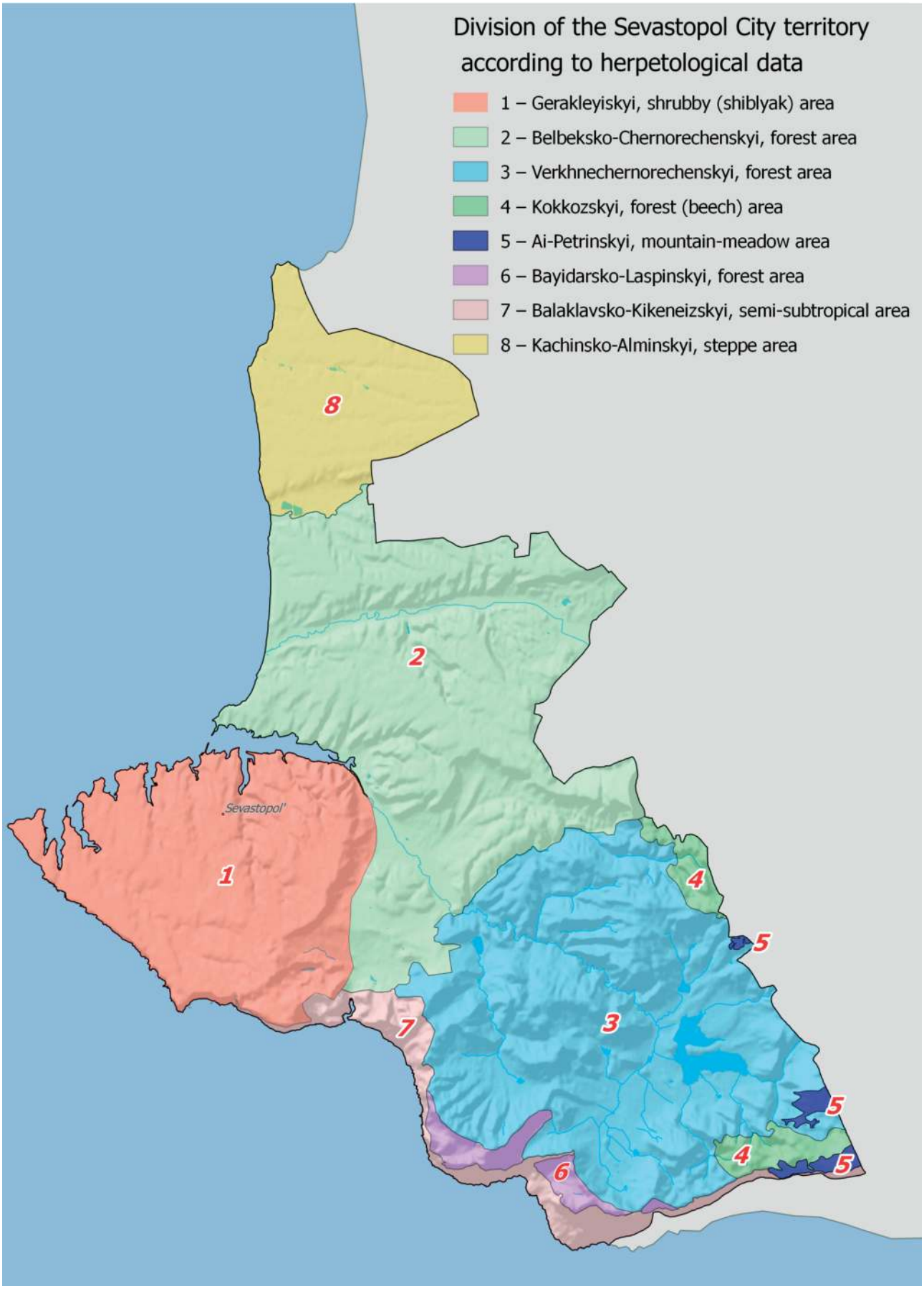

Fig. 2. Division of Sevastopol territory, according to herpetological data.

the village of Opolznevoe) we observed an individual *N. natrix* aberr. *persa* (29.06.2016), which caught a large marsh frog. Another individual of this "color" morph was photographed by V.E. Giragosov on the shore of Streletskaya Bay in Sevastopol 03.05.2019 in the process of hunting a peacock blenny *Salaria pavo* (Risso, 1810) (Blenniidae), and on 23.05.2019, at a distance of 3 m from the coast, he observed an unsuccessful attempt of a young grass snake to hunt a young mullet.

Dice snake has was recorded in some bays of Gerakleyiskyi Peninsula, large fresh water bodies (quarry lakes, reservoirs, large stocked ponds), as well as in rivers with a stable regime (Chernaya River). The distribution of *N. tessellata* in the region resembles that in the southeast of the Balkan Peninsula and in the Western Caucasus: the habitats of this snake are confined to the sea coast and gorges of mountain rivers at relatively low elevation above sea level (Naumov et al., 2011; Tuniyev et al., 2011). Interestingly, despite the wide range of habitats occupied, this species has a relatively narrow distribution in the region and clearly gravitates toward the Chernaya River basin. This snake certainly spread towards its present habitats in the bays of Sevastopol from the estuary of this large river.

European pond turtle, previously observed in Sevastopol in a variety of reservoirs from floodplains in desalinated shallow water areas of bays to small forest ponds has survived only in flooded quarries, reservoirs or ponds of very large size and water bodies located in a river floodplain or isolated from reservoirs during lowstands.

We have not recorded cases of spawning of green toad or inhabitation of a marsh frog in the desalinated upper reaches of the Gerakleyiskyi Peninsula bays (Streletskaya and Solenaya) since the late 1980s (Pysanets and Kukushkin, 2016). Apparently, the continuous development of the shores of the bays disturbed the fresh water discharge regime and caused salinization in the upper reaches where underwater springs were previously located (the bays of the northern coast of Gerakleyiskyi Peninsula are ancient valleys flooded during the last transgression). However, a vocalizing male green toad was caught in a brackish pool 1 m from the sea on 25.04.2011 on the eastern shore of Kazachya Bay. Unfortunately, brackish-water amphibian populations, known in the Black Sea region from a very small number of sites (Dotsenko, 2006; Natchev et al., 2011), apparently, disappeared in Sevastopol before they were studied.

We also note the exceptional rarity of the green toad, even on very moist areas of the Southern coast east of Laspi Bay and Cape Sarych. It is known that the number of southern coastal populations of this species is subject to significant fluctuations (Kotenko and Kukushkin, 2010; Pysanets and Kukushkin, 2016). At the same time, this amphibian remains relatively common on the neighboring uplands (Yayla) (Turbanov et al., 2019). Between 2012 and 2019 a spawning pond of *B. viridis* (a large puddle) on this stretch of the Southern coast was only once discovered by us in an anthropogenic biotope (a dirt road near a landfill of building materials) in the vicinity of the village of Opolznevoe of the Yalta urban territory (29.04.2016; N 44.41°, E 33.96°, 279 m above sea level). By 2018, this spawning site had ceased to exist, but as early as on 12.05.2018, egg masses and larvae of the green toad were observed in a large pond situated on the overlying slope at an altitude of 412 m above sea level, although up to this point, the toad had never been recorded here in the period since 2013.

Individuals of *Pe. ridibundus* s. str., identified using molecular markers, were found only in the upper reaches of a number of the most isolated tributaries of the Chernaya River (mainly in canyons, which for most of the year were cut off from the intermontane hollows by long sections of dry channels), some small forest lakes located under the forest canopy, as well as in the Skelskaya Cave (Kukushkin et al., 2018; Turbanov et al., 2019). The altitude of the localities is 295–815 m above sea level, an average of 467 ± 52.5 m. In our collections (n = 8) from the reservoirs of open landscapes of Yayla (Besh-Tekne Site, 1040 m above sea level) so far only *Pe.* cf. *bedriagae* was identified (unpublished data of O.V. Kukushkin and O.A. Ermakov).

As early as at the end of the 20th century, the Karelin's newt reproduced in some places almost at sea level (Northern Side of Sevastopol city, the estuary part of the Belbek River valley), but due to the considerable changes in coastal landscapes, its populations are presently mainly restricted to mountainous regions. According to data collected on the territory of the Republic of Crimea (in the foothills, in the area of the Main Range and on the Southern coast), Karelin's newt mainly reproduces in large (0.4–1.5 ha), sufficiently deep (up to 2–3 m), and periodically drying out water bodies (Kukushkin and Kushchan, 2015). In 2018, we observed a completely different pattern in the Sevastopol Region. In most cases, newts were found in small or medium-sized ponds (the area is usually less than 0.1 ha), in swamps and floods, in small diggings and even in small puddles located under the forest canopy with a diameter of only 5–10 m and a depth of 0.2–0.5 m with fallen leaves and branches, which we have never seen in other areas of the Crimean Mountains. In large reservoirs, newts were observed rarely and in very small numbers. In our opinion, on the territory of Sevastopol, the choice of shallow reservoirs for newt reproduction is due to the general and fairly permanent stocking of ponds and reservoirs with fish. Newts do not survive well with any species of fish. With the stocking of reservoirs, the numbers of this amphibian drop, and it may completely disappear.

Table 3. The spatial distribution of amphibians and reptiles in the territory of Sevastopol and the quantitative characteristics of their populations, in accordance with the scheme of herpeto-geographic division. Abbreviations: RDBS – the Red Book of Sevastopol; abbreviations of the areas names: GS – Gerakleyiskyi, shrubby (shiblyak), BC – Belbeksko-Chernorechenskyi, forest, UC – Verkhnechernorechenskyi, forest, KB – Kokkozskyi, forest (beech), LL – Baydarsko-Laspinskyi, forest, AM – Ai-Petrinskyi, mountain-meadow, SS – Balaklavsko-Kikeneizskyi, semi-subtropical, KA – Kachinsko-Alminskyi, steppe; taxa abundance assessment: 0 – the species is absent; 1 – very rare species (known from single records); 2 – rare species (sporadically distributed, with relatively high population density, or widespread species with low density); 3 – common species (widespread, with heterogeneous, but, as a rule, high population density); 4 – abundant species (living almost everywhere, with high population density); (?) – "uncertain" species (not identified during special search, but its presence seems likely); (†) – presumably, disappeared species.

Herpeto-geographic regions	GS	BC	UC	KB	LL	AM	SS	KA
Triturus karelinii	0	2	3	3	1	2	0 (?)	0
Hyla orientalis	2	4	4	4	3	4	2	0 (?)
Bufotes viridis	3	4	3	2	2	3	1	3
Pelophylax cf. *bedriagae*	3	4	4	4	2	2	2	3
Pelophylax ridibundus s. str.	0	0	2	1	0	0	0	0
Emys orbicularis	1	2	2	0 (?)	0	0	0	1
Mediodactylus danilewskii	2	0	0	0	1	0	4	0
Pseudopus apodus	2	4	3	0	1	0	4	0
Podarcis tauricus	2	4	4	2	3	1	4	1
Darevskia lindholmi	3	4	4	3	4	4	4	0
Lacerta agilis tauridica	0	1	2	1	0	3	0	0
Coronella austriaca	0	1	1	1	0	3	0	0
Dolichophis caspius	3	4	3	1	3	1	3	2
Elaphe sauromates	1	3	2	1	1	0	0	0 (?)
Zamenis situla	2	2	2	0	2	0	3	0
Natrix natrix	2	3	3	2	1	1	1	2
Natrix tessellata	2	2	3	1	0	0	0	0
Vipera renardi	0	0	0	0	0	0	0	1 (†)
Total number of amphibian taxa	**3**	**4**	**5**	**5**	**4**	**4**	**3**	**2**
Total number of reptile taxa	**10**	**11**	**11**	**8**	**8**	**6**	**7**	**5**
Number of RDBS taxa	**8**	**10**	**10**	**7**	**7**	**5**	**4**	**3**

Table 4. Distribution of amphibian and reptile species ecologically related to aquatic environments, by types of water bodies. Abbreviations: *T. k.* – Karelin's newt, *H. o.* – Eastern tree frog, *B. v.* – green toad; *Pe. b.* – "Eastern" form of the marsh frog; *Pe. r.* – "Western" form of the marsh frog, *Em. o.* – European pond turtle, *N. n.* – grass snake, *N. t.* – dice snake; assessment of the species abundance as in Table 3.

Type of basin	Amphibians					Reptiles		
	T. k.	*H. o.*	*B. v.*	*Pe. b.*	*Pe. r.*	*Em. o.*	*N. n.*	*N. t.*
Reservoirs	1	1	1	4	0	3	3	3
Ponds	2	4	4	4	1	1	3	2
Small forest lakes	3	3	1	3	2	1 (†)	2	0
Bogs	2	3	2	2	0	0	2	0
Ephemeral	0	2	4	2	0	0	1	0
Mountain rivers	0	0	3	3	3	0	1	1
Stable rivers	0	0	0	3	0	1	2	3
Marine basin	0	0	1 (†)	1 (†)	0	1 (†)	1	2

Amphibian and reptile species differ in their ability to exist in anthropogenic, especially urban, landscapes (Mollov, 2005). In the conditions of southwestern Crimea, nine species can be categorized as clearly anthropophobic (hemerophobes): Karelin's newt, European pond turtle, Eurasian glass lizard, Balkan wall lizard and Taurida's sand lizard, smooth snake, Caspian whipsnake, blotched snake, and steppe viper. All of them will inevitably disappear in close proximity to humans, although the rate of extinction of their populations can vary significantly depending on the intensity and nature of the impact on the environment, and in some cases the consequences of human activity even bring indirect benefits (for example, the European pond turtle disappeared in the Chernaya River estuary, but remained in adjacent quarry ponds). There are no fully synanthropic species of amphibians and reptiles in the studied region (although the Danilewski's gecko lives on the Gerakleyiskyi Peninsula almost exclusively in urban landscapes, at least at present). All other species are hemerodiaphores (the existence of which depends little on the anthropogenic transformation of habitats) or hemerophiles (that is, species that, in certain circumstances, prefer habitats created by humans). Among the reptiles, in addition to the gecko mentioned above, the Lindholm's rock lizard (urban populations of this species are known in Sevastopol; the species lives in isolation even in the historical center of the city) and the leopard snake easily adapt to a synathropic or semi-synanthropic lifestyle. Among amphibians in anthropogenic landscapes, the green toad is the most common. The creation of artificial reservoirs on the outskirts of settlements and summer cottages allows populations of Eastern tree frog and marsh frog to be maintained, even in totally built up areas. At the same time, quite a small amount of water remaining in various kinds of irrigation tanks and pools is enough for tree frogs successful breeding, which allows this amphibian to persist in the northwestern part of the Gerakleyiskyi Peninsula, which has now been completely deforested.

Adventive herpetofauna

Over the years, the following exotic species of amphibians and reptiles have been recorded in the territory of Sevastopol: a fire-bellied toad (hybrid *Bombina bombina* (Linnaeus, 1761) and *B. variegata* (Linnaeus, 1758)), European water terrapins of the *Mauremys (caspica – rivulata)* species complex, red-eared terrapin (*Trachemys scripta elegans* (Wied, 1838)), the spur-thighed tortoise (*Testudo graeca* (Linnaeus, 1758)) and, apparently, a Western green lizard (*Lacerta bilineata* Daudin, 1802), which was described from collections from the vicinity of Yalta and Sevastopol as endemic subspecies of the green lizard, *Lacerta viridis magnifica* Sobolevssky, 1930 (Sobolevssky, 1930; Kukushkin et al., 2017a). The possibility of detecting small synanthropic groups of the Mediterranean house gecko (*Hemidactylus turcicus* (Linnaeus, 1758)) in the warmest areas of the city lying at sea level (ports, transport terminals) was also indicated. In this regard, we note that, apparently, a completely viable population of *H. turcicus* was recently recorded on the Russian Black Sea coast of the Caucasus (Dunayev and Imshenitsky, 2018).

From the above list, only the red-eared slider could pose an invasive threat in the long term. In 2018 and 2019 we did not record this exotic species in any of the examined natural reservoirs of Sevastopol. For comparison, in recent years we repeatedly observed *T. scripta* in the Republic of Crimea (especially on the South-Eastern coast and on the Kerch Peninsula), and although cases of the emergence of reproducing populations of red-eared slider on the Crimean Peninsula are still unknown, its naturalization is likely to be only a matter of time (Kukushkin et al., 2017a). In any case, this has already happened in countries with a climate similar to Crimea (Slovenia, Serbia, and Hungary). The term "biological invasion" in relation to the situation with this exotic species in Crimea is not presently applicable, since the introduction of *T. scripta* into peninsula ecosystems has not yet been pronouncedly aggressive in character. To date, we can only talk about the introduction of an alien species and its potential threat, which consists primarily in the similarity of the environmental preferences of *T. scripta* to that of the native European pond turtle, with which the invader can begin to compete. The epidemiological risks associated with the possibility of the spread of specific infections and parasitoses along with individuals of *T. scripta* must be taken into account (Urošević et al., 2016). The latter is all the more dangerous if we take into account the uniqueness of the autochthonous Crimean populations of *Em. orbicularis*, represented by unique or rare genetic lineages related to Anatolian and absent in the East European Plain (Fritz et al., 2009; Kotenko, 2010).

To summarize the above: the human introduction of *T. scripta* observed in Crimea today is, of course, an undesirable phenomenon, and in the case of successful assimilation of this species into the biocenosis and its occupation of a particular ecological niche, it may in the future become an aggressive invader. Therefore, long before the naturalization of this exotic taxon can become truly problematic, it is worthwhile to consider the possibility of introducing restrictions on the importation of the red-eared slider into Crimea in order to reduce the influx of new individuals. However, such a prohibition would only work effectively, if it affected large consignments of animals transported by animal traders.

Amphibians and reptiles in the environmental lists of Russia and the category of threatened species status in Sevastopol Region, according to IUCN standards

Almost all species of amphibians and reptiles protected in the Republic of Crimea (Krasnaya kniga..., 2016) were included in the Red Book of Sevastopol (Krasnaya kniga..., 2018) with the exception of the Pallas' spadefoot toad and Western steppe-runner. Moreover, in the Red Book of Sevastopol we have included a dice snake, a species not numerous and widespread in this area, only in the Chernaya River basin. In total, in the List of wildlife objects protected in the Sevastopol Region includes two species of amphibians out of four (50%) and 10 species of reptiles out of 13 (77%), i.e., 71% of the local herpetofauna.

From the number of taxa living in the territory of Sevastopol, seven species were included in the List of Fauna Objects recommended for inclusion in the Red Book of the Russian Federation (Draft of the Red Book of the Russian Federation): Karelin's newt, European pond turtle (as *Em. orbicularis colchica* Fritz, 1994[2]), Crimean (Mediterranean) gecko (as *M. kotschyi danilewskii*), Eurasian glass lizard (populations of Crimea and the Black Sea coast of the Caucasus), blotched snake, leopard snake and Eastern steppe viper (as *Pelias renardi* – populations of the Caucasus and Crimea) (Ilyashenko et al., 2018). In addition, the population of the Caspian whipsnake (as *Hierophis caspius*) from the Caucasian Black Sea Coast is included in Red Book Project of the Russian Federation, while the species as such (except for the Black Sea population) was included in the List of fauna objects that require special attention to their condition in nature environment. Another taxon recommended for inclusion in the Red Book of Russia – the Western steppe-runner (populations of Crimea and Krasnodar Region) – is not represented in Sevastopol.

In both Crimean protection lists (republican and for Sevastopol), as well as in the draft all-Russian list, are absent such widespread forms as green toad, green frogs *Pe. (ridibundus)* complex and common grass snake (with the exception of its peculiar West Caucasian population, which is recognized by some experts as a separate species and for this reason is included in the Russian Red Book Project as *N. megalocepha* Orlov et Tuniyev, 1987). Lacertid species, Lindholm's rock lizard and Balkan wall lizard, were not included in the lists and are background species in southwestern Crimea, despite the fact that the former is endemic of the Crimean Mountains, and the range of the latter in Russia is limited exclusively to the Crimean Peninsula.

Information on the categories of rarity status in the protection lists of Crimea and Russia and the threat of extinction of amphibian and reptile species in the Sevastopol Region are given in Table 5. Previously for the Crimean Peninsula Red Book project, Kotenko (2010) proposed the following IUCN categories for species now listed in the Sevastopol Red Book: EN – 2 or 3 species (*M. danilewskii, Z. situla*, and *Ps. apodus*, although belonging of the latter species to the VU category was also discussed); VU – 4 or 5 species (*T. karelinii, C. austriaca, El. sauromates, V. renardi,* and possibly *Ps. apodus*); NT – 2 or 3 species (*Em. orbicularis, Do. caspius,* and *H. orientalis*, but for the latter its belonging to the DD – Data Deficient category was also discussed); LC – 2 species (*L. agilis, N. tessellata*). *B. viridis, Pe. ridibundus*, *Da. lindholmi*, *Po. tauricus* and *N. natrix*, also belong to the last category of the species living in Sevastopol. The species *Pelobates vespertinus* and *Er. arguta* that are absent in the region, were categorized as VU (Kotenko, 2010). In general, we share this point of view, however, Danilewski's gecko, which is currently increasing its range of distribution in Crimea, in our opinion, deserves the VU category, Caspian whipsnake, the most numerous and widespread representative of the peninsula opidiofauna – LC category. However, Pallas' spadefoot toad, characterized by very low total number and significant annual fluctuations, on the contrary, requires a higher category – EN (Table 5).

In the city of Sevastopol, which is a separate subject of the Russian Federation, the situation is less favorable than in the whole of Crimea, in particular, taking into account the current pace of urbanization, the high fragmentation of natural landscapes and increasing recreational pressure. Two species of snakes, *C. austriaca* and *V. renardi*, should be assigned to the CR category, and the latter species has most likely disappeared from the region, which in the long run will require a change in category (RE). Five species (*T. karelinii, Em. orbicularis, M. danilewskii, L. agilis tauridica,* and *Z. situla*) are currently categorized as EN due to their small area of distribution in the region and/or sporadic distribution, the threatened state of their habitats, or unfavorable dynamics of changes in the number, or extremely low population density. Another six species, currently relatively prosperous or insufficiently studied in the region (*H. orientalis, Ps. apodus, Do. caspius, El. sauromates,* and *N. tessellata*), are classified by us as vulnerable (VU) (Table 5). It is possible, however, that if more objective information on the state of regional populations is obtained, the category for a number of species may be reduced (*H. orientalis* – NT, *M. danilewskii* and *L. agilis tauridica* – VU, *C. austriaca* – EN), while

[2] The subspecies *E. orbicularis colchica* Fritz, 1994 previously comprised turtles from northern Anatolia, the Western Caucasus, the northeast of the Balkan Peninsula and Southern Crimea. However, it is now synonymized with the nominative subspecies (Fritz et al., 2009).

the status for *El. sauromates*, likely, on the contrary, should be increased (EN), although this conclusion would be premature before further studies. The situation with marsh frogs in Mountainous Crimea needs a more thorough study. For *Pe. ridibundus* s. str., the CR category is probably applicable due to its negligible range, sporadic distribution and introgressive hybridization with the widespread taxon *Pe.* cf. *bedriagae* (Kukushkin et al., 2018). The condition of other representatives of the herpetofauna of the region was evaluated by us as LC.

Based on the results of recent studies, we recommend taking into account the following observations regarding the nomenclature of taxa and categories of status of rarity and priority of conservation measures.

Nomenclature issues

Kotschy's gecko, *M. kotschyi* (Steindachner, 1870), was considered by herpetologists as a species complex during the last decade, and in 2018 was divided into five species (Kotsakiozi et al., 2018). Thus, the systematic position of Danilewski's gecko (previously a subspecies of Kotschy's gecko *M. kotschyi danilewskii*) has changed. The current name of the species inhabiting Crimea is *M. danilewskii*.

The Mountainous Crimean subspecies of the sand lizard is included in the Red Book of Sevastopol (RDBS) as *L. agilis tauridica* Suchow, 1926. It has now been established that during revalidation of the subspecies (Kalyabina-Hauf et al., 2004), an error was made in the year of species description (unpublished data by O.V. Kukushkin and I.V. Doronin). When preparing a new edition of the RDBS, the year of description should be corrected to 1927 (*L. agilis tauridica* Suchow, 1927).

Nomenclature changes should be taken into account when preparing new versions of the lists of protected objects of the animal world of Sevastopol, as well as when preparing a new edition of RDBS.

List of species, categories of rarity status and priority of conservation measures

It is possible that the list of protected herpetofauna of the region can be reduced to 10 species (instead of the current 12). According to the results of our research, one of the species of amphibians in Sevastopol (Eastern tree frog) can be excluded from RDBS due to the favorable state of populations and the absence of significant threats in the future (the species has a tendency to synanthropization). It is also necessary to organize special searches for the steppe viper on the northern coast of Sevastopol and, based on their result, exclude it from the list of protected objects of the animal world as a species that has disappeared in the region or, if the presence of the species is confirmed, to establish new categories of conservation status for this snake and environmental protection measures (1 – endangered species).

According to our results, it is necessary to raise the status categories of rarity for three reptile species. Thus, the current state of the populations of the European pond turtle and blotched snake will be reflected more adequately if the categories are raised to 1 (endangered species). A more suitable category for dice snake is 3 (rare species).

The lowering of the category for Karelin's newt and the leopard snake to 2 (vulnerable species), which is more consistent with their actual status, we consider inappropriate due to the low total number and low population density of these species in the region, as well as for some other reasons, including primarily the threatened state of the vast majority of spawning water bodies for amphibians and the high commercial attractiveness of Karelin's newt and the leopard snake. Thus, the former category (1) should be retained for these species.

Distribution of species in specially protected natural areas and their "herpetological specialization"

To date, 14 specially protected natural territories have been created within the borders of Sevastopol, which vary greatly in size (the largest area exceeds the area of the smallest by 923 times) (Fig. 3, Table 6). Excluding the plot of the Yalta Mountain-Forest Reserve, which is subordinate to the departments of the Republic of Crimea, the total area of regional protected sites (SNPT) of Sevastopol is 250.6 km^2, which is about 1/4 of the region's territory (23.2%) – a very high indicator for the Crimean Peninsula. Only eight territories out of this number, the area of which is 246.4 km^2 (or, possibly, nine, if the steppe viper is discovered at Cape Lukull) are really significant for the conservation of herpetofauna (Table 6). A large area of the Inner Range between the Chernaya and Belbek rivers is lacking SPNT, however, the Mekenzievskoe Forestry of the "Sevastopol Experimental Forest Hunting" state enterprise occupies most of this territory. In addition to the upland of Mekenzievy Gory, this forestry includes heights on the right bank of the Belbek River.

The Yalta Mountain-Forest Nature Reserve (subordinate to the Republic of Crimea) enters the extreme southeast of the Sevastopol Region. In Sevastopol, the western part of the Opolznevskoe Forestry of the Yalta Reserve is located, occupying the cliffs and basement of the Ai-Petri Yayla above the old (pre-1917) Yalta road (Baydaro-Kastropolskaya Wall) and a thrust fault of Mount Chelebi in the vicinity of the Baydarskie Vorota Pass. The total area of the Opolznevskoe Forestry is 3019 ha, while the area of its "Sevastopol" plot is currently not exactly known and, to a first approximation, is about 1000 ha.

The greatest diversity (15 species) is observed in the herpetofauna of the "Baydarskyi" state regional landscape sanctuary, which is explained by both the significant area of its territory and the very high va-

Table 5. Categories of the extinction threat status, according to the IUCN criteria, and the rarity status of amphibians and reptiles of the Crimean Peninsula in the Red Lists of Europe and Russia. Abbreviations: ERL – European Red List; RDBS – the Red Book of Sevastopol; RDBC – the Red Book of Republic of Crimea; RDBRF – a project of the Red Book of Russia; categories of rarity status: 0 – presumably disappeared species; 1 – endangered species; 2 – species decreasing in number; 3 – rare species; 4 – species of undefined status; 5 – species recovering in numbers. *By: Cox and Temple (2009); Temple and Cox (2009); **By: Ilyashenko et al. (2018); ***respectively (from top to bottom), as: *Pelobates fuscus*, *Pseudepidalea viridis*, *Hyla arborea*, *Pelophylax ridibundus* (with *Pelophylax bedriagae*), *Cyrtopodion kotschyi*; ****Pelophylax* cf. *bedriagae* – LC, *Pelophylax ridibundus* s. str. – CR.

no.	Taxon	ERL*	RDBS	RDBC	RDBRF**
1	*Triturus karelinii*	LC	EN A4 abcde; B1ab (i, ii, iii, iv, v), c (ii, iii, iv) 1	VU 2	VU 2
2	*Pelobates vespertinus*	LC***	–	EN 1	–
3	*Bufotes viridis*	LC***	LC –	LC –	–
4	*Hyla orientalis*	LC***	VU B1ab (iii, iv, v), c(iv) + 2b (iii, iv, v), c (iv) 4	NT 2	–
5	*Pelophylax* (*ridibundus*) complex	LC***	LC/CR**** –	LC –	–
6	*Emys orbicularis*	NT	EN A4abcd 2	VU 2	CR 1
7	*Mediodactylus danilewskii*	LC***	EN B1ab (iii), c (ii) + 2ab (iii), c (ii) 3	VU 2	VU 2
8	*Pseudopus apodus*	LC	VU B1ab (ii, iii, iv, v) + 2ab (ii, iii, iv, v); C2a 2	VU 2	EN 2
9	*Eremias arguta*	NT	–	VU 2	VU 2
10	*Darevskia lindholmi*	NE	LC –	LC –	–
11	*Podarcis tauricus*	LC	LC –	LC –	–
12	*Lacerta agilis*	LC	EN B1ab (ii, V), c(ii, iv) + 2ab (ii, v), c (ii, iv) 3	LC 3	–
13	*Coronella austriaca*	LC	CR C2a (i) 3	VU 2	–
14	*Dolichophis caspius*	LC	VU B2b (ii, iii, iv, v), c(iv); C2a (i) 5	NT 5	–
15	*Elaphe sauromates*	LC	VU A4abcd; B2ab (i, ii, iii, iv, v), c (iv); D1 2	VU 2	VU 2
16	*Zamenis situla*	LC	EN B1ab (ii, iii, iv, v), c (ii, iv) 1	EN 1	EN 1
17	*Natrix natrix*	LC	LC –	LC –	–
18	*Natrix tessellata*	LC	VU B2ab (i, ii, iii, iv, v), c (ii, iii, iv); D1 4	LC –	–
19	*Vipera renardi*	VU	CR A4abcd; C2a(i); D; E (RE?) 0	VU 2	VU 2

riety of natural conditions: from Sub-Mediterranean to the Yayla landscapes (Table 6). Of the species recorded in the territory of Sevastopol, only Danilewski's gecko (which can still be found in the settlements in the south of the Baydarskaya Valley) and the steppe viper are absent here. Mekenzievskoe Forestry, with 13 species of herpetofauna, is slightly less diverse than the "Baydarskyi" landscape sanctuary. To date 11–12 species have been recorded in both the "Laspi" and "Cape Aya" state regional landscape sanctuaries, which occupy the southernmost position in the region, as well as in the Sevastopol section of the Yalta Mountain-Forest Nature Reserve. A marked decrease in the species diversity of herpetofauna from east to west is explained by simplification of the structure of landscapes and a decrease in water abundance. The reduced number of species in the Gerakleyiskyi Peninsula natural wildlife territories compared to the Southern coast is associated not only with the small size of the protected areas, but with the natural features of this dry limestone plateau; however in some cases the decrease in species diversity is caused by the catastrophic depletion of fauna due to the influence of human activity. For example, in the "Khersonesos of Taurida" archeological reserve in the period from the mid-1980s until the end of the 1990s, as a result of draining the coastal marshes, systematic burning or mowing of grassland and direct destruction, the marsh frog, Eurasian glass lizard, Balkan wall lizard, Caspian whipsnake and leopard snakes completely disappeared. Currently, the only species of reptiles in the ruins of the ancient settlement is Danilewski's gecko, and the only amphibian is the green toad. The Cape Lukull also has an extremely impoverished herpetofauna, since the narrow strip of steppe has been leveled by holidaymakers, and the extremely degraded steppe between arable land and coastal cliffs deprived of vegetation is not able to support the existence of stable populations of even background reptile species.

Distribution features and density gradients of amphibian and reptile populations in protected areas make it possible to identify territories that are significant for the conservation of rare species. To preserve Karelin's newt in Sevastopol, the "Baydarskyi" state landscape sanctuary is the most significant; a few oppressed populations remained in the "Laspi" state landscape sanctuary and near the borders of "Cape Aya" state landscape sanctuary southwest of it. The most significant role in the preservation of Danilewski's gecko is played by "Cape Aya" and "Laspi" sanctuaries, and within the city itself to the "Khersonesos of Taurida" archeological museum-reserve (Kukushkin, 2005b, 2005c, 2005d, 2005f). To preserve the Eurasian glass lizard, which is more widespread in Sevastopol than Danilewski's gecko, Mekenzievskoe forestry, the "Baydarskyi" wildlife sanctuary (with adjacent territories) and the southern coastal protected areas are most important (and to a lesser extent the "Cape Fiolent" and "Karanskyi" landscape sanctuaries in the southeastern part of Gerakleyiskyi Peninsula). The smooth snake is preserved mainly in the peripheral areas of the "Baydarskyi" landscape sanctuary, as well as along the upper border of the Opolznevskoe Forestry, passing along the cliffs of the Ai-Petri Yayla; the blotched snake remains in the Mekenzievskoe Forestry and the "Baydarskyi" landscape sanctuary, as well as in the peripheral areas of the "Cape Aya" landscape sanctuary; leopard snake is preserved in the "Cape Aya", "Laspi" and "Baydarskyi" landscape sanctuaries, as well as in the Mekenzievskoe Forestry and on the Sevastopol plot of the Yalta Mountainous Forest Nature Reserve. The Taurida's sand lizard and dice snake in Sevastopol dwell mainly on the territory of the "Baydarskyi" landscape sanctuary, while the Chernorechenskyi Canyon is especially valuable for preserving the populations of the latter species. The isolated coastal dice snake population is also known in the "Kazachya Bukhta" state regional zoological sanctuary and adjacent territories. With regard to the conservation of the widespread Caspian whipsnake, all protected areas with a sufficiently large area are more or less equivalent. The steppe viper (assuming that it still exists in Sevastopol) most likely lives outside the protected areas. Thus, in order to preserve the rare herpetofauna, the "Baydarskyi", "Cape Aya", "Laspi" and "Karanskyi" state regional landscape sanctuaries, located in the Main Range and the Southern coast, are the most important. They also have the largest area (Table 6, Fig. S1, Appendix). In the foothills, the role of the Mekenzievskoe forestry is significant, while on the Southern coast, the Opolznevskoe Forestry of the Yalta Mountain-Forest Reserve is important. We also emphasize the unique role of the "Khersonesos of Taurida" museum-reserve in preserving the scientifically valuable synanthropic population of Danilewski's gecko. Note that the gecko biology in Crimea was first studied precisely in Khersonesos (Shcherbak, 1960, 1966).

Thus, the large urban population of this lizard living here can be regarded as a kind of standard, which determines its scientific significance and the need for constant monitoring and protection (Kukushkin, 2005b, 2005c, 2005d). All other protected areas of Sevastopol are characterized by a very small area, and can only claim auxiliary value in terms of protecting herpetofauna.

Outline of the population state of amphibians and reptiles of the Red Book of Sevastopol and recommendations for their protection

The period of data collection on the distribution, changes in habitats, and the dynamics of amphibian and reptile populations for this article covers a period of more than a quarter of a century, which determines

Table 6. Lists of amphibians and reptiles of special protected natural territories and some forestry of Sevastopol. Abbreviations: *T. k.* – Karelin's newt, *H. o.* – Eastern tree frog, *B. v.* – green toad; *Pe. r.* – marsh frog, *Em. o.* – European pond turtle, *M. d.* – Danilewski's gecko, *Ps. a.* – Eurasian glass lizard, *Da. l.* – Lindholm's rock lizard, *Po. t.* – Balkan wall lizard, *L. a.* – Taurida's sand lizard, *Do. c.* – Caspian whipsnake, *El. s.* – blotched snake, *Z. s.* – leopard snake, *C. a.* – smooth snake, *N. n.* – grass snake, *N. t.* – dice snake, *V. r.* – steppe viper; abbreviations of the special protected natural areas names: see the legend to Fig. 3; also provides the data on the Mekenzievskoe Forestry (MF) and Sevastopol's plot of the Opolznyovskoe Forestry of the Yalta Mountain-Forest State Nature Reserve [OF/YR]; assessment of the species abundance as in the Tables 3, 4.

Territory (area, ha)	CL (129)	KT (61)	MD (84)	KB (23)	CF1+CF2 (44)	KP (569)	CA (1377)	BV (21231)	LR+LB (1251)	OF/Ya (< 3019)	MF (8356)
T. k.	0	0	0	0	0	0	0	3	2	1	2
H. o.	0	0	3	0	1	2	2	4	2	2	3
B. v.	2	3	3	2	2	3	2	4	2	2	4
Pe. r.	0	1 (†)	3	0	0	2	2	4	1	0	3
Em. o.	0	0	0	0	0	0	1 (†)	2	0	0	2
M. d.	0	4	0	1 (?)	0	1	4	0	3	2	0
Ps. a.	0	1 (†)	3	2	3	3	3	2	3	2	4
Da. l.	0	0	4	0	4	4	4	4	4	4	4
Po. t.	(?)	1 (†)	4	2	2	4	4	4	4	3	4
L. a.	0	0	0	0	0	0	0	2	0	0	0
C. a.	0	0	0	0	0	0	0	1	0	1	0
Do. c.	2	1	3	1	3	3	3	3	3	3	3
El. s.	0	0	0	0	0	0	2	2	1	0	2
Z. s.	0	1 (†)	2	1	2	1	2	2	2	2	1
N. n.	0	1 (†)	2	1	1	2	1	3	1	1	3
N. t.	0	0	0	2	0	0	0	3	0	0	1
V. r.	1 (?)	0	0	0	0	0	0	0	0	0	0
Amphibian species	**1**	**1**	**3**	**1**	**2**	**3**	**3**	**4**	**4**	**3**	**4**
Reptile species	**1–3**	**2–6**	**6**	**6–7**	**6**	**7**	**8–9**	**11**	**8**	**8**	**8–9**
Total	**2–5**	**3–7**	**9**	**7–8**	**8**	**10**	**11–12**	**15**	**12**	**11**	**13**
RDBS	**1–2**	**2–4**	**5**	**4–5**	**4**	**5**	**6–7**	**10**	**7**	**7**	**8**

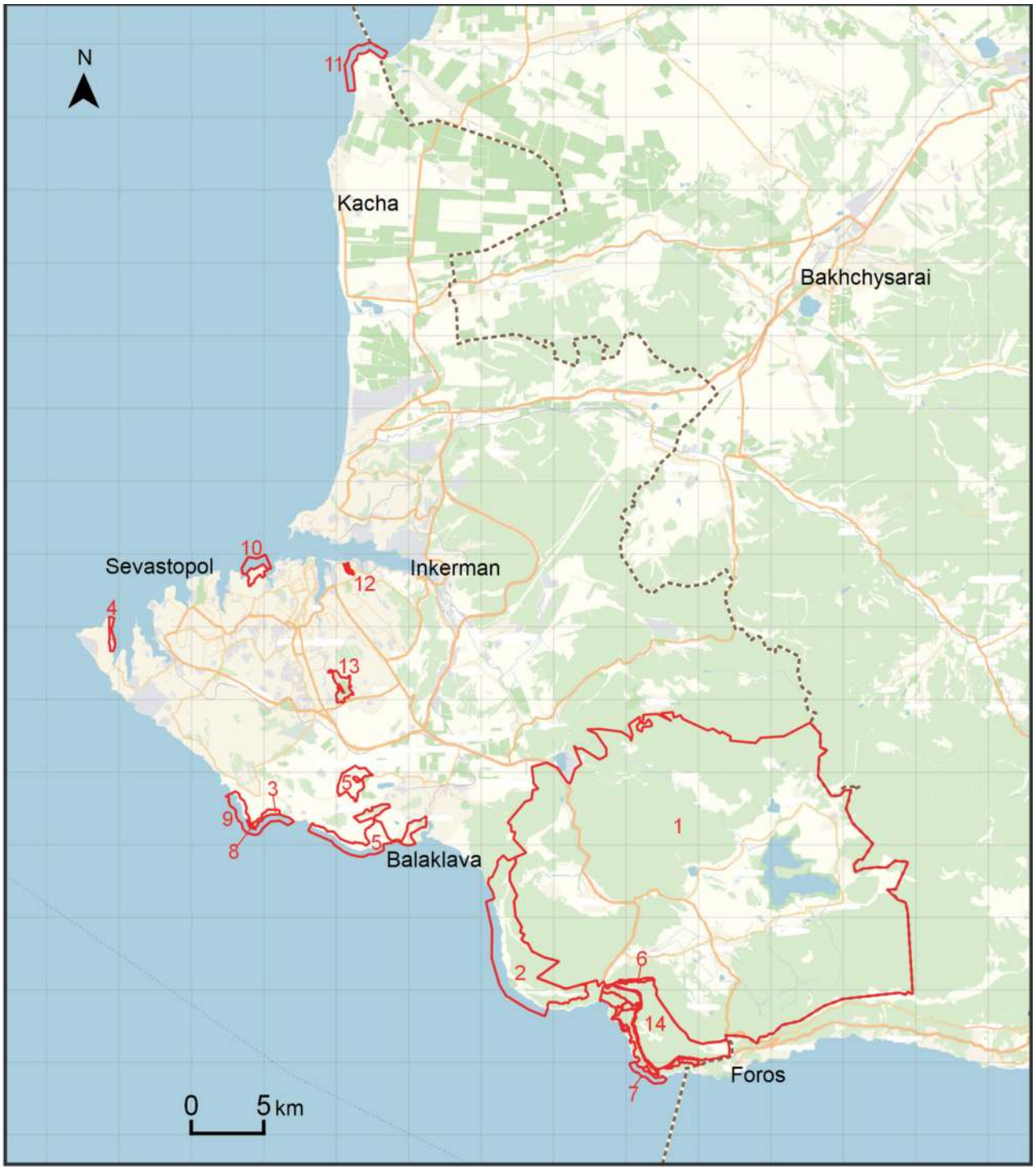

Fig. 3. Specially protected natural areas of Sevastopol city. Signature and abbreviations: 1 –"Baydarskyi" State Nature Landscape Sanctuary [BV]; 2 – "Cape Aya" State Nature Landscape Sanctuary [CA]; 3 – "Cape Fiolent" State Nature Landscape Sanctuary [CF1]; 4 – "Kazachya Bukhta" State Nature Zoological Sanctuary [KB]; 5 – "Karanskyi" State Nature Landscape Sanctuary [KP]; 6 – "Laspi Rocks" nature monument [LR]; 7 – "Coastal-aquatic complex at the Cape Sarych" hydrological nature monument; 8 – "Cape Fiolent" complex nature monument [CF2]; 9 – "Coastal-aquatic complex at the Cape Fiolent" hydrological nature monument; 10 – "Coastal-aquatic complex at Khersonesos of Taurida" hydrological nature monument" [KT]; 11 – "Coastal-aquatic complex at the Cape Lukull" hydrological nature monument [CL]; 12 – "Ushakova balka" botanical nature monument; 13 – "Maksimova Dacha" natural park [MD]; 14 – "Laspi" State Nature Landscape Sanctuary [LB].

the high reliability of our findings. The facts obtained can serve as a platform both for further research and for the management of protected areas.

(1) Karelin's newt

Based on the results of fieldwork of 2018, a number of conclusions can be made regarding the state of Karelin's newt populations (Fig. S2, Appendix). During the breeding season, the species was identified only in water bodies located along the Main Range. In the zone of the foothills (Mekenzievy Gory heights, Belbek River Valley), newts were not observed. The most significant population of the species in the territory of Sevastopol at present is the Chernaya River basin, a significant part of which is located within the "Baydarskyi" state regional landscape sanctuary. In 2015 and 2016 newts were also observed in relatively small numbers in a large water body in the Adym-Chokrak Valley, located near the border of Sevastopol and the Bakhchysarai District (near the foot of the Mount Baba-Dag). A significant refinement to the known range of this amphibian is its detection on the southern slope in the vicinity of Laspi Bay. The population density, according to available data, is low and, in any case, an order of magnitude lower than the maximum values recorded in the reservoirs of the Republic of Crimea (Kukushkin and Kushchan, 2015; Kukushkin et al., 2016). In the vast majority of cases, we observed a few or single individuals. Some peripheral populations (for example, in the Varnutskaya Valley near the village of Reservnoe) show signs of oppression and are apparently close to extinction. Most of Karelin's newt populations in the Sevastopol Region are at risk. Relatively large populations of newts (up to 50–100 individuals, according to rough estimates) were found at two sites in Sevastopol (in a fire reservoir on the Mordvinovskaya road and in a forest lake between the village of Orlinoe and the Baydarskie Vorota Pass), as well as in one of the reservoirs between the villages of Opolznevoe and Goluboy Zaliv in the Yalta urban territory. Another very important site for species conservation is localized on the northern slopes of the Ai-Petri Yayla in the area of the Shaitan-Merdven Pass and Balchikh-Kuyu Spring. The forests in which these water bodies are located require increased attention and protection. Of particular importance is the complete ban on logging within a radius of 1 km of water bodies, since outside the breeding season, newts live in forest litter and rotten tree trunks at a great distance from the water. In addition to the set of usual water conservation and forest conservation measures, the preservation of newt populations would undoubtedly be facilitated by the construction of small digging ponds (diameter up to 10–15 m, depth up to 3–4 m) in forest habitats and protection of river sources from pollution, which will also help the conservation and populations of anurans, especially the Eastern tree frog and the scientifically valuable "mixed" marsh frog populations represented by individuals of two mitochondrial haplotypes: the "eastern" (widespread in Crimea, the Caucasus and Anatolia), and the Central European "western" forms (Fig. S3, Appendix).

A distinctive feature of the spawning reservoirs of *T. karelinii* in the territory of Sevastopol is their small size and instability (Fig. S4, Appendix). Even under the canopy of a tall forest, they dry out, for the most part, in late May – mid-June. In the Sevastopol Region, adult newts were recorded spawning from the end of March – beginning of May to mid-June, that is, their time spent in water does not exceed 1.5 months. In view of the above-described features of the hydrological regime of small reservoirs in which newts breed, the timing of metamorphosis and release of juveniles to land in the extreme southwest of Crimea is likely at the end of June (judging by the time of recording of large larvae), however, in this case, reproductive success obviously should be quite low.

This is to some extent a paradoxical situation: on the one hand, the instability of the regime of shallow water bodies does not contribute to the growth of populations of the species, and on the other hand, only periodic drying of the water bodies and allows the newts to persist in them. Large reservoirs with a stable filling regime are completely stocked with fish; therefore, the number of newts in them is extremely low. The fish-stocking of shallow forest ponds, which is already happening everywhere and is being carried out, including by forestry workers, is completely unacceptable. There is good reason to believe that the introduction of even omnivorous (mainly herbivorous) fish species (such as ornamental koi carp) affects the state of newt populations in an extremely negative way. The stocking of reservoirs in the Sukhaya Rechka River basin with a pumpkinseed (*Lepomis gibbosus* (Linnaeus, 1758)) seems to render them completely unsuitable as newt habitats, since the spatial ecological niches of newts during the breeding season and the pumpkinseed, a predator with aggressive territorial behavior, at least coincide (shallow water with rich aquatic vegetation). The pumpkinseed should be categorized as a dangerous invader, the introduction of which causes significant damage to the native fauna.

In the next three-year period, a more thorough inventory of Karelin's newt habitats in Sevastopol and the development of a system of measures to restore oppressed populations (up to the discharge of water from some medium-sized forest ponds currently stocked up, such as, for example, Chuvash-Gol lakes) are necessary. Another relevant measure is the control of animal trade in aquarium pets. Karelin's newts (mostly young animals), although in a small numbers, are almost always present in the pet market of Sevastopol.

When setting environmental priorities, it should be borne in mind that at present, Karelin's newt is the most disadvantaged species of herpetofauna of the region.

(2) Eastern tree frog

Most records of this anuran species (Fig. S3B, Appendix) in 2018 were in the zone of the Main Range and the southern part of the Inner Cuesta (Mekenzievy Gory). It was also noted on the isthmus of Mayachnyi Peninsula inear the 35th coastal battery and some valley systems of the eastern part of Gerakleyiskyi Peninsula. Large spawning aggregations of the species have not been identified; as a rule, single individuals were recorded. The northern border of the Eastern tree frog range in Sevastopol has not been reliably established. There is reason to believe that in the Nakhimovsky District the species may be more common than is currently known.

The tree frog survives well with humans, and in arid treeless areas (such as the western part of Gerakleyiskyi Peninsula) it shows a tendency to synanthropization, using small artificial ponds in summer cottages and on the outskirts of settlements for spawning. It is possible that, based on the results of repeated monitoring, the question may be raised about the exclusion of this amphibian from the List of protected objects of wildlife in the city of Sevastopol.

(3) European pond turtle

The European pond turtle (Fig. S5A, Appendix) was identified in 2018 at a few sites located in the valleys of the region's main rivers (Chernanya and Belbek). According to the local population, the species also survives in small number in the floodplain of the Alma River near the village of Peschanoe in the Bakhchysarai District, where it was previously recorded (Fig. S6A–C, Appendix). In the Sevastopol Region, the population density of turtles is very low in comparison with that known for the reservoirs of the Republic of Crimea. In rare cases, we observed 3–4 individuals per count; usually single individuals were registered. The current state of populations of Baydarskaya Valley remains unclear, since a full survey of the eastern shore of the Chernorechenskoe reservoir was not possible (closed water protection zone). Taking into account the literature data and long-term observations in the territory of Sevastopol, it can be concluded that the range has narrowed and the species abundance significantly decreased in the second half of the 20th century. On the Gerakleyiskyi Peninsula, in the last decade the species has been recorded at a single site in the central part of peninsula; in bays it had completely disappeared by the beginning of the 1990s due to the degradation of reed floodplains in their desalinated upper reaches, coastal development, and salinization (Fig. S6D, Appendix). A survey of three forest ponds at the head of Cape Aya, where the turtle was observed in the 1980s, showed that the conditions for its habitat are currently absent due to the conversion of ponds to cattle drinking ponds.

It is necessary to maintain in its present form a large reservoir near the railway bridge on the Belbek River (the vicinity of the village of Dalnee), including the territory adjacent to it (slopes of dense vegetation and areas used by turtles for egg-laying at their bases). It should be taken into account that egg-laying places can be several hundred meters away from the waterline. When conducting re-monitoring, it is necessary to pay maximum attention to the state of the populations of the European pond turtle. Crimean populations of *Em. orbicularis* are characterized by a high level of genetic diversity and uniqueness (Fritz et al., 2009; Kotenko, 2010).

We did not observe the North American red-eared slider (*Trachemys scripta elegans*) when examining the natural reservoirs of Sevastopol. Thus, it can be assumed that this species does not extend beyond city parks in the region. So far, there is no reason to consider the red-eared slider in the region as a dangerous invasive species, or even as a naturalized adventive species (Kukushkin et al., 2017a).

(4) Danilewski's gecko

The Sevastopol Region contains the largest area of natural landscapes inhabited by Danilewski's gecko in the Crimean Peninsula (Fig. S5B, Appendix). It is completely located within the Balaklava District of Sevastopol city and stretches with some gaps from the heights of Kaya-Bash to the southeastern border of the city territory, at least to the cliffs of the Mounts Forossky Kant and Mshatka-Kayasy (Fig. S7, Appendix). Only in the territory of Sevastopol the gecko has numerous populations at altitudes from 500 to 640 m above sea level (the top of Cape Aya), rising to the mountains to 680 m above sea level (Mount Ilyas-Kaya). It is the widespread gecko in relic juniper-oak forests, and the altitude of the upper edge of its distribution is a phenomenon absolutely unique not only for the Black Sea region, but even for a significant part of the range of this lizard on the coast of Mediterranean Sea. Thus, the scientific value of Sevastopol populations is extremely high. The population density is distinctly uneven in different areas: from low to very high. Most valuable are the numerous populations living on the plot from Balaklava (Mount Asketi, the Micro-Yalo locality) to Cape Sarych (Choban-Tash Rocks). They are also the most vulnerable due to the strong recreational pressure, which leads to a high probability of forest fires. The highest population density of the species in Crimea was recorded in the isolated (accessible only from the sea) rocky couloir of Shaitan-Dere in the "Cape Aya" state regional landscape sanctuary (Kukushkin, 2004a) (Fig. S7B, Appendix).

A completely isolated gecko population (in total up to 100 individuals) located at a great distance from the sea on the southern slopes of the Kayu Ridge in the vicinity of the settlement of Blagodatnoe and the Vitmer's Gully (2.5 km east of Balaklava) is also of high scientific value (Fig. S7C, Appendix). It is necessary to provide a fire-fighting measures in recreational areas (along the Great Sevastopol Trail), and to prevent the development of the Vitmer's Gully.

At the same time, a change (increase) in the category of the conservation status of the species (currently "rare") is not required. Danilewski's gecko easily populates various modern buildings, so there is no direct threat to the existence of the species in the Sevastopol Region. Currently, synanthropization of the gecko is observed in the vicinity of Balaklava (Fig. S7D, Appendix) and on the top of Mount Kokiya-Kaya (more than 500 m above sea level), where this species inhabits the structures of the abandoned military unit, located 20 to 50 m away from the seaside cliffs. Modern climatic conditions clearly favor for expansion of the gecko. When protecting a species in the coastal massifs of relic juniper forest, it is important to be guided by the uniqueness and very high scientific value of these populations.

Among the "urban" groupings of the species, it is extremely important to preserve the ruin population of ancient town of Khersonesos. It was here that the gecko was first discovered in the territory of Crimea, and the first information on its biology was obtained here (Shcherbak, 1960, 1966). Thus, the synanthropic population of Khersonesos retains its reference value in studies of the species in Crimea. During restoration of the monument, specialist herpetologists should be consulted. The main requirement is to preserve a sufficiently large number of cracks in the masonry of the ancient walls, which are the main habitat of the gecko. It should be noted that the gecko's habitat in Khersonesos can be used to further increase the tourist attraction of the monument, since this lizard was brought to Khersonesos in ancient times (most likely from the Southern coast of Crimea and or from Northern Bulgaria) and, thus, is living evidence of Greek and Roman colonization of Taurica.

(5) Eurasian glass lizard

Studies in 2018 confirmed a rather favorable state of Eurasian glass lizard populations (Fig. S5D, Appendix) in the preserved natural landscapes of Gerakleyiskyi Peninsula (Cape Fiolent area), in the low mountains of the Baydarskaya Valley, as well as in the foothills (Temnaya Gully, Inkerman region, Mekenzievy Gory upland, Belbek River Valley). In many areas, this largest lizard of the local fauna has retained a high population density (Kukushkin, 2003a, 2003b). A survey of the Kacha River valley in the Bakhchysarai District (near the borders of the territory of Sevastopol) also confirmed the existence of numerous populations of the species, however, its distribution here (on the periphery of the range) is more distinctly sporadic than in Sevastopol. Within the Baydarskaya Valley, the species is distributed only in certain areas due to the more severe climate than in the foothills. The characteristic habitats of this lizard on the territory of Sevastopol are presented in Fig. S8 (Appendix).

Despite its seeming success, the total size of local populations of the Eurasian glass lizard is low (from several tens to a few hundred individuals), and the numbers of the species within the Sevastopol Region as a whole has a tendency to decrease, which can only worsen in the near future. Attention should be paid to a large and relatively prosperous population from Mount Gasforta, and in the interfluve of the Chernaya and Sukhaya Rechka rivers, and measures should be taken to protect them (to prevent the development of the foothills of the site from the village of Khmelnitskoe to Gasfortinskoe reservoir). For the protection of the Eurasian glass lizard and the natural complex as a whole, it is desirable to create several protected areas in the foothills. A promising area is that located above the abandoned military unit in the Temnaya Gully, where a large population of this lizard dwells and practically unbroken by human activity pistachio-tree sparse forest are preserved (Fig. S8C, Appendix).

Due to the anatomical features, Eurasian glass lizards can hardly move on smooth surfaces, and die everywhere on the roads. The section of "Taurida" highway passing through the territory of Sevastopol must be equipped with special shields that prevent reptiles from entering the roadway, or with underground passages (large diameter pipes) to ensure normal migration of animals between biotope sites. The conservation of the species on the outskirts of cities (Sevastopol, Inkerman, Balaklava) would be facilitated by the inclusion of extensive green areas in the plan of their development, where the landscape should be preserved in a close to natural form. When organizing these, one should take into account the presence on the territory of steep slopes overgrown with shrubs, rock ridges and piles of stones, where lizards could hide during human pursuit. It is advisable to install information boards on the territory of the" Laspi" , "Cape Aya" , and "Baydarskyi" wildlife landscape sanctuaries indicating the absence of poisonous snakes. This measure is likely to help reduce the killing of individual reptiles by tourists and locals.

(6) Taurida's sand lizard

This is the least common species of true lizard living in Sevastopol (Fig. S9, Appendix). A 2018 study revealed the Taurida's sand lizard in most of the places it was previously known from (Kukushkin, 2013) (Fig. S10, Appendix). Population density is low or very low. On the territory of Sevastopol, the species is naturally rare due to adverse, hot and arid climatic conditions. We could not find this species in the Gulustan-Bair Plateau (the southern spur of Mount Bechko-Kaya), where it was recorded in 2011 and 2012. Since we did not find the Taurida's sand lizard here during repeated surveys of the territory in 2017 (five times during the year), 2018 and 2019, it is possible that the boundary of the species range in this area shifted ("receded") to the Bakhchysarai District under the influence of climatic factors or other natural causes. Previously fluctuations in the abundance and southern boundary of the range of *L. agilis tauridica*

were noted for the outskirts of town of Alushta (Kukushkin, 2017a; Sviridenko and Kukushkin, 2005).

The Crimean endemic populations living on the territory of Sevastopol (Baydarskaya Valley, Trapan-Bair Ridge) belong to ancestral genetic lineages and have high scientific value (unpublished data by O.V. Kukushkin and O.A. Ermakov). The species does not need special protection measures, but the development of the foot of the Baydarskaya Yayla in the extreme southwest of the Baydarskaya Valley (a section from the foot of Mount Kalanykh-Kaya near the village of Tylovoe to the Mount Kukuman-Bair and the village of Kizilovoe) should be prevented.

(7) Smooth snake

A naturally rare species, the distribution of which is limited by climatic conditions. Its numbers and population density are subject to fluctuations (Kotenko et al., 2008). The range of the smooth snake at present only enters the territory of Sevastopol in some places, and so the smooth snake is one of the rarest and most locally distributed species of regional ophidiofauna (Fig. S12C, Appendix). The smooth snake should be included in the list of objects of the planned re-monitoring examination, since its southernmost populations have high scientific value. The genetic diversity of the smooth snake in Crimea is higher than in the entire territory of the East European Plain (Jablonski et al., 2019a). Note that due to a certain similarity of environmental preferences, this snake has been recorded in many habitats of the mountain Taurida's sand lizard (Fig. S10A, C, D, Appendix), although in very small numbers. Thus, measures aimed at preserving these two types of reptile can be combined.

(8) Caspian whipsnake

Caspian whipsnake (Fig. S11A, Appendix) is the most widespread and successful species of ophidiofauna in Sevastopol and Crimea as a whole. However, in 2018 this species of snake was relatively rare in Sevastopol, which confirms the need for its inclusion in the Red Book of Sevastopol. On the one hand, the low occurrence of the background species of herpetofauna can be explained by not quite favorable weather conditions during the period of the most intensive field expeditions (frequent rains), and on the other hand, this may indicate a lower density compared to other regions of Crimea populations in Sevastopol due to its afforestation. The optimal biotopes of the Caspian snake are stony steppes and light forests in the foothills zone. So, for example, during the only day (24.05.2018) spent in the southwestern part of the Bakhchysarai District, 7 individuals of the species (locally up to three individuals per 100 m of the route) were found in steppe biotopes on the slopes of the Cuesta hills in the Kacha Valley, and two individuals were found crushed on a highway on a flat site between the villages of Vilino and Uglovoe.

An indirect confirmation of the above can be a sharp decrease in the population density of the species in the Khvorostyanka locality in the vicinity of the village of Rodnoe. In the late 1990s and early 2000s, it was at this point that one of the highest values of the population density of the species in the whole of Crimea was established (Krasnaya kniga..., 2018), and now the snake has almost ceased to be found here. The reason for this, in our opinion, lies in the cessation of cattle grazing in the water protection zone of Su-Bashi Spring. The edge of the forest with sparse ruderal vegetation and individual small groups of trees and shrubs was for several years covered with almost impassable shrub thickets; the projective cover of grassy vegetation increased very significantly. Apparently, this was the reason for the decrease in the population density of this snake, which prefers open spaces.

When conducting monitoring studies in the future, the question of raising the category of rarity of the Caspian whipsnake on the territory of the city of Sevastopol (currently the "restored and restored species") may be raised. There is reason to believe that for a more objective reflection of the current situation with this species in Sevastopol, the category "species, decreasing in number" should be applied. In the urban area, the Caspian whipsnake is now literally disappearing before our eyes, as the territory is under development (many gullies of the Gerakleyiskyi Peninsula) expands, or the recreational pressure grows (ancient town of Khersonesos).

(9) Blotched snake

The blotched snake, or Sarmatian ratsnake (Fig. S11B, Appendix) is widespread in Sevastopol and uses a wide range of biotopes, avoiding only arid, completely treeless areas of the Gerakleyiskyi Peninsula and arid hot areas of the Southern coast. On the southern macroslope it is virtually absent. For unknown reasons, the abundance of this snake is dropping in Sevastopol. Between 2013 and 2016 the species was not recorded during special searches in those points where it was regularly found in the late 1990s–early 2000s, in particular, in the Varnutskaya Valley and in the vicinity of the village of Rodnoe. In 2018, blotched snake was very rare (3 records during the expedition period). To preserve the habitats of this snake the development of building-up the gorges in the vicinity of the village of Reservnoe should be discontinued and efforts should be made to save as many sites of natural landscapes near the village of Rodnoe as possible. The main populations of this species survive in the "Baydarskyi" regional landscape sanctuary (Fig. S13A, Appendix) and the Mekenzievskoe Forestry, and, according to available data, in the latter it is found more often and in greater numbers. In order to clarify the distribution of the blotched snake in Sevastopol, it is necessary to conduct searches in the central and

eastern parts of Gerakleyiskyi Peninsula, where there are characteristic habitats of the species (forest plantations of the Sevastopolskoe Forestry, pistachio-oak woodlands of Kilen-balka Gully).

(10) Leopard snake

The leopard snake (Fig. S11C, D, Appendix) is found in a significant part of the territory of Sevastopol, but everywhere has a very low population density. In 2018 and 2019 we know of only four records of the species: three within the territory of Sevastopol, one near the borders of Sevastopol and the Bakhchysarai District of the Republic of Crimea. Nevertheless, the state of the populations of this naturally rare snake is not yet cause for concern. Due to the gravitation of the species to places that are difficult to access and not widely visited (rocks, cliffs, gorges, steep slopes), many localities are still in a close to natural state (Fig. S13A, B, Appendix). Due to its small size and a very secretive life (in the hot season, it turns to twilight-night activity), the leopard snake persists even in large settlements, where it lives on shrub-covered slopes of valleys, in various ruins and wastelands. Nevertheless, lowering the category of the conservation status of the species (currently "a threatened species") is impractical because of the high commercial attractiveness of the species and the great demand for it amond amateurs-terrariumers. The population density of the species is so low that trapping even a small number of individuals may lead to irreversible processes, and the disappearance of local populations. In the city, this species has recently almost been never found, although in the period from 1996 to 2006 in the urban area, we recorded at least 30 individuals of *Z. situla*.

The land use regime near the borders of the "Laspi", "Baydarskyi" and "Cape Aya" state regional landscape sanctuaries, the sites of the main populations of the species in Sevastopol (Kukushkin and Tsvelykh, 2004; Kukushkin et al., 2017b), should be controlled. Due to the proximity to the town of Balaklava and the year-round threat of fires, the Ayazma (Inzhir) locality and the slopes of Mount Kalafatlar, as well as the valleys adjacent to the "Cape Aya" landscape sanctuary from the north (Mikro-Yalo and Megalo-Yalo bays, Mount Asketi) require special attention in this regard. The abundance of wild boar, which should be controlled in "Cape Aya" and "Baydarskyi" landscape sanctuaries, negatively affects the abundance of the species. To popularize the idea of the uniqueness and fragility of the nature of the Sevastopol Region, it is desirable to use the image of this very beautiful snake in the emblems of environmental institutions and clubs.

(11) Dice snake

In a number of regions of the Republic of Crimea, the dice snake is still one of the most characteristic and numerous species of snakes, but in Sevastopol this species is rare, the records of single individuals are more typical. In 2018 and 2019 few findings have been made that, on the one hand, gravitate to the stocked quarry lakes of the Chernaya River basin, and on the other hand, to the shallow bays of the extreme western part of Gerakleyiskyi Peninsula (Fig. S12B, S13A, Appendix). The reasons for the current low abundance of the species in the Chernaya River basin are not clear. In the XIX century the species was numerous in the estuary of this river (Kessler, 1861), however, in the late 1990s in the Chernorechenskyi canyon there were no more than one or two records of this snake per excursion. In Gerakleyiskyi Peninsula bays, the number of species is steadily declining. The greatest damage to the "coastal" population was done in the 1990s during the continuous development of the rocky peninsula, which separates the Kazachya and Solenaya bays. For an objective assessment of the processes in the Sevastopol populations of *N. tessellata*, special studies are desirable. The monitoring object should also be the coastal populations of dice snake, which are of great interest to science (Fig. S12A, Appendix).

(12) Steppe viper

In 2018 and 2019 steppe viper (Fig. S12D, Appendix) was not recorded during the surveys of the plains of steppe in the Kacha and Alma rivers interfluve. Thus, the concept that this snake has supposedly disappeared from the territory of Sevastopol remains valid. Since specialists have data on periodic fluctuations of the western border of the range and the catastrophic decline in the numbers of steppe vipers in North-Western Crimea at the turn of the 20th and 21st centuries (up to complete extinction over large areas) (Kotenko, 2007), today there are grounds to propose removing this species of snake from the List of protected objects of wildlife in the city of Sevastopol. However, the steppe viper is quite resistant to anthropogenic impact and restrcition of its range, so there is still hope that oppressed micropopulations of this snake could still survive on the territory of Sevastopol and be detected by targeted research.

All steppe areas of good preservation in a kilometer strip from the sea within the Nakhimovsky District of Sevastopol, including abandoned agricultural lands with restored steppe vegetation (Fig. S13D, Appendix), must be taken into account and preserved, especially since their area is very small and they can be withdrawn from agricultural circulation almost without damage to the national economy or significant costs to farmers. Particular attention should be paid to the vast steppe areas adjacent to the military airfield in the Kacha settlement, where, according to reports, the steppe viper was last recorded in the early 1990s (Kukushkin, 2004b). When examining this territory in May 2006, we were not able to find *V. renardi* here, which does not indicate its absence, since this snake has a very low population density in a particularly arid regions of the Crimean coast (such as, for example, the Opuk Nature Reserve in the southeast of the Kerch Peninsula), and it can be found extremely rare-

ly, and the finds are not annual. Currently, access to the steppe plots near the Kacha settlement has been stopped, and their examination for zoological purposes is difficult or impossible. However, through Sevprirodnadzor, it is possible to persuade the authorities and employees of the airfield to collect data on the snakes living here. As evidence of the habitation of the steppe viper in Sevastopol, photographs of animals (ideally with georeferencing), cast skins or corpses of snakes provided to Sevprirodnadzor can be used. Upon receipt of any of these items, a consultation with a specialist herpetologist is required to accurately identify the species of reptile. The scientific value of a new find of the steppe viper in Sevastopol would be extremely high. It is noteworthy that this information will also benefit the military, since the presence of poisonous snakes on the territory of a military units is necessary information.

The notion about some anthropogenous negative impacts leading to an irreversible reduction in the area of amphibians and reptiles habitats in Sevastopol Region presented in Fig. S4D and S13 (Appendix).

Conclusions

The herpetofauna of the southwestern Crimea is characterized by significant diversity (17 species of amphibians and reptiles) and distinct features. It contains taxa with a Circum-Euxinian ranges (*H. orientalis, Em. orbicularis, C. austriaca, Do. caspius, El. sauromates, N. natrix,* and *N. tessellata*), Crimean-Balkan-Anatolian (*M. danilewskii, Po. tauricus, Z. situla*), Crimean-Caucasian (*T. karelinii*), Crimean-Caucasian-Anatolian (*Pe.* cf. *bedriagae*), Crimean-Caucasian-Turanian (*Ps. apodus apodus*), and European ranges (*B. viridis, Pe. ridibundus* s. str.), as well as endemic Crimean forms (*Da. lindholmi, L. agilis tauridica, V. renardi puzanovi*). Most species are broadly related to a Mediterranean origin. There is reason to believe that the southwestern part of Mountainous Crimea (the Chernaya River basin with adjacent territories in the foothills and on the Southern coast) served as one of the important herpetofauna refugia during the last stage of the Wurm glaciation, when severe boreal conditions were established in most of the Mountainous Crimea (Kukushkin et al., 2018; unpublished data of O.V. Kukushkin and O.A. Ermakov). The antiquity of the biota of the southernmost part of the peninsula determines the high scientific value of the populations inhabiting Sevastopol territory.

The herpetofauna of the Sevastopol Region is characterized by a number of unique features that are not recorded anywhere else in Crimea in this combination (composition of species, features of their distribution). The maximum diversity of taxa, as well as the number of rare species, was noted in the Balaklava District of Sevastopol city. In the same area, all the protected areas important for the conservation of herpetofauna are concentrated.

The state of the populations of most species of amphibians and reptiles listed in the Red Book of Sevastopol has not reached a critical level. The most threatened taxon among them is Karelin's newt, a species with a little ability for synanthropization that disappears when the reservoirs are stocked with fish. Current trends in climate change are unfavorable for this amphibian species, as is the accompanying landscape aridization (Transformatsiya…, 2010).

When preparing a new edition of the Red Book of Sevastopol, it is recommended to make a number of changes regarding the nomenclature of taxa, the general list of species and categories of their conservation status. In particular, it is necessary to raise the categories of conservation status for the European pond turtle, blotched snake, and dice snake. The accounting and qualification of the remaining steppe plots and a targeted search for the allegedly extinct steppe viper on the northern coast of Sevastopol and in the coastal strip within the Bakhchysarai, Simferopol and Saky regions (a section from the Kacha settlement to Kizyl-Yar Lake) are extremely relevant.

In modern socio-economic conditions, it is difficult to imagine government events aimed at protecting species such as Karelin's newt or the blotched snake, therefore the preservation of large areas of natural landscapes becomes extremely important. Significant success of environmental activities in recent years is the organization in Sevastopol of new protected areas with a relatively large area, the "Karanskyi" and "Laspi" state regional landscape sanctuaries (although it should be recognized that, in general, the political events of recent years have not contributed to the preservation of the natural complex and the strengthening of the position of nature conservation). Currently, all the protected areas of Sevastopol, including those created to protect landscapes that are absolutely unique to Eastern Europe (such as Cape Aya, Laspi Bay, the Chernaya river basin), are of regional importance. The protection of these territories is still more formal than real, and obviously cannot significantly affect the rate of degradation of the natural complex of Sevastopol as a whole. Only Yalta Mountain-Forest Nature Reserve of the Republic of Crimea, which occupies a narrow strip of Yayla cliffs in the administrative territory of Sevastopol, should receive federal status in the future. This paradox can be eliminated by combining the closely located territories of the "Cape Aya", "Baydarskyi", "Laspi" wildlife sanctuaries in one protected area – for example, a national park that includes two territorial clusters: mountainous and southern-coastal region.

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References

Arslan, D., Olivier, A., Yaşar, Ç., Ismail, I.B., Döndüren, Ö., Ernoul, L., Beck, N. Çiçek, K., 2018. Distribution and current status of herpetofauna in the Gediz delta (Western Anatolia, Turkey). *Herpetology Notes* **11**, 1–15.

Atlas. Autonomous Republic of the Crimea, 2003. In: Bagrov, M.V., Rudenko, L.G. (eds.). Institute of Geography: V.I. Vernadsky Tavrida National University, Kyïv – Simferopol, Ukraine, 80 p. (In Ukrainian).

Baker, J.M.R., 2015. Marine sightings of grass snakes *Natrix natrix*. *The Herpetological Bulletin* **131**, 30–31.

Belik, V.P., 2013. Ornitogeograficheskie svyazi i rayionirovanie Bolshogo Kavkaza (novye podhody v analize fauny) [Ornithogeographical links and division of the Great Caucasus (new approaches to the analysis of the fauna)]. *Strepet* **11** (1), 5–88. (In Russian).

Bertrand, M., Kukushkin, O., Pogrebnyak, S., 2013. A new species of mites of the genus *Geckobia* (Prostigmata, Pterygosomatidae), parasitic on *Mediodactylus kotschyi* (Reptilia, Gekkota) from Crimea. *Vestnik zoologii [Bulletin of Zoology]* **47** (2), 99–111. https://doi.org/10.2478/vzoo-2013-0009.

Bokov, V.A., 1999. Sistematika landshaftov [Systematics of landscapes]. In: Apostolov et al. (eds.), *Biologicheskoe i landshaftnoe raznoobrazie Kryma: problemy i perspektivy [Biological and landscape diversity of the Crimea: problems and prospects]. Nauchno-Prakticheskiy diskusionno-analiticheskiy sbornik "Voprosy razvitiya Kryma". Vypusk 11 [Scientific-practical discussion-analytic compilation "Issues of the development of the Crimea". Issue 11].* SONAT, Simferopol, Ukraine, 25–28. (In Russian).

Bokov, V.A., 2004. Prostranstvennaya model' zonal'nykh landshaftov Kryma [Spatial model of the zonal landscapes of the Crimea]. *Uchenye zapiski Tavricheskogo natsional'nogo universiteta imeni V.I. Vernadskogo. Seriya "Geographiya" [Scientific Notes of the V.I. Vernadsky Taurida National University. Series "Geography"]* **17** (4), 3–10. (In Russian).

Borkin, L.J., Shabanov, D.A., Brandler, O.V., Kukushkin, O.V., Litvinchuk, S.N., Mazepa, G.A., Rosanov, J.M., 2007. A case of natural triploidy in european diploid green toad (*Bufo viridis*), with some distributional records of diploid and tetraploid toads. *Russian Journal of Herpetology* **14** (2), 121–132.

Brauner, A., 1903. Predvaritel'noe soobschenie o presmykayuschikhsya i gadakh Bessarabii, Khersonskoyi gubernii, Kryma i severo-zapadnogo Kavkaza mezhdu Novorossyiskom i Adlerom [Preliminary report on reptiles and amphibians of Bessarabia, Kherson Province, Crimea and the North-West Caucasus between Novorossiysk and Adler]. *Zapiski Novorossyiskogo Obschestva Estestvoispytateleyi [Notes of Novorossiya Society of Naturalists]* **25** (1), 43–59. (In Russian).

Brauner, A., 1905. Predvaritel'noe soobschenie o presmykayuschikhsya i zemnovodnykh Kryma, Kubanskoyi oblasti, Volynskoyi i Varshavskoyi gubernyi [Preliminary report on reptiles and amphibians of the Crimea, Kuban Region, Volyn and Warsaw Provinces]. *Zapiski Novorossyiskogo Obschestva Estestvoispytateleyi [Notes of Novorossya Society of Naturalists]* **28**, 1–14. (In Russian).

Chervona kniga Ukrainy. Tvarinnyi svit, 2009. [Red Data Book of Ukraine. Animal Kingdom, 2009]. Akimov, I.A. (ed.). Globalconsaltyng, Kyïv, Ukraine, 600 p. (In Ukrainian).

Cordova, C.E., 2007. Holocene Mediterranization of the Southern Crimean vegetation: palaeoecological records, regional climate change, and possible non-climatic influences. In: Yanco-Hombach, V. et al. (eds.), *The Black Sea Flood Question: Changes in Coastline, Climate, and Human Settlement*. Springer, Dordrecht, The Netherlands, 319–344. https://doi.org/10.1007/978-1-4020-5302-3_13.

Cox, N.A., Temple, H.J., 2009. European Red List of Reptiles. Office for Official Publications of the European Communities, Luxembourg, 33 p.

Didukh, Ya.P., 1992. Rastitel'nyi pokrov Gornogo Kryma (struktura, dinamika, evolyutsiya i okhrana) [Vegetation cover of the Mountain Crimea (structure, dynamics, evolution and protection)]. Naukova Dumka, Kiev, Ukraine, 256 p. (In Russian).

Doronin, I.V., 2012. Ispol'zovanie geoinformatsionnykh sistem dlya analiza rasprostraneniya skal'nykh yascherits kompleksa *Darevskia* (*saxicola*) (Sauria: Lacertidae) [The use of GIS for the analysis of the distribution of rock lizards *Darevskia* (*saxicola*) complex (Sauria: Lacertidae)]. *Sovremennaya herpetologiya [Current Studies in Herpetology]* **12** (3/4), 91–122. (In Russian).

Doronin, I.V., Tuniyev, B.S., Kukushkin, O.V., 2013. Differentsiatsiya i sistematika skal'nykh yascherits kompleksa *Darevskia (saxicola)* (Sauria: Lacertidae) po dannym morfologicheskogo i molekulyarnogo analizov [Differentiation and taxonomy of the rock lizards *Darevskia* (*saxicola*) complex (Sauria: Lacertidae) according to morphological and molecular analyses]. *Trudy Zoologicheskogo instituta RAN [Transactions of Zoological Institute of the RAS]* **317** (1), 54–84. (In Russian).

Dotsenko, I.B., 2003. Katalog kollektsyi Zoologicheskogo muzeya NNPM NAN Ukrainy. Zmei [Catalogue of the Collections of Zoological Museum, NSNHM, NAS of Ukraine. The Snakes]. NSNHM, NAS of Ukraine, Kiev, Ukraine, 86 p. (In Russian).

Dotsenko, I.B., 2006. O solonovodnykh populyatsiyakh ozernoyi lyagushki (*Rana ridibunda*) v okrestnostyakh Odessy [The marsh frog (*Rana ridibunda*) saltwater populations in the vicinities of Odessa]. *Zbirnik prats' Zoologichnogo museyu [Transactions of Zoological Museum]* **38**, 80–83. (In Russian).

Dunayev, E.A., Imshenitsky, A.V., 2019. Zemnovodnye i presmykayuschiesya – introdutsirovannye i invazivnye vidy [Amphibians and reptiles – introduced and invasive species]. *RusTerra magazine* **5**, 4–16. (In Russian).

Duysebaeva, T.N., 2012. Obzor fauny amfibyi i reptilyi Mangistauskoyi oblasti [Review of amphibian and reptilian fauna of Mangistau District (Kazakhstan)]. *Selevinia* **20**, 59–65. (In Russian).

Eksilmez, H., Altunişik, A., Özdemir, N., 2017. The herpetofauna of Karçal Mountains (Artvin/Turkey). *Biological Diversity and Conservation* **10** (1), 1–5.

Emelyanov, A.F., 1974. Predlozheniya po klassifikatsii i nomenklature arealov [Proposals on classification and nomenclature of distributional ranges]. *Entomologicheskoe obozrenie [Entomological Review]* **53** (3), 497–522. (In Russian).

Epova, L.A., Kuranova, V.N., Babina, S.G., 2013. Vidovoe raznoobrazie, biotopicheskoe raspredelenie i chislennost' zemnovodnykh i presmykayuschikhsya zapovednika "Kuznetskyi Alatau" v gradiente vysotnoyi poyasnosti (yugo-vostok Zapadnoyi Sibiri) [Species diversity, spatial distribution, and abundance of amphibians and reptiles of Kuznetsk Alatau Natural Reserve in altitude gradient (south-east of Western Siberia)]. *Vestnik Tomskogo gosudarstvennogo universiteta (Biologiya) [Bulletin of the Tomsk State University. Biology]* **4** (24), 77–97. (In Russian).

Eser, Ö., Erismis, U.C., 2014. Research of the Herpetofauna of Başkomutan Historical National Park, Afyonkarahisar, Turkey. *Biharen Biologist* **8** (2), 98–101.

Firsov, L.V., 1990. Isary (ocherki istorii srednevekovykh kreposteyi Yuzhnogo berega Kryma) [Isary. Essays on the history of medieval fortresses of the Southern coast of the Crimea]. Nauka, Siberian Branch, Novosibirsk, Russia, 470 p. (In Russian).

Fritz, U., Ayaz, D., Hundsdörfer, A.K., Kotenko, T., Guicking, D., Wink, M., Tok, C.V., Çiçek, K., Buschbom, J., 2009. Mitochondrial diversity of European pond turtles (*Emys orbicularis*) in Anatolia and the Ponto-Caspian Region: Multiple old refuges, hotspot of extant diversification and critically endangered endemics. *Organisms, Diversity & Evolution* **9**, 100–114. https://doi.org/10.1016/j.ode.2009.02.002.

Frost, D.R., 2018. Amphibian Species of the World: an Online Reference. Ver. 6.0. Web page. URL: http//:research.amnh.orgherpetologyamphibiaindex.html (accessed: 22.04.19).

Fuentes, M.A., Escoriza, D., 2015. *Natrix maura* (viperine snake) marine foraging. The *Herpetological Bulletin* **134**, 31–32.

Gablitz, K.I., 1785. Fizicheskoe opisanie Tavricheskoyi oblasti, po eyo mestopolozheniyu i vsem tryom tsarstvam prirody [Physical description of Taurida region by its location and all three Kingdoms of Nature]. I. Weitbrecht Emperor Printing house, St. Petersburg, Russia, 198 p. (In Russian).

Garkusha, L.Ya., Bagrova, L.A., Pozachenyuk, E.A., 2012. Raznoobrazie landshaftov Kryma so sredizemnomorskimi elementami flory [The diversity of Crimean landscapes with Mediterranean elements of flora]. *Uchenye zapiski Tavricheskogo natsional'nogo universiteta imeni V.I. Vernadskogo [Scientific Notes of V.I. Vernadsky Taurida National University]* **25** (2), 36–47. (In Russian).

Iljashenko, V.Yu., Shatalkin, A.I., Kuvaev, A.V., Komandatov, A.Yu., Britaev, T.A., Kosyan, A.R., Pavlov, D.S., Shilin, N.I., Ananjeva, N.B., Tuniyev, B.S., Semenov, D.V., Syroechkovsky, E.E., Morozov, V.V., Mishchenko, A.L., Rozhnov, V.V., Poyarkov, A.D., 2018. Redkie i nakhodyaschiesya pod ugrozoyi ischeznoveniya zhivotnye Rossii. Materialy k Krasnoyi knige Rossyiskoyi Federatsii [Rare and endangered animals of Russia. Materials for the Red Data Book of the Russian Federation]. KMK, Moscow, Russia, 69 p. (In Russian).

IUCN Red List Categories and Criteria: Version 3.1. Second Edition, 2012. IUCN, Gland, Switzerland and Cambridge, UK, iv + 32 p.

Jablonski, D., Jandzik, D., Gvoždík, V., 2012. New records and zoogeographic classification of amphibians and reptiles from Bosnia and Herzegovina. *North-Western Journal of Zoology* **8** (2), 324–337.

Jablonski, D., Nagy, Z.T., Avci, A., Kurtuluş, O., Kukushkin, O.V., Safaei-Mahroo, B., Jandzik, D., 2019a. Cryptic diversity in the smooth snake (*Coronella austriaca*). *Amphibia-Reptilia* **40**, 179–192. https://doi.org/10.1163/15685381-20181025.

Jablonski, D., Kukushkin, O.V., Avci, A., Bunyatova, S., Kumlutaş, Y., Ilgaz, Ç., Polyakova, E., Shiryaev, K., Tuniyev, B., Jandzik, D., 2019b. The biogeography of *Elaphe sauromates* (Pallas, 1814), with a description of a new rat snake species. *PeerJ* **7**:e6944. https://doi.org/0.7717/peerj.6944.

Jandzik, D., Jablonski, D., Zinenko, O., Kukushkin, O.V., Moravec, J., Gvoždíc, V., 2018. Pleistocene extinctions and recent expansions in an anguid lizard of the genus *Pseudopus. Zoologica Scripta*, **47**, 21–32. https://doi.org/10.1111/zsc.12256.

Kadeev, V.I., 1970. Ocherki istorii ekonomiki Khersonesa v I–IV vv. n. e. [Essays on the history of the economics of Khersonesos in I–IV centuries A.D.] Kharkovsky gosudarstvennyi universitet, Kharkov, USSR, 162 p. (In Russian).

Kalyabina-Hauf, S.A., Milto, K.D., Ananjeva, N.B., Joger, U., Kotenko, T.I., Wink, M., 2004. Reevaluation of the status of *Lacerta agilis tauridica* Suchow, 1926. *Russian Journal of Herpetology* **11** (1), 65–72.

Karmishev, Yu.V., 1999. Berns'ki vidy yaschirok u Chervonoyi knizi Ukrainy. Zhovtopuz – *Ophisaurus apodus* [Bern' species of the lizard in the Red Data Book of the Ukraine. Eurasian glass lizard – *Ophisaurus apodus*]. In: Zagorodnyuk, I.V. (ed.*), Katalog flori i fauni Bernskoi Konvencii. Vypusk 3. Zemnovodni ta plazuny Ukrayiny pid okhoronoyi Berns'koyi Konventsyii [Catalogue of the flora and fauna of Bern Convention. Issue 3. Amphibians and reptiles of Ukraine protected by the Bern Convention]*. Kyiv, Ukraine, 61–62. (In Ukrainian).

Karmyshev, Yu.V., 1999. Rasprostranenie i morfologicheskaya izmenchivost' stepnoyi gadyuki Kryma i sopredelnykh territoryi [Distribution and morphological variability of the steppe viper from Crimea and adjacent territories]. *Problemy izuchenya fauny yuga Ukrayiny: Sbornik nauchnykh statei pamyati Yu.V. Kostina [Problems in the study of the fauna of the south of Ukraine: Collection of scientific articles in memory of Yu.V. Kostin].* AstroPrint, Odessa, Branta, Melitopol', Ukraine, 54–59. (In Russian).

Karmyshev, Yu.V., 2001a. Reproduktivnye osobennosti chetyryokhpolosogo poloza (*Elaphe quatuorlineata sauromates* Pallas, 1814) na yuge Ukrayiny [Reproductive characteristics of a four-lined ratsnake (*Elaphe quatuorlineata sauromates* Pallas, 1814) at the south of Ukraine]. *Vestnik Zaporozhskogo gosudarstvennogo universiteta [Bulletin of Zaporizhia State University]* **2**, 1–3. (In Russian).

Karmyshev, Yu.V., 2001b. Novye dannye o rasprostranenii leopardovogo poloza (*Elaphe situla*) v Krymy [New data on distribution of the leopard ratsnake (*Elaphe situla*) in the Crimea]. *Vestnik zoologii [Bulletin of Zoology]* **1**, 52. (In Russian).

Kessler, K.F., 1861. Puteshestvie, s zoologicheskoyi tseljyu, k severnomu beregu Chernogo morya i v Krym, v 1858 godu [A journey, with a zoological purpose, to the northern shore of the Black Sea and in the Crimea, in 1858]. University Printing House, Kiev, Ukraine, 248 p. (In Russian).

Köppen, V., 1938. Osnovy klimatologyii (klimaty Zemnogo shara) [Basic Climatology (Climates of the Earth)]. State educational-pedagogical publishing house of the People's Commissariat of Education of the RSFSR, Moscow, USSR, 375 p. (In Russian).

Kostin, Yu.V., Dulitsky, A.I., Kostin, S.Yu., 1999. Zonal'no-biotopicheskoe delenie territoryii (ornito-teriologicheskyi podhod) [Zonal-biotopic division of the territory (ornito-theriological approach)]. In: Apostolov et al. (eds.), *Biologicheskoe i landshaftnoe raznoobrazie Kryma: problemy i perspektivy [Biological and landscape diversity of the Crimea: problems and prospects]. Nauchno-Prakticheskiy diskusionno-analiticheskiy sbornik "Voprosy razvitiya Kryma". Vypusk 11 [Scientific-practical discussion-analytic compilation* "*Issues of the development of the Crimea". Issue 11].* SONAT, Simferopol, Ukraine, 33–56. (In Russian).

Kotenko, T.I., 1987. Okhrana amfibyi i reptilyi v zapovednikakh Ukrayiny [Protection of amphibians and reptiles in the reserves of Ukraine]. In: Darevsky, I.S., Krever, V.G. (eds.), *Amfibii i reptilii zapovednykh territory. Sbornik naucnhykh trudov [Amphibians and reptiles of protected territories. Collection of scientific papers].* Central Scientific Research Laboratory of Glavokhota of RSFSR, Moscow, USSR, 60–80. (In Russian).

Kotenko, T.I., 2002. Predlozheniya po rasshireniyu zapovedmoyi seti Ravninnogo Kryma [Proposals for the widening of the reserve network of the Plain Crimea]. *Materialy vtoroy nauchnoy konferencii "Zapovedniki Kryma. Bioraznoobrazie na prioritetnykh territoriyakh: 5 let posle Gurzufa" [Proceedings of the 2d scientific conference "Nature reserves of the Crimea. Biodiversity on the areas of high priority: 5 years after Gurzuf"].* Simferopol, Ukraine, 129–134. (In Russian).

Kotenko, T.I. 2004. Distribution, habitats, abundance and problems of conservation of the European pond turtle (*Emys orbicularis*) in Crimea (Ukraine): first results. *Biologia, Bratislava* **59** (14), 33–46.

Kotenko, T.I., 2007. O rasprostranenii stepnoyi gadyuki, *Vipera renardi* (Reptilia, Viperidae), v zapadnoyi chasti ravninnogo Kryma [On distribution of the steppe viper, *Vipera renardi* (Reptilia, Viperidae), in the western part of the lowland Crimea]. *Vestnik zoologii [Bulletin of Zoology]* **41** (5), 422. (In Russian).

Kotenko, T.I., 2010. Zemnovodnye i presmykayuschiesya Kryma [Amphibians and Reptiles of the Crimea]. *Nauchnye zapiski prirodnogo zapovednika "Mys Martyan" [Scientific Notes of the "Cape Martyan" Nature Reserve]* **1**, 171–224. (In Russian).

Kotenko, T.I., Kukushkin, O.V., 2003. Osobennosti rasprostraneniya zmeyi na Krymskom poluostrove. Chast' 1. [Peculiarities of the distribution of snakes on the Crimean Peninsula. Part 1]. *Materialy Mezhdunarodnoy konferencii "Zmei Vostochnoyi Evropy" [Materials of the International conference "Snakes of the Eastern Europe"].* Institute of Ecology of the Volga River Basin of RAS, Togliatti, Russia, 35–41. (In Russian).

Kotenko, T.I., Kukushkin, O.V., 2008. Gadyuka stepova, *Vipera renardi* (Christ.), – vid Chervonoyi knigi Ukrayiny [Steppe Viper, *Vipera renardi* (Christ.), – a species of the Red Data Book of Ukraine]. In: Kostiushin, A.V., Fesenko, G.V. (eds.), *Znakhidky tvaryn Chervonoyi knigi Ukrainy [Records of the animals of Red Data Book of Ukraine].* I.I. Schmalhausen Institute of Zoology, Kyïv, Ukraine, 101–132. (In Ukrainian).

Kotenko, T.I., Kukushkin, O.V., 2010. Annotirovannye spiski zemnovodnykh i presmykayuschikhsya zapovednikov Kryma [Annotated lists of amphibians and reptiles of Crimea reserves]. *Nauchnye zapiski prirodnogo zapovednika "Mys Martyan" [Scientific Notes of the "Cape Martyan" Nature Reserve]* **1**, 225–261. (In Russian).

Kotenko, T.I., Kukushkin, O.V., 2013. Territorii vostochnogo Kryma – objecty regional'noyi ekoseti, vazhnye dlya sokhraneniya herpetofauny [Territories of the eastern Crimea as objects of the regional ecological network, important for the preservation of herpetofauna]. In: Ivanov, S.P. (ed.), *Priroda Vostochnogo Kryma. Otsenka bioraznoobraziya i raz-*

rabotka proekta lokal'noyi ekologicheskoyi seti [Nature of the Eastern Crimea. Biodiversity assessment and development of the project of local ecological network]. Kiev, Ukraine, 55–60. (In Russian).

Kotenko, T.I., Kukushkin, O.V., Zinenko, O.I., 2008, Midyanka zvichayina, *Coronella austriaca* Laur., – vid Chervonoyi knigi Ukrayiny [A smooth snake, *Coronella austriaca* Laur., – a species of the Red Data Book of Ukraine]. In: Kostiushin, A.V., Fesenko, G.V. (eds.), *Znakhidky tvaryn Chervonoyi knigi Ukrainy [Records of the animals of Red Data Book of Ukraine].* I.I. Schmalhausen Institute of Zoology, Kiev, Ukraine, 133–151. (In Ukrainian).

Kotsakiozi, P., Jablonski, D., Ilgaz, Ç., Kumlutaş, Y., Avci, A., Meiri, S., Itescu, Y., Kukushkin, O., Gvoždík, V., Scillitani, G., Roussos, S.A., Jandzik, D., Kasapidis, P., Lymberakis, P., Poulakakis, N., 2018. Multilocus phylogeny and coalescent species delimitation in Kotschy's gecko, *Mediodactylus kotschyi*: Hidden diversity and cryptic species. *Molecular Phylogenetics & Evolution* **125**, 177–187. https://doi.org/10.1016/j.ympev.2018.03.022.

Krasnaya kniga goroda Sevastopolya [The Red Data Book of Sevastopol], 2018. In: Dovgal, I.V., Korzhenevsky, V.V. (eds.). ROST–DOAFC, Kaliningrad, Sevastopol, Russia, 432 p. (In Russian).

Krasnaya kniga Respubliki Krym. Zhivotnye. Izdanie vtoroe, ispravlennoe [Red book of the Republic of Crimea. Animals. Second edition, revised.], 2016. In: Ivanov, S.P., Fateryga A.V. (eds.). Arial, Simferopol, Russia, 440 p. (In Russian).

Krym. Chast' I. Geologicheskoe opisanie [Crimea. Part I. Geological description], 1969. In: Sidorenko, A.V. (ed.). Nedra, Moscow, USSR, 576 p. (In Russian).

Kukushkin, O.V., 2003a. Osobennosti rasprostraneniya zheltopuzika v Krymu. Chast' 1. Gornyi Krym [Patterns of the glass lizard distribution in the Crimea. Part 1. Mountain Crimea]. *Materiali naukovoi konferencii, prisvyachennoi 80-richu Kanivskogo prirodnogo zapovidnika"Rol' prirodno-zapoidnykh teritoryi u pidtrymanni bioriznomanittya" [Proceedings of scientific conference, dedicated to 80th anniversary of the Kanivs'kyi Nature Reserve "The role of nature protected areas in the maintaining of biodiversity"].* Kanivs'kyi Nature Reserve, Kaniv, Ukraine, 225–226. (In Russian).

Kukushkin, O.V., 2003b. Sovremennoe sostoyanie populyatsyi zheltopuzika *Pseudopus apodus* (Squamata, Anguidae) v Krymu [The current state of the glas lizard *Pseudopus apodus* (Squamata, Anguidae) populations in Crimea]. *Materialy II Mezhdunarodnoi nauchnoi konferencii "Bioraznoobrazie i rol' zootsenoza v estestvennykh i antropogennykh ekosistemakh" [Proceedings of the 2d International scientific conference "Biodiversity and the role of zoocenosis in natural and anthropogenic ecosystems"].* Dnepropetrovskyi National University, Dnepropetrovsk, Ukraine, 217–218. (In Russian).

Kukushkin, O.V., 2004a. Rasprostranenie, biotopicheskoe raspredelenie i chislennost' sredizemnomorskogo (krymskogo) gekkona, *Cyrtopodion kotschyi danilewskii* (Strauch, 1887) (Reptilia, Squamata, Gekkonidae), v Yuzhnom Krymu [Distribution, habitat allocation and abundance of the Kotschy's (Crimean) gecko, *Cyrtopodion kotschyi danilewskii* (Strauch, 1887) (Reptilia, Squamata, Gekkonidae), in the Southern Crimea]. In: Morozova, A.L., Gniubkin, V.F. (eds.), *Sbornik nauchnikh trudov, posvyaschennykh 90-letiyu Karadagskoy nauchnoy stancii im. T.I. Vyazemskogo i 25-letiyu Karadagskogo prirodnogo zapovednika NAN Ukrainy "Karadag. Isoriya, geologiya, botanika, zoologiya". Kniga 1 [Collection of scientific paper dedicated to 90th anniversary of T.I. Vyazemsky Karadag scientific station and 25th anniversary of Karadag Nature Reserve of NAS of Ukraine "Karadag. History, geology, botany, zoology". Book 1].* SONAT, Simferopol, Ukraine, 367–396. (In Russian).

Kukushkin, O.V., 2004b. Rasprostranenie, reproductivnye osobennosti, razmerno-vozrastnaya struktura i sovremennoe sostoyanie populyatsyi stepnoyi gadyuki, *Vipera renardi* (Christoph, 1861), v Krymu [Distribution, reproductive peculiarities, size-age structure and current state of populations of the steppe viper, *Vipera renardi* (Christoph, 1861), in the Crimea]. In: Morozova, A.L., Gniubkin, V.F. (eds.), *Sbornik nauchnikh trudov, posvyaschennykh 90-letiyu Karadagskoy nauchnoy stancii im. T.I. Vyazemskogo I 25-letiyu Karadagskogo prirodnogo zapovednika NAN Ukrainy "Karadag. Isoriya, geologiya, botanika, zoologiya". Kniga 1 [Collection of scientific paper dedicated to 90th anniversary of T.I. Vyazemsky Karadag scientific station and 25th anniversary of Karadag Nature Reserve of NAS of Ukraine "Karadag. History, geology, botany, zoology". Book 1*]. SONAT, Simferopol, Ukraine, 397–424. (In Russian).

Kukushkin, O.V., 2005a. Materialy k reproduktivnoyi biologyii sredizemnomorskogo gekkona – *Cyrtopodion kotschyi danilewskii* (Strauch, 1887) v Krymu [Data on reproductive biology of Kotschy's gecko – *Cyrtopodion kotschyi danilewskii* (Strauch, 1887) in the Crimea]. *Sovremennaya Herpetologiya [Current Studies in Herpetology]* **3/4**, 84–92. (In Russian).

Kukushkin, O.V., 2005b. K voprosu o sokhranenii krymskogo gekkona (Reptilia, Sauria, Gekkonidae) v natsional'nom arkheologicheskom zapovednike "Khersones Tavricheskyi" (Sevastopol) [On the issue of the preservation of the Crimean gecko (Reptilia, Sauria, Gekkonidae) in the national archaeological reserve "Khersonesos of Taurida" (Sevastopol)]. *Materialy III nauchnoy konferencii "Zapovedniki Kryma: zapovednoe delo, bioraznoobrazie, ekoobrazovanie. Chast' 2. Zoologiya bespozvonochnykh. Zologiya pozvonochnykh. Ekologiya" [Proceedings of 3d scientific conference "Reserves of the Crimea: conservation, biodiversity, environmental education. Part 2. Zoology of invertebrates. Zoology of vertebrates. Ecology]*. V.I. Vernadsky Taurida State University, Simferopol, Ukraine, 154–159. (In Russian).

Kukushkin, O.V., 2005c. Problemy sokhraneniya krymskogo gekkona (Reptilia, Sauria, Gekkonidae) v arkheologicheskom zapovednike "Khersones Tavricheskyi" (Sevastopol) [Problems of preservation of the Crimean gecko (Reptilia, Sauria, Gekkonidae) in the archeological reserve "Khersonesos of Taurida" (Sevastopol)]. *Materialy Mezhdunarodnoi nauchnoi memorialnoi konferencii, posvyaschennoi 140-letiyu osnovaniya Odesskogo natsionalnogo universiteta im. I.I. Mechnikova i 120-y godovschine so dnya rozhdeniya professora I.I. Puzanova "Sovremennye problemy zoologii i ekologii" [Materials of International scientific memorial conference dedicated to 140th anniversary of the founding of the I.I. Mechnikov Odessa National University and 120th anniversary of the birth of professor I.I. Puzanov "Current problems of zoology and ecology"].* I.I. Mechnikov Odessa National University, Phoenix, Odessa, Ukraine, 145–148. (In Russian).

Kukushkin, O.V., 2005d. Prodolzhitel'nost' zimneyi spyachki i osobennosti biologyii krymskogo gekkona (*Mediodactylus kotschyi danilewskii*) v period gibernatsyii [A duration of winter diapause and the features of the biology of the Crimean gecko (*Mediodactylus kotschyi danilewskii*) during the hibernation period]. *Materialy Mezhdunarodnoi nauchnoi memorialnoi konferencii, posvyaschennoi 140-letiyu osnovaniya Odesskogo natsionalnogo universiteta im. I.I. Mechnikova i 120-y godovschine so dnya rozhdeniya professora I.I. Puzanova "Sovremennye problemy zoologii i ekologii" [Materials of International scientific memorial conference dedicated to 140th anniversary of the founding of the I.I. Mechnikov Odessa National University and 120th anniversary of the birth of professor I.I. Puzanov "Current problems of zoology and ecology"].* I.I. Mechnikov Odessa National University, Phoenix, Odessa, Ukraine, 148–151. (In Russian).

Kukushkin, O.V., 2005e. O stepnoyi gadyuke (*Vipera renardi*) na zapadnom poberezhje Kryma [About the steppe viper (*Vipera renardi*) on the western coast of the Crimea]. *Materialy mezhdunarodnoi nauchno-prakticheskoi konferentsii, posvyaschennoi 70-letiyu Tsentral'no-Chernozyomnogo zapovednika "Izuchenie i sokhranenie prirodnykh ekosustem zapovednikov lesostepnoyi zony" [Proceedings of the International scientific-practical conference dedicated to 70th anniversary of the Tsentral'no-Chernozemnyi Reserve "Study and preservation of natural ecosystems in reserves of the forest-steppe zone"].* Zapovednyi settlement, Kursk Region, Kursk, Russia, 311–314. (In Russian).

Kukushkin, O.V., 2005f. Problems of preservation of Crimean Gecko (*Mediodactylus kotschyi danilewskii*) in archaeological reserve "Khersonesos of Taurida" (Sebastopol). *Programme & Abstracts of the 13th Ordinary General Meeting Societas Europaea Heretologica (S.E.H.)*. Bonn, Germany, 61.

Kukushkin, O.V., 2006a. O smertnosti krymskogo gekkona (Reptilia, Sauria, Gekkonidae) v Khersonese Tavricheskom (Sevastopol) pri ekstremal'nom pokholodanii v yanvare 2006 g. [About mortality of the Kotschy's gecko (Reptilia, Sauria, Gekkonidae) in Khersonesos of Taurida (Sevastopol) during an extreme cold snap in January 2006]. *Materialy IX Mezhdunarodnoi nauchno-prakticheskoi ekologicheskoi konferencii "Sovremennye problemy populyatsionnoyi ekologyii" [Proceedings of the 9th International scientific-practical ecological conference "Current problems of population ecology"].* POLYTERRA, Belgorod, Russia, 107–109. (In Russian).

Kukushkin, O.V., 2006b. Novye dannye o razmnozhenii leopardovogo poloza (Reptilia, Serpentes, Colubridae) v Krymu [New data on the reproduction of the Leopard Snake (Reptilia: Serpentes: Colubridae) in the Crimea]. *Ekosistemy, ikh optimizatsiya i okhrana [Ecosystems, their optimization and protection]* **16**, 103–110. (In Russian).

Kukushkin, O.V., 2007. Data on cold tolerance during hibernation in the Crimean Kotschyi's Gecko. *Programme & Abstracts of the First Mediterranean Herpetological Congress (CMH1).* University Cadi Ayyad, Marrakech, Morocco, 88–89.

Kukushkin, O.V., 2008. Data on distribution and morphological variability of the Leopard snake, *Zamenis situla* (Linnaeus, 1758) (Reptilia: Serpentes: Colubridae), from the Crimean Peninsula. *Materialy X Mezhdunarodnoi nauchno-prakticheskoi ekologicheskoi konferentsii "Zhivye objekty v*

usloviyakh antropogennogo pressa" [Proceedings of the 10th International scientific-practical conference "Alive objects in conditions of anthropogenic press"]. POLYTERRA, Belgorod, Russia, 106–107.

Kukushkin, O.V., 2009a. Ob obitanii sredizemnomorskogo golopalogo gekkona, *Mediodactylus kotschyi danilewskii* (Reptilia, Sauria, Gekkonidae), v srednem lesnom poyase yuzhnogo makrosklona Krymskikh gor [About Inhabitatation of the Kotschy's naked-toed gecko, *Mediodactylus kotschyi danilewskii* (Reptilia, Sauria, Gekkonidae), in the middle forest belt of southern macroslope of the Crimean mountains]. *Pratsi Ukrains'kogo herpetologichnogo tovaristva [Transactions of Ukrainian Herpetological Society]* **2**, 27–36. (In Russian).

Kukushkin, O.V., 2009b. *Vipera renardi puzanovi* ssp. nov. (Reptilia, Serpentes, Viperidae) – novyi podvid stepnoyi gadyuki iz Gornogo Kryma [*Vipera renardi puzanovi* ssp. nov. (Reptilia: Serpentes: Viperidae) – a new subspecies of steppe viper from Mountain Crimea]. *Sovremennaya herpetologiya [Current Studies in Herpetology]*, **9** (1/2), 18–40. (In Russian).

Kukushkin, O.V., 2013. K utochneniyu granits areala gornokrymskoyi prytkoyi yascheritsy, *Lacerta agilis tauridica* (Reptilia, Squamata) na Krymskom nagorje [To the verification of the Limits of distribution range of *Lacerta agilis tauridica* (Reptilia, Squamata) from the Crimean Upland]. *Vestnik zoologii [Bulletin of Zoology]* **47** (6), 546. (In Russian).

Kukushkin, O.V., Doronin, I.V., 2013. Osobennosti rasprostraneniya redkikh aberratsyi okraski u krymskoyi yascheritsy, *Podarcis tauricus* (Sauria, Lacertidae), v Krymu [Distribution peculiarities of the rare colour aberrations in the Balkan wall lizard, *Podarcis tauricus* (Sauria, Lacertidae), from the Crimea]. *Trudy Zoologicheskogo instituta RAN [Transactions of Zoological Institute of the Russian Academy of Sciences]* **37** (4), 474–493. (In Russian).

Kukushkin, O.V., Karmyshev, Yu.V., 2002. Rasprostranenie i chislennost' chetyryokhpolosogo poloza (*Elaphe quatuorlineata sauromates*) v Krymu [Distribution and Number of the Four-lined Snake (*Elaphe quatuorlineata sauromates*) in Crimea]. *Vestnik zoologii [Bulletin of Zoology]* **36** (1), 8. (In Russian).

Kukushkin, O.V., Karmyshev, Yu.V., 2008. The notes on interpopulation variability and taxonomy of the armoured glass lizard, *Pseudopus apodus* (Pallas, 1775) (Reptilia: Sauria: Anguidae), from the Crimea. *Materialy X Mezhdunarodnoi nauchno-prakticheskoi ekologicheskoi konferentsii "Zhivye objekty v usloviyakh antropogennogo pressa" [Proceedings of the 10th International scientific-practical conference "Alive objects in conditions of anthropogenic press"].* POLYTERRA, Belgorod, Russia, 107–108.

Kukushkin, O.V., Kotenko, T.I., 2003. Osobennosti rasprostraneniya zmeyi na Krymskom poluostrove [Peculiarities of the distribution of snakes on the Crimean Peninsula]. Part 2. *Materialy mezhdunarodnoi konferentsii "Zmei Vostochnoyi Evropy" [Materials of the International conference "Snakes of the Eastern Europe"].* Institute of Ecology of the Volga River Basin of Russian Academy of Sciences, Togliatti, 41–45. (In Russian).

Kukushkin, O.V., Kotenko, T.I., 2013. Kharakteristika klyuchevykh territoryi lokal'noyi ekoseti Vostochnogo Kryma po gerpetologicheskim dannym [Characteristics of the key territories of the local ecological network of the Eastern Crimea according to herpetological data]. In: Ivanov, S.P. (ed.), *Priroda Vostochnogo Kryma. Otsenka bioraznoobraziya i razrabotka proekta lokal'noyi ekologicheskoyi seti [Nature of the Eastern Crimea. Biodiversity assessment and development of the project of local ecological network].* Kiev, Ukraine, 126–163. (In Russian).

Kukushkin, O.V., Kushchan, N.B., 2015. Materialy k izucheniyu tritona Karelina (Amphibia, Caudata, Salamandridae) v Krymu [Materials to the study of Karelin's newt (Amphibia, Caudata, Salamandridae) in the Crimea]. *Sbornik statei II Vserossiyskoi nauchno-prakticheskoi konferentsii "Ustoyichivoe razvitie osobo okhranyaemykh prirodnykh territoryi". T. 2. [Collection of the papers of the 2nd All-Russian scientific-practical conference "Sustainable Development of Specially Protected Natural Territories". Vol. 2].* Nature ornithological park in the Imeretinskaya nizmennost', Donizdat, Sochi, Russia, 141–151. (In Russian).

Kukushkin, O.V., Sharygin, S.A., 2005. Novye dannye po morfologii sredizemnomorskogo gekkona, *Mediodactylus kotschyi danilewskii* (Reptilia, Gekkonidae), v Krymu [New Data on Morphology of the Mediterranean (Kotschyi's) (sic!) gecko, *Mediodactylus kotschyi danilewskii* (Reptilia, Gekkonidae) in Crimea]. *Vestnik zoologii [Bulletin of Zoology]* **39** (6), 37–49. (In Russian).

Kukushkin, O.V., Sviridenko, E.Yu., 2002. Nakhodki melanisticheskikh osobeyi skal'noyi yascheritsy, *Darevskia lindholmi* (Reptilia, Sauria, Lacertidae), v Krymu [Finds of Melanistic Specimens of a Rock Lizard *Darevskia lindholmi* (Reptilia, Sauria, Lacertidae) in the Crimea. *Vestnik zoologii [Bulletin of Zoology]* **36** (3), 98. (In Russian).

Kukushkin, O.V., Tsvelykh, A.N., 2004. Rasprostranenie i ekologo-morfologicheskie osobennosti leopardovogo poloza, *Elaphe situla* (Serpentes, Colubridae), v Krymu [Distribution and ecological-morphological peculiarities of the leopard ratsnake, *Elaphe situla* (Serpentes, Colubridae), in the Crimea]. *Zoologicheskyi zhurnal [Zoological journal]* **83** (4), 439–448. (In Russian).

Kukushkin, O.V., Karmyshev, Yu.V., Yaryhin, A.N., Sharygin, S.A., 2013. O sostoyanii izuchennosti reproduktivnoyi biologyii zheltopuzika (Reptilia, Sauria, Anguidae) v Krymu [A state of the knowledge about reproductive biology of a giant glass lizard (Reptilia, Sauria, Anguidae) in the Crimea]. *Samarskaya Luka: Problemy regional'noi i global'noi ekologyii [Samarskaya Luka: Problems of Regional and Global Ecology]* **22** (2), 114–125. (In Russian).

Kukushkin, O.V., Dovgal, I.V., Leonov, S.V., Kuschan, N.B., 2016. Polovoyi dimorfizm morfometricheskikh parametrov i osobennosti okraski tritona Karelina (Amphibia, Caudata, Salamandridae) v populyatsii ozera Burchu-Gol' [Sexual dimorphism of the morphometric parameters and peculiarities of the color pattern of Karelin's newt (Amphibia, Caudata, Salamandridae) from the population in Burchu-Gol' lake]. *Sovremennaya herpetologiya [Current Studies in Herpetology]* **15** (1/2), 27–42. (In Russian). https://doi.org/10.18500/1814-6090-2016-16-1-2-27-42.

Kukushkin, O.V., Doronin, I.V., Tuniyev, B.S., Ananjeva, N.B., Doronina, M.A., 2017a. Introduktsiya zemnovodnykh i presmykayuschikhsya na Kavkaze i v Krymu: obschyi obzor i nekotorye fakty [Introduction of amphibians and reptiles in the Caucasus and Crimea: an overview and some actual data]. *Sovremennaya herpetologiya [Current Studies in Herpetology]* **17** (1/2), 157–197. (In Russian). https://doi.org/10.18500/1814-6090-2018-18-3-4-180-187.

Kukushkin, O.V., Petrov, B.P., Nazarov, R.A., Melnikov, D.A., 2017b. Problema biogeograficheskogo statusa dvukh uzkoareal'nykh vidov presmykayuschikhsya Gornogo Kryma i znachenie karstovykh pescher mysa Aya dlya eyo resheniya [The problem of the biogeographical status of two reptiles with narrow distributions in the Crimean Mountains and the importance of Cape Aya karst caves of Cape Aya for its solution]. *Materialy II Vserossiyskoi molodezhnoi konferentsii "Biospeleologicheskie issledovaniya v Rossii i sopredel'nykh gosudarstvakh" [Proceedings of 2nd All-Russian young scientist conference "Biospeleological studies in Russia and neighboring countries"].* Moscow, Russia, 56–69. (In Russian).

Kukushkin, O.V., Ivanov, A.Yu., Ermakov, O.A., 2018. O geneticheskoyi neodnorodnosti naseleniya ozernykh lyagushek Kryma, vyyavlyaemoyi po rezul'tatam analiza mitokhondrial'noyi i yadernoyi DNK (*Pelophylax* (*ridibundus*) complex; Anura, Ranidae) [Genetic heterogeneity of the marsh frog (*Pelophylax* (*ridibundus*) complex; Anura, Ranidae) population in Crimea revealed by mitochondrial and nuclear DNA analysis]. *Izvestiya Vysshikh Uchebnykh Zavedeniyi. Povolzhskyi region. Estestvennye nauki [Bulletin of High School Education Institutes. Volga Region. Natural Sciences]* **3** (23), 32–54. (In Russian). https://doi.org/10.21685/2307-9150-2018-3-3.

Kulagin, N.M., 1890. K faune presmykayuschikhsya i zemnovodnykh Krymskogo poluostrova [To the fauna of reptiles and amphibians of the Crimean Peninsula]. *Izvestia Imperatorskogo Moskovskogo Obschestva lyubiteleyi estestvennoyi istoryii, antropologii i etnografii [Bulletin of Emperor Moscow Society of naturalists, anthropologists and ethnographers]* **67**, *Proceedings of Zoological Department* **6** (3), 36–40. (In Russian).

Kuzmin, Yu.I., Kukushkin, O.V., 2012. *Hexametra quadricornis* (Nematoda, Ascaridida) from Leopard Snake (Reptilia, Serpentes, Colubridae) in Crimea (Ukraine). *Vestnik zoologii [Bulletin of Zoology]* **46** (6), 550.

Litvinchuk, S.N., Borkin, L.Ya., 2009. Evolyutsiya, sistematika i rasprostranenie grebenchatykh tritonov (*Triturus cristatus* complex) na territorii Rossii i sopredel'nykh stran [Evolution, systematics and distribution of crested newts (*Triturus cristatus* complex) in Russia and adjacent countries]. Europeyisky Dom, St. Petersburg, Russia, 592 p. (In Russian).

Litvinchuk, S.N., Rozanov, Yu.M., Usmanova, N.M., Borkin, L.Ya., Mazanaeva, L.F., Kazakov, V.I., 2006. Izmenchivost' mikrosatellitov *BM224* i *Bcal7* v populyatsiyakh zelenykh zhab (*Bufo viridis* complex), razlichayuschikhsya po razmeru genoma i ploidnosti [Variation of microsatellites *BM224* and *Bcal7* in populations of green toads (*Bufo viridis* complex) with various nuclear DNA content and ploidy]. *Tsitologiya [Cytology]* **48** (4), 306–319. (In Russian).

Lychak, A.I., 1999. Charakteristika landshaftov (1 i 2 zonal'nogo urovnya) [Characteristics of landscapes (1 and 2 zonal level)]. In: Apostolov et al. (eds.), *Biologicheskoe i landshaftnoe raznoobrazie Kryma: problemy i perspektivy [Biological and landscape diversity of the Crimea: problems and prospects]. Nauchno-Prakticheskiy diskusionno-analiticheskiy sbornik "Voprosy razvitiya Kryma". Vypusk 11 [Scientific-practical discussion-analytic compilation* "*Issues of the development of the Crimea". Issue 11].* SONAT, Simferopol, Ukraine, 28–31. (In Russian).

Materialy k kadastru amfibyi i reptilyi basseyina Sredneyi Volgi [Materials to the cadastre of amphibians and reptiles of the Middle Volga basin. Collection of scientific papers], 2002. Pestov, M.V. (ed.). International Social-ecological Union; Eco-center "Dront", Nizhnyi Novgorod, Russia, 222 p. (In Russian).

Mazanaeva, L.F., Askenderov, A.D., 2014. Landshaftno-zonalnoe raspredelenie amphibii i reptilii vo Vnutrigornom Dagestane [Landscape-zonal distribution of amphibians and reptiles in the Intramontane Dagestan]. *Vestnik Dagestanskogo nauchnogo Tsentra [Bulletin of the Dagestan scientific Center]* **54**, 53–58. (In Russian).

Mazanaeva, L.F., Tuniyev, B.S., 2011. Zoogeograficheskyi analiz gerpetofauny Dagestana [Zoogeographical analysis of the Dagestan herpetofauna]. *Sovremennaya herpetologiya [Current Studies in Herpetology]* **11** (1/2), 55–76. (In Russian).

Mizsei, E., Zinenko, O., Sillero, N., Ferri, V., Roussos, S.A., Szabolcs, M., 2018. The distribution of meadow and steppe vipers (*Vipera graeca*, *V. renardi* and *V. ursinii*): a revision of the New Atlas of Amphibian and Reptiles of Europe. *Basic and Applied Herpetology* **32**, 77–83.

Molchanov, E.F., Shcherbatyuk, L.K., Golubeva, I.V., Grigorov, A.N., 1984. Unikal'nyi prirodnyi kompleks novogo gosudarstvennogo zakaznika USSR "Mys Aya" [A unique natural complex of the new state reservat of the Ukrainian SSR "Cape Aya"]. *"Prirodnye ekosistemy Yuzhnogo berega Kryma" ["Natural ecosystems of the Southern coast of the Crimea"]. Trydy Gosudarstvennogo Nikitskogo botanicheskogo sada* [*Proceedings of State Nikitsky Botanical Garden]* **94**, 7–26. (In Russian).

Mollov, I.A., 2005. A study of the amphibians (Amphibia) and reptiles (Reptilia) from three urban protected areas in the town of Plovdiv (South Bulgaria). *Animalia* **41**, 79–94.

Muratov, M.V., 1973. Rukovodstvo po uchebnoi geologicheskoyi praktike v Krymy. Tom II. Geologiya Krymskogo poluostrova [Guide to educational geological practice in the Crimea. Volume 2. Geology of the Crimean Peninsula]. Nedra, Moscow, USSR, 192 p. (In Russian).

Natchev, N., Tzankov, N., Gemel, R., 2011. Green frog invasion in the Black Sea: habitat ecology of the *Pelophylax esculentus* complex (Anura, Amphibia) population in the region of Shablenska Tuzla lagoon in Bulgaria. *Herpetology Notes* **4**, 347–351.

Naumov, B., Tzankov, N., Popgeorgiev, G., Stojanov, A., Kornilev, Yu., 2011. The Dice Snake (*Natrix tessellata*) in Bulgaria: Distribution and Morphology. *Mertensiella* **18**, 288–297.

Nikolaenko, G.M., 1999. Khora Khersonesa Tavricheskogo. Zemel'nyi kadastr IV–III vv. do n.e. Chast' 1 [Chora of Khersonesos of Taurida. Land cadastre of the IV–III centuries BC. Part I]. National Rezerve "Khersonesos of Taurida", Sevastopol, Ukraine, 84 p. (In Russian).

Nikolsky, A.M., 1891. Pozvonochnye zhivotnye Kryma [Vertebrate animals of Crimea]. *Notes of the Imperial Academy of Sciences, Physical-mathematical department* **68** (4), 484 p. (In Russian).

Nikolsky, A.M., 1905. Presmykayuschiesya i zemnovodnye Rossyiskoyi Imperii (Herpetologia rossica) [Reptiles and amphibians of the Russian Empire (Herpetologia rossica)]. *Notes of the Imperial Academy of Sciences, Physical-mathematical department* **17** (1), 517 p. (In Russian).

Pallas, P.S., 1831. Zoographia rosso-asiatica. Tome 3. Animalia monocardia seu frigidi sanguinis. Academiae Scientarum Impress, Petropoli, Russia, 549 p. (In Latin).

Pallas, P.S., 1999. Nablyudeniya, sdelannye vo vremya puteshestviya po yuzhnym namestnichestvam Russkogo gosudarstva v 1793–1794 godakh [Observations made during a jorney to the southern provinces of the Russian state in 1793–1794]. Nauka, Moscow, Russia, 246 p. (In Russian).

Peel, M.C., Finlayson, B.L., McMahon, T.A., 2007. Updated world map of the Koppen-Geiger climate classification. *Hydrology and Earth System Sciences Discussions* **4**, 439–473. https://hal.archives-ouverts.fr/hal-00305098.

Petrov, B.P., 2007. Amphibians and reptiles of Bulgaria: fauna, vertical distribution, zoogeography, and conservation. In: Fet, V., Popov, A. (eds.), *Biogeography and Ecology of Bulgaria*. Springer, 85–107.

Podgorodetsky, P.D., 1988. Krym: Priroda. Spravochnoe izdanie [The Crimea: Nature. Reference edition]. Tavria, Simferopol, USSR, 192 p. (In Russian).

Psonis, N., Antoniou, A., Kukushkin, O., Jablonski, D., Petrov, B., Crnobrnja-Isailović, J., Sotiropoulos, K., Gherghel, I., Lymberakis, P., Poulakakis, N., 2017. Hidden diversity in the *Podarcis tauricus* (Sauria, Lacertidae) species subgroup in the light

of multilocus phylogeny and species delimitation. *Molecular Phylogenetics & Evolution* **106**, 6–17. http://dx.doi.org/10.1016/j.ympev.2016.09.007.

Psonis, N., Antoniou, A., Karameta, E., Leache, A.D., Kotsakiozi, P., Darriba, D., Kozlov, A., Stamatakis, A., Poursanidis, D., Kukushkin, O., Jablonski, D., Crnobrnja-Isailović, J., Gherghel, I., Lymberakis, P., Poulakakis, N., 2018. Resolving complex phylogeographic patterns in the Balkan Peninsula using closely related wall-lizard species as a model system. *Molecular Phylogenetics & Evolution* **125**, 100–115. https://doi.org/10.1016/j.ympev.2018.03.021.

Pulev, A.N., 2016. Zoogeografsko rayionirane na Blgariya vz osnova na razprostranenieto na herpetofaunata [Zoogeographical division of Bulgaria, based on herpertophauna spreading]. *Synopsis of PhD Research Theses.* Blagoevgrad, Bulgaria, 41 p. (In Bulgarian).

Puzanov, I.I., 1929. Zhivotnyi mir Kryma [Animal Kingdom of the Crimea]. Simferopol, Krymgosizdat, 34 p. (In Russian).

Puzanov, I.I., 1949. Svoeobrazie fauny Kryma i eyo proiskhozhdenie [Singularity of the fauna of Crimea and its origin]. *Uchenye zapiski Gor'kovskogo gos. universita [Scientific Notes of the Gor'kyi State University]* **14**, 5–32. (In Russian).

Pysanets, E.M., 2003. Khvostatye amfibii (Amphibia: Caudata) Katalog kollektsyi Zoologicheskogo muzeya NNPM NAN Ukrainy [The Tailed Amphibians (Amphibia: Caudata). Catalogue of Collection of Zoological Museum NMNH, NAS of Ukraine]. Zoomuseum NMNH NAS of Ukraine, Kyiv, Ukraine, 148 p. (In Russian).

Pysanets, E., Kukushkin, O., 2016. Amphibians of the Crimea. National Museum of Natural History, NAS of Ukraine, Kiev, Ukraine, 320 p.

Pysanets, E.M., Litvinchuk, S.N., Kurtyak, F.F., Radchenko, V.I., 2005. Zemnovodnye Krasnoyi knigi Ukrainy (Spravochnik-kadastr) [The amphibians of Ukrainian Red Book (Handbook – cadastre)]. Zoomuseum NMNH NAS of Ukraine, Kiev, Ukraine, 230 p. (In Russian).

Seregin, A.P., 2008. Contribution to the vascular flora of the Sevastopol area (the Crimea): a checklist and new records. *Flora Mediterranea*, **18**, 171–246.

Sharygin, S.A., 1977. Ekologiya krumskogo gekkona [Ecology of the Crimean gecko]. Letopis' prirody gosudarstvennogo zapovednika "Mys Martyan", Kniga 4 [Annals of nature of the State Reserve "Cape Martyan", Book 4] (manuscript). State Nikitsky botanical garden, Yalta, USSR, 158–203.

Sharygin, S.A., 1980. Sezonnaya i sutochnaya aktivnost' krymskogo gekkona [Seasonal and daily activity of the Crimean gecko]. *Tezisy dokladov Vsesoyuznoi konferentsii "Sezonnaya ritmika redkikh i ischezayuschikh vidov rastenyi i zhivotnykh" [Abstracts of the reports of the All-Union conference "Seasonal rhythmics of rare and endangered species of plants and animals"].* Moscow Branch of the Geographical Society of the USSR, Moscow, Russia, 171–173. (In Russian).

Sharygin, S.A., 1983. K izucheniyu redkikh vidov gerpetofauny Kryma [To the study of rare species of the Crimean herpetofauna]. *Tezisy Vsesoyuznoi konferentsii molodykh uchenykh "Okhrana zhivoyi prirody" [Abstracts of the All-Union conference of young scientists "Wildlife Conservation"].* VASKhNIL, Moscow, Russia, 212–213. (In Russian).

Sharygin, S.A., 1984. O rasprostranenii krymskogo gekkona [On the geographical distribution of the Crimean Gecko]. In: Kubantsev, B.S., Zhukova, T.I., Zinyakova, M.P. (eds.), *Fauna i ekologiya amphibii i reptilii [Fauna and Ecology of Amphibians and Reptiles]*. Kubanskyi State University, Krasnodar, Russia, 49–54. (In Russian).

Sindaco, R., Venchi, A., Carpaneto, G.M., Bologna, M.A., 2000. The reptiles of Anatolia: a checklist and zoogeographical analysis. *Biogeography* **21**, 441–554.

Sobolevssky, N.I., 1930. Novaya forma *Lacerta* (Reptilia) iz Kryma [New Form of the Genus *Lacerta* (Reptilia) from the Crimea]. *Izvestiya Assotsiatsyii issledovatel'skikh institutov pri fiziko-matematicheskom fakultete Pervogo Moskovskogo gosudarstvennogo universiteta [Bulletin of Research Institute Association, Physical-mathematical Faculty of the First Moscow State University]* **3** (2-A), 129–143. (In Russian).

Stöck, M., Dufresnes, Ch., Litvinchuk, S.N., Lymberakis, P., Biollay, S., Berroneau, M., Borzée, A., Ghali, K., Ogielska, M., Perrin, N., 2012. Cryptic diversity among Western Palearctic tree frogs: Postglacial range expansion, range limits, and secondary contacts of three European tree frog lineages (*Hyla arborea* group). *Molecular Phylogenetics & Evolution* **65**, 1–9. https://dx.doi.org/10.1016/j.ympev.2012.05.014.

Strauch, A., 1887. Bemerkungen über die Geckoniden-Sammlung im Zoologischen Museum der Kaiserlichen Akademie der Wissenschaften zu St. Pe-

tersburg. *Memoires L'Académie Impériale des Scienses de St.-Pétersbourg, VII série* **35** (2), 1–74. (in German).

Sukhareva, A.O., Oskolskaya, O.I., 2009. Ekologicheskoe sostoyanie i perspektivy zapovedaniya prirodnogo kompleksa Chilter (Zapadnyi Krym) [Ecological state and prospects for the preservation of the natural complex of Chilter (Western Crimea)]. *Ekosystemy, ikh optimizatsiya i okhrana [Ecosystems, their optimization and protection]* **20**, 212–223. (In Russian).

Suryadna, N.M., Pysanets, E.M., 2010. Zemnovodni (Amphibia: Caudata, Anura). Katalog kolektsyi. Vip. 1 [Amphibians (Amphibia: Caudata, Anura). Catalogue of collections. Issue 1]. Vidavnychyi budynok MMD, Melitopol, Ukraine, 92 p. (In Ukrainian).

Sviridenko, E.Yu., Kukushkin, O.V., 2005. Zametki o rasprostranenii i chislennosti prytkoyi yascheritsy, *Lacerta agilis* (Reptilia, Sauria, Lacertidae) v Gornom Krymu [Notes on the distribution and number of the sand lizard, *Lacerta agilis* (Reptilia, Sauria, Lacertidae) in the Mountain Crimea]. *Materiali Pershoi konferentsii Ukrainskogo gerpetologichnogo tovaristva [Proceedings of the First Conference of the Ukrainian Herpetological Society].* Kyiv, Ukraine, 158–161. (In Russian).

Sviridenko, E.Yu., Popov, V.N., 2007. Materialy po ekologii *Lacerta agilis* and *Podarcis taurica* (Reptilia, Lacertidae) v Krymu [Materials on ecology of *Lacerta agilis* and *Podarcis taurica* (Reptilia, Lacertidae) in Crimea]. *Naukovyi visnyk Uzhgorods'kogo universitetu (Seriya Biologiya) [Science Bulletin of Uzhgorod University. Serie Biology]* **21**, 124–127. (In Russian).

Shcherbak, N.N., 1982. Grundzüge einer herpetogeographischen Gliederung der Paläarctis. *Vertebrata Hungarica* **21**, 227–239. (In German).

Shcherbak, N.N., 1960. Novye dannye o krymskom gekkone (*Gymnodactylus kotschyi danilewskii* Str.) [New Data on the Crimean Gecko (*Gymnodactylus kotschyi danilewskii* Str.)]. *Zoologicheskyi zhurnal [Zoological journal]* **39** (9), 1390–1397. (In Russian).

Shcherbak, N.N., 1966. Zemnovodnye i presmykayuschiesya Kryma (Herpetologia Taurica) [Amphibians and reptiles of Crimea (Herpetologia Taurica)]. Naukova dumka, Kiev, USSR, 240 p. (In Russian).

Shcherbak, N.N., 1984. O zoogeograficheskom statuse Sredizemnomorja [On the zoogeographic status of the Mediterranean]. In: Kubantsev, B.S., Zhukova, T.I., Zinyakova, M.P. (eds.), *Fauna i ekologiya amfibyi i reptilyi [Fauna and ecology of amphibians and reptiles].* Kubanskyi State University, Krasnodar, Russia, 4–9. (In Russian).

Shcherbak, N.N., 1988. Presmykayuschiesya [Reptiles]. In: Sytnik, K.M. (ed.), *Redkie i ischezayuschie rasteniya i zhivotnye Ukrainy. Spravochnik [Rare and endangered plants and animals of Ukraine. Reference book]*. Naukova dumka, Kiev, USSR, 160–165. (In Russian).

Tarashchuk, V.I., 1959. Fauna Ukrayiny. Tom 7. Zemnovodni ta plazuny [Fauna of the Ukraine. Volume 7. Amphibians and reptiles]. Academy of Scienses of Ukrainskaya SSR, Kyiv, USSR, 246 p. (In Ukrainian).

Temple, H.J., Cox, N.A., 2009. European Red List of Amphibians. Office for Official Publications of the European Communities, Luxembourg, 33 p.

Transformatsiya landshaftno-ekologicheskikh protsessov v Krymy v XX veke – nachale XXI veka [Transformation of landscape-ecological processes in Crimea in XX century – beginning of the XXI century], 2010. Bokov, V.A. (ed.). DOLYA, Simferopol, Ukraine, 304 p. (In Russian).

Tunyiev, B.S., 1995. On the Mediterranean influence on the formation of herpetofauna of the Caucasian Isthmus and its main xerophylous refugua. *Russian Journal of Herpetology* **2** (2), 95–119.

Tunyiev B., Tuniyev S., Kirschey T., Mebert K., 2011. Notes on the Dice Snake (*Natrix tessellata*) from the Caucasian Isthmus. *Mertensiella* **18**, 343–356.

Turbanov, I.S., Kukushkin, O.V., Vargovitsh, R.S., 2019. Amphibians and reptiles in the subterranean cavities of the Crimean Mountains. *Russian Journal of Herpetology* **26** (1), 29–53. https://doi.org/ 10.30906/1026-2296-2019-26-1-29-53.

Uetz, P., Freed, P., Hosek, J. 2018. The Reptile Database. Web page. URL: http//:www.reptile-database.org (accessed: 22.04.2019).

Urošević, A., Tomović, L., Ajtić, R., Simović, A., Džukić, G., 2016. Alterations in the reptilian fauna of Serbia: Introduction of exotic and anthropogenic range expansion of native species. *Herpetozoa* **28** (3/4), 115–132.

Ved', I.P., 2000. Klimaticheskyi atlas Kryma [Climatic atlas of the Crimea]. Tavriya-Plus, Simferopol, Ukraine, 120 p. (In Russian).

Vedmederya, V.I., Zinenko, O.I., Goncharenko, L.A., 2007. Katalog kollektsyi Muzeya prirody

Khar'kovskogo natsional'nogo universiteta imeni V.N. Karazina. Zmei (Reptilia: Serpentes) [Catalogue of collections of the Museum of Nature at V.N. Karazin Kharkov National University. Snakes (Reptilia: Serpentes)]. V.N. Karazin Kharkov National University, Kharkov, Ukraine, 82 p. (In Russian).

Vigna Taglianti, A., Audisio, P., Biondi, M., Bologna, M., Carpaneto, G., De Biase, A., Fattorini, S., Piattella, E., Sindaco, R., Venchi, A., Zapparoli, M., 1999. A proposal for a chorotype classification of the Near East fauna, in the framework of the Western Palearctic region. *Biogeographia* **20**, 31–59.

Voinstvensky, M.A., 2006. Dnevniki krymskikh ekspeditsyi 1957 i 1958 gg. [Diaries of the Crimean expeditions of 1957 and 1958]. *Avifauna Ukrainy [Avifauna of the Ukraine]* **3**, 3–42. (In Russian).

Vozniychuk, O.P., Kuranova, V.N., 2008. Zemnovodnye i presmykayuschiesya Katunskogo zapovednika i sopredel'noyi territorii (Tsentral'nyi Altai) [Amphibians and Reptiles of Katun Nature Reserve and adjacent territories (the Central Altai)]. *Sovremennaya herpetologiya [Current Studies in Herpetology]* **8** (2), 101–117. (In Russian).

Yena, An.V., 1986. Sovremennoe sostoyanie krymskikh populyatsyi zemlyanichnika melkoplodnogo [Current state of the Crimean populations of the Greek strawberry tree]. *Prirodookhrannye aspekty izucheniya Gornogo Kryma [Environmental aspects of the study of the Mountain Crimea]*. Simferopol State University, Simferopol, USSR, 26–30. (In Russian).

Yena, An.V., Ena, Al.V., 1991. O mezhkomponentnykh svyazyakh na granitsakh biogeotsenozov v Krymskom subsredizemnomorje [On intercomponent connections at the boundaries of biogeocenoses in the Crimean Sub-Mediterranean]. *Ekologicheskie aspekty okhrany prirody Kryma [Ecological foundations of the protection of the nature of the Crimea]*. UMK VO, Kiev, Ukraine, 27–29. (In Russian).

Yena, V.G., Yena, Al.V., Yena, An.V., 2004. Zapovednye landshafty Tavridy [Protected landscapes of Taurida]. Biznes-Inform, Simferopol, Ukraine, 424 p. (In Russian).

Yudin, V.V., 2009. Geologicheskaya karta i razrezy Gornogo, Predgornogo Kryma [Geological map and sections of the Mountain and Piedmont Crimea]. Scale 1:200 000. Cartographic factory VSEGEI, St. Petersburg, Russia. (In Russian).

Zinenko, A.I., Goncharenko, L.A., 2011. Katalog kollektsii Muzeya prirody Khar'kovskogo natsionalnogo universiteta im V.N. Karazina. Reptilii (Reptilia): Kluvogolovye (Rhynchocephalia); Cheshuychatye (Squamata): Yascheritsy (Sauria), Dvukhodki (Amphisbaenia) [Catalogue of collections of the Museum of Nature at V. N. Karazin Kharkov National University. Reptiles (Reptilia): Rhynchocephalia; Squamata: Lizards (Sauria), Amphisbaenians (Amphisbaenia)]. V.N. Karazin Kharkov National University, Kharkov, Ukraine, 100 p. (In Russian).

Zinenko, A.I., Korshunov, A.V., Tupikov, A.I., 2014. Amfibii i reptilii natsionalnogo prirodnogo parka "Dvurechanskyi" [Amphibia and Reptilia of the National Nature Park "Dvurechanskyi"]. *Visnyk Kharkivskogo natsional'nogo universitetu imeni V.N. Karazina. Seriya: Biologiya [Bulletin of V.N. Karazin Kharkov National University. Series: Biology]* **1097** (19), 68–74. (In Russian).

Zubar', V.M., 1993. Khersones Tavricheskyi v antichnuyu epokhu (ekonomika i sotsial'nye otnosheniya) [Khersonesos of Taurida in ancient epoch (economics and social relations)]. Naukova dumka, Kiev, Ukraine, 138 p. (In Russian).

APPENDIX

A list of amphibian and reptile records in the Sevastopol Region

Triturus karelinii: Nakhimovsky District: 1 – Northern Side of the city of Sevastopol, "Radiogorka" microdistrict, N 44.63°, E 33.52°, 1989 and 1995; 2 – Vicinity of Sonnoe (= Gorchakovskoe) cemetery of the Crimean campaign, N 44.66°, E 33.59°, 1999 and 2000; 3 – 3 km W of the village of Frontovoe, N 44.67°, E 33.70°, 2012 and 2013 (Pysanets and Kukushkin, 2016); 4 – village of Dalnee, N 44.67°, E 33.64°, 2008 (Pysanets and Kukushkin, 2016); 5 – 3 km SE of the Verkhnesadovoe railway station, N 44.65°, E 33.66°, 1989, 23.05.2010, 2011–2013 (Pysanets and Kukushkin, 2016); Balaklava District: 6 – near the 2nd cordon of the Mekenzievskoe Forestry, N 44.62°, E 33.69°, 2015–2017 (Pysanets and Kukushkin, 2016); 7 – Mount Gasforta, "at the Italian cemetery near Sevastopol", N 44.53°, E 33.67°, 1958 (Shcherbak, 1966); 8 – vicinity of the village of Chernorechie, N 44.54°, E 33.68°, 1998 (Pysanets and Kukushkin, 2016); 9 – 4 km to the SE from Balaklava, near the "Sotka" object (abandoned military unit), N 44.49,° E 33.65°, 05.06.2018; 10 – lower pond in near the village of Reservnoe, N 44.48°, E 33.68°, 17–18.05.2013 (Litvinchuk and Borkin, 2009; Pysanets and Kukushkin, 2016); 11 – pond near the village of Goncharnoe, N 44.46°, E 33.71°, 1996 (Pysanets and Kukushkin, 2016); (12) – Laspi state regional landscape sanctuary, N 44.41°, E 33.74°, 1989, 07.05.2018, 08.04.2019 (Turbanov et al., 2019); 13 – downthrown block of Mount Chelebi in the vicinity of the Baydarskie Vorota Pass, N 44.40°, E 33.77°, 1988 (Pysanets and Kukushkin, 2016); 14 – vicinity of the village of Kizilovoe, Mamut-Chokrak Cave, N 44.43°, E 33.75°, 08.10.2016 (Turbanov et al., 2019); 15 – 1 km S of the village of Orlinoe, N 44.42°, E 33.78°, 08–12.05.2018, 09.05.2019; 16 – fire pond on the Mordvinovskaya road, N 44.42°, E 33.80°, 15.05 and 19.07.2018, 30.03.2019, 09.05.2019; 17 – Baydarskaya Valley, irrigation trench in the fields, N 44.47°, E 33.79°, 18.07.1991 (Litvinchuk and Borkin, 2009); 18 – vicinity of the village of Ozernoe, N 44.48°, E 33.79°, 09.06.2002 (Litvinchuk and Borkin, 2009); 19 – Mount Khlama, Anna Grotto, N 44.53°, E 33.77°, 31.05.2003 (Turbanov et al., 2019); 20 – Chernorechenskyi Canyon, N 44.52°, E 33.75°, 05.05.2017 (Turbanov et al., 2019); 21 – village Rodnoe near the Merdven-Tubyu waterfall, N 44.55°, E 33.74°, 04.05.2014 (Pysanets and Kukushkin, 2016); 22 – lake 2 km SE of the village of Rodnoe, N 44.55°, E 33.77°, 13.05.2018; 23 – flooded area 6 km SE of the village of Ternovka, N 44.55°, E 33.82°, 13.05.2018; 24 – Baydarskaya Valley, bogging at the roadside between the villages of Podgornoe and Rodnikovskoe, N 44.46°, E 33.83°, 08–12.05.2018; 25 – village of Peredovoe, pond at the dam of Lake Nizhnee, N 44.50°, E 33.81°, 10.05.2018; 26 – vicinity of the village of Rodnikovskoe, Karadagskyi Les locality, Kristalnaya Cave, N 44.45°, E 33.91°, 1990, 2003 and 2004 (Turbanov et al., 2019); 27 – Mount Kurt-Kaya, Entuziastov Cave, N 44.46°, E 33.87°, 20.11.2016 (Turbanov et al., 2019); 28 – vicinity of the village of Rodnikovskoe, Chuvash-Gol Lake, N 44.49°, E 33.89°, 2000 (Pysanets and Kukushkin, 2016); 29 – Uzundzhinskaya hollow; 30 – vicinity of the village of Kolkhznoe, Tolaka-Gol Lake, N 44.48°, E 33.88°, 07.06.2005, 19.05.2018, 26.06.2018, 29.04.2019 (Pysanets and Kukushkin, 2016); 31 – Ai-Petri Yayla, Balchikh-Kuyu spring, N 44.43°, E 33.88°, 1998–2005, 20.04.2017, 15.05.2018 (Kotenko and Kukushkin, 2010; Pysanets and Kukushkin, 2016); 32 – Ai-Petri Yayla, Byuzyuka locality, N 44.43°, E 33.89°, 1999, 15.05.2018; 33 – at the Shaitan-Merdven Pass and near Mount Isar-Kaya, N 44.43°, E 33.85°, 1993, 15.05.2018; 34 – Ai-Petri Yayla, pond near Kuyu-Alan well, N 44.42°, E 33.85°, 15.05.2018; 35 – Ai-Petri Yayla, Mordvinovskaya road, N 44.43°, E 33.86°, 15.05.2018; Bakhchysarai District, Republic of Crimea: 36 – Adym-Chokrak Valley, pond to S of Mount Baba-Dag, N 44.58°, E 33.81°, 17.04.1998, 08–09.06.2003, 2007, 26.04.2016, 25.05.2017 (Pysanets and Kukushkin, 2016); Yalta urban territory, Republic of Crimea: 37 – pond «no. 250» in the vicinity of the village of Opolznevoe, N 44.41°, E 33.96°, 17.06.2013, 07.05.2018, 29.06.2018, 03.08.2018, 07.04.2019 (Pysanets and Kukushkin, 2016).

Hyla orientalis (after Pysanets and Kukushkin, 2016, modified): Gagarinsky District: 1 – Isthmus of Mayachnyi Peninsula, cottage area near the Golubaya Bukhta beach, 100 m from the sea, N 44.56°, E 33.41°, 14.10.2018; 2 – summer cottage area in the Kamyshovskaya Gully near the Fiolentovskoe highway, N 44.56°, E 33.43°, 29–30.04.2015; Leninsky District: 3 – Maksimova Dacha landscape park and stream valley in the Khomutov Valley, N 44.57°, E 33.54°, regular records in 1989–1993, 12.05.2018; Nakhimovsky District: 4 – Kilen-balka Gully, summer cottage area, N 44.60°, E 33.57°, 08.10.2016; 5 – vicinity of the villages of Pirogovka and Verkhnesadovoe, N 44.69°, E 33.74°, 15.05.1998, 13.06.2008, 16.06.2008; 6 – near the "VIR" railway station and the village of Fruktovoe, N 44.68°, E 33.60°, 1898, 23.05.2010; 7 – vicinity of the village of Dalnee, near the railway bridge over the Belbek River, N 44.67°, E 33.64°, 23.05.2010; Balaklava District: 8 – SE coast of Gerakleyiskyi Peninsula, forested landslides above Dzhanshiev Cape, N 44.52°, E 33.47°, 15.08.2003, 26.05.2007, 25.04.2011; 9 – vicinity of the village of Flotskoe, Karanskaya Valley and summer cottage area in the Berman Gully, N 44.52°, E 33.52°, 2006; 10 – SE margin of Mount Sapun-gora upland and summer cottage area at its foot, N 44.54°, E 33.59°, 1988–1990; 11 – Inkerman, near the Kalamita fortress, N 44.61°,

E 33.61°, 05.05.2018; 12 – Mekenzievskoe Forestry, 2nd forest cordon, N 44.62°, E 33.69°, 23.09.1995, 14.02.1997, 24.04.2018; 13 – within the borders of the village of Ternovka, N 44.57°, E 33.80°, 23.05.2010, 13.05.2018; 14 – 5 km SE of the village of Ternovka, N 44.55°, E 33.81°, 14.05.2018; 15 – near the Shuldan cave monastery, artificial reservoir in the Pyataya Gully, N 44.60°, E 33.76°, 24.05.2018; 16 – Adym-Chokrak Valley, S of Mount Baba-Dag, N 44.58°, E 33.81°, 25.05.2017; 17 – vicinity of the village of Ternovka, Ay-Todorskaya Valley, 02.06.2002, 09.04.2016; 18 – within the borders of the village of Rodnoe and near the Su-Bashi spring, N 44.56°, E 33.77°, 13.04.2001, 26.04.2011; 19 – 2 km SE of the village of Rodnoe, water body in the Munde-Dere Gully, N 44.55°, E 33.77°, 26.05.2018; 20 – Sukhaya Rechka River Canyon, near 17th km of the Yalta Highway, N 44.52°, E 33.68°, 1998–2012, 18.05.2018; 21 – Varnutskaya Valley, vicinity of the village of Reservnoe, lower pond, N 44.48°, E 33.68°, 17–18.05.2013, 15.03.2015; 22 – Baydarskaya Valley, vicinity of the village of Tylovoe, N 44.44°, E 33.73°, 08.05.2018; 23 – 2 km E of Balaklava, Vitmer's Gully, N 44.51°, E 33.63°, 1998, 24.04.2011; 24 – "Cape Aya" state regional landscape sanctuary, Ayazma locality, N 44.47°, E 33.64°, 01.04.1997, 20.10.1997, 30.03.1998, 2006; 25 – settlement of Batiliman, N 44.42°, E 33.68°, 1996–2004; 26 – wooded gorge between the Baydarskaya Yayla and Mount Ilyas-Kaya, N 44.41°, E 33.74°, 1998 and 1999, 17–18.04.2011; 27 – Baydarskie Vorota Pass, Mount Chelebi, N 44.40°, E 33.78°, 15.06.2006, 14.04.2012; 28 – Chernorechenskyi Canyon along its entire length, N 44.51°, E 33.76°, 1998–2001; 29 – Baydarskaya Valley, vicinity of the village of Ozernoe, N 44.46°, E 33.80°, 10.04.2005; 30 – 1.5 km SE of the village of Pavlovka, Mount Biyuk-Sinor, Sakhtykh Cave, N 44.44°, E 33.81°, 11.08.2012 (Turbanov et al., 2019); 31 – vicinity of the village of Kizilovoe, Mamut-Chokrak Cave, N 44.43°, E 33.75°, 19.08.2010 (Turbanov et al., 2019); 32 – village of Orlinoe, N 44.44°, E 33.77°, 1989–2017; 33 – within the borders of the village of Peredovoe and near the dam in Nizhnee Lake, N 44.50°, E 33.81°, 2017, 10.05.2018; 34 – vicinity of the village of Novobobrovskoe and village of Rossoshanka, N 44.48°, E 33.84°, 19.05.2018; 35 – vicinity of the village of Rodnikovskoe, N 44.46°, E 33.84°, 22.05.1998, 02.05.2014; 36 – valley of the Uzundzha River, reservoir near the "Gornyu" Tourist Camp, N 44.48°, E 33.88°, 19.05.2018; 37 – Ai-Petri Yayla, lake at the S slope of Mount Chkhu-Bair, N 44.42°, E 33.80°, 2001, 22–23.05.2012, 15.05.2018; 38 – Ai-Petri Yayla, small lake below Balchikh-Kuyu spring, N 44.43°, E 33.88°, 1998 and 2001, 22.05.2011; Bakhchysarai District, Republic of Crimea: 39 – Ai-Petri Yayla, Oreshek Cave, N 44.46°, E 34.00°, 23.10.2010 (Turbanov et al., 2019); 40 – vicinity of the village of Polyana, plateau of the Kordon-Bair Ridge, N 44.54°, E 33.86°, 13–14.07.2011, 03.09.2017.

***Pelophylax ridibundus* s. str.** (after Kukushkin et al., 2018): Balaklava District: 1 – vicinity of the village of Orlinoe, Deimen-Dere Gorge, N 44.43°, E 33.80°, 19.04.2014, 07.10.2016; 2 – Baydarskaya Valley, 1 km S of the village of Orlinoe, N 44.42°, E 33.78°, 08.05.2018; 3 – vicinity of the village of Peredovoe, valley of the Kobalar-Su River, N 44.53°, E 33.82°, 10.06.2016, 10.05.2018; 4 – lake in the village of Podgornoe, N 44.46°, E 33.84°, 20.07.2017; 5 – vicinity of the village of Rodnikovskoe, Chuvash-Gol lakes, N 44.45°, E 33.91°, 01.05.2016; 6 – vicinity of the village of Rodnikovskoe, Skelskaya Cave, N 44.46°, E 33.87°, 04.03.2018; 7 – vicinity of the village of Peredovoe, Petrolar locality, N 44.55°, E 33.82°, 13.05.2018; Bakhchysarai District, Republic of Crimea: 8 – canyon of the Uzundzha River, N 44.49°, E 33.90°, 18.07.2018; 9 – vicinity of the village of Kolkhznoe, N 44.48°, E 33.90°, 19.05.2018.

Emys orbicularis: Balaklava District: 1 – estuary of the Chernaya River, N 44.61°, E 33.60°, 1858 (Kessler, 1861); 2 – vicinity of Inkerman, quarry lakes near the Kalamita fortress, N 44.61°, E 33.61°, 05.05.2018; 3 – Gasfortinskoe reservoir, N 44.53°, E 33.68°, 18.05.2018; 4 – Baydarskaya Valley, village of Peredovoe, Nizhnee Lake, N 44.51°, E 33.81°, 10.05.2018; 5 – Baydarskaya Valley, between the village of Rodnikovskoe and village of Rossoshanka, protected zone of the Chernorechenskoe Reservoir, N 44.47°, E 33.85°, 2013; 6 – Baydarskaya Valley, Chernaya River, near the village of Shirokoe (Kotenko, 2004); 7 – near Balaklava, sand pit area, N 44.51°, E 33.61° (Kotenko, 2004); 8 – "Cape Aya" state regional landscape sanctuary, forest lakes in the Kokia locality, N 44.45°, E 33.68°, 1980s; Gagarinsky District: 9 – near the top of the Streletskaya Bay, N 44.59°, E 33.47°, repeatedly 1982–1989, in the 1960s common; 10 – wetlands near the top of the Kamyshovaya Bay, N 44.58°, E 33.43°, up to 1950; Leninsky District: 11 – pond in the cottage area near the Maksimova Dacha landscape park and 7th km of the Sevastopol–Yalta highway, N 44.54°, E 33.52°, 22.10.2009; Nakhimovsky District: 12 – water body near the railway bridge near the "1518-й km" station, N 44.67°, E 33.64°, 30.04.2018, 22.05.2018; 13 – mouth of the Kacha River, dried canal near the village of Orlovka, N 44.73°, E 33.55° (Kotenko, 2004); 14 – Kacha River, near the village of Vishnevoe, N 44.74°, E 33.61° (Kotenko, 2004); Bakhchysarai District, Republic of Crimea: 15 – flooded plain and mouth of the Alma River near the village of Peschanoe, N 44.84°, E 33.60°, 2018 (Shcherbak, 1966; information from local inhabitants, 06.04.2019).

Mediodactylus danilewskii (after: Kukushkin, 2004a, 2005d, 2009; Turbanov et al., 2019, supplemented): Gagarinsky District: 1 – ruins of the ancient town Khersonesos of Taurida and

modern buildups in the archaeological protected site, N 44.61°, E 33.49°, regular observations в 1990–2018; 2 – Sevastopol urban neighborhoods adjacent to Khersonesus: Karantinnaya Gully, Drevnyaya Street, tuberculosis dispensary, etc., N 44.60°, E 33.49°, 1999–2001; 3 – W of the end of the Streletskaya Bay, on the roofs and attics of five-story houses in the area of the Yumashevsky market, N 44.59°, E 33.46°, 28.10.2005; 4 – W coast of the Solenaya Bay, buildings of State Oceanarium, modern ruins on the isthmus of Mayachnyi Peninsula Isthmus opposite the Kazachya Bay, N 44.58°, E 33.40°, 2000 and 2006, respectively; Leninsky District: 5 – Khomutova Gully, near the ancient ruins in grottos on the slopes, N 44.58°, E 33.53°, 1993; 6 – central regions of the Gerakleyiskyi Peninsula (brad- and milk factory), upper reaches of the Karatinnaya Gully, NE–E from the Molochnye Dachi settlement, ruins between the "Entuasiast" Factory and LLC "Rutiks", N 44.57, E 33.51, 14.06.2016; Balaklava District: 7 – Balaklava, Kadykovka microdistrict, N 44.51°, E 33.60°, 1996; 8 – Karanskie Rocks W of the 21st coastal battery, Vasileva Gully, N 44.49°, E 33.55°, 2006, 10.06.2016; 9 – Kefalo-Vrissi Gully and Mount Kastron (rocks above the paths, hotels, ruins of the Chembalo fortress), N 44.50°, E 33.61°, 2002–2006, 22–23.07.2012, 27.05.2018; 10 – plateau of Mount Kefalo-Vrissi, Balaklava Northern fort, N 44.51°, E 33.61°, 07.05.1998, 1999–2006, 05.10.2013, 27.05.2018; 11 – vicinity of the settlement of Blagodatnoe, W fringes of the Kayu Ridge above the Vitmer's Gully, N 44.50° E 33.64°, 07.05.1998, regular observations in 1998–2015, 09.06.2018; 12 – top of Asketi (Balaklava Southern fort, Asketi-1, Asketi-2 Caves), N 44.49°, E 33.62°, 2014, 26.09.2015, 27.05.2018; 13 – nameless summits SW of the Kamara-Bogaz Pass, Spilia Ridge, N 44.49°, E 33.63°, regular observations in 1998–2009; 14 – Mikro-Yalo and Megalo-Yalo localities SE of Balaklava, N 44.49°, E 33.62°, 23.08.1993, later regular observations in 1996–2018; 15 – "Cape Aya" state regional landscape sanctuary (Ayazma locality, Mount Gurush, Mount Kalafatlar, Arfen-Chair-Burun, W part of the Biller Ridge, N 44.45°, E 33.65°, N 44.47°, E 33.66°, 01.04.1997, regular observations in 1997–2017, 23.05.2018, 27.05.2019; 16 – "Cape Aya" state regional landscape sanctuary, summit area and cliffs of the Mounts Samnalykh-Burun and Kokia-Kala, N 44.43° E 33.66°, 1998 and 1999, 29.06.2018; 17 – "Cape Aya" state regional landscape sanctuary, coastal couloir Shaitan-Dere, N 44.43°, E 33.65°, 1997; 18 – "Cape Aya" state regional landscape sanctuary, summit of Mount Kush-Kaya, N 44.43°, E 33.67°, 1998, 29.06.2018; 19 – "Cape Aya" state regional landscape sanctuary, Batiliman locality, N 44.42°, E 33.66°, regular observations in 1996–2006, 17.05.2018; 20 – Laspi Bay, N 44.42°, E 33.73°, 1992–2000, 22.07.2012; 21 – between the Mounts Shaburla and Adzher-Kanat, W fringes of the Donguz-Orun Ridge, N 44.26, E 33.43, 1999, 29.09.2018; 22 – summit area and cliffs of the Mounts Ilyas-Kaya and Delikli-Burun, N 44.41°, E 33.74°, 1998 and 1999; 23 – Choban-Tash Rocks and Comperia locality, N 44.40°, E 33.74, regular observations in 1998–2011, 07.05.2018; 24 – Sarych Cape, lighthouse, N 44.39°, E 33.74°, 1996; 25 – cliff of Baydarskaya Yayla, Mount Chelebi, Parus Rock, N 44.40°, E 33.77°, 2003, 16.09.2012; 26 – Baydaro-Kastropolskaya Wall, cliffs and foots of the Mounts Forossky Kant and Mshatka-Kayasy, also retaining walls of the old Yalta serpentine road near the Baydarskie Vorota Pass, N 44.40°, E 33.81°, 09.11.2005, 20.05.2018, 04.03.2019, 07.04.2019; 27 – old Yalta road near the foot of the Mount Kilse-Burun, N 44.41°, E 33.83°, 07.05.2018, 29.06.2018, 07.04.2019; 28 – Baydaro-Kastropolskaya Wall, 0.7 km NW of Mount Kilse-Burun, N 44.41° E 33.64°, 23.05.2018; 29 – vicinity of the settlement of Foros, special object "Zarya", N 44.39°, E 33.75°, 2004; Yalta urban territory, Republic of Crimea: 30 – settlement of Foros, historical park, 44.39°, 33.78°, 2005, 12.11.2016, 31.12.2018.

Pseudopus apodus: Gagarinsky District: 1 – coast of the Kazachya Bay, shooting range near the Golubaya Bukhta beach, N 44.58°, E 33.40°, 1987–2017, 17.05.2016; 2 – within the city of Sevastopol, near the Kruglaya Bay (= Omega Bay), N 44.59°, E 33.44°, 1989; 3 – within the city of Sevastopol, Streletskaya Bay, N 44.59°, E 33.48°, 1990; 4 – Khersonesos archaeological reserve, N 44.61°, E 33.49°, 1989–1993; 5 – – within the city of Sevastopol, Karaite cemetery, N 44.60°, E 33.51°, 2014; Leninsky District: 6 – Maksimova Dacha landscape park and adjacent areas to the Khomutovaya Gully, area of the 5th km of the Yalta Highway, N 44.56°, E 33.56°, 1989–1992, 06.08.1993, 15.05.2018; Nakhimovsky District: 7 – coast of the Gollandiya, Yuzhnaya and Apollonova Bays, Ushakova Gully, N 44.63°, E 33.57°, 1989–1995, 04.05.2018; 8 – Kilen-balka Gully, N 44.61°, E 33.56°, 1990; 9 – between the E slope of the Tash-Yol-Bair Upland and Kamyshlovsky Ravine, 1 km N of the village of Dalnee, N 44.67°, E 33.64, 30.04.2018, 22.05.2018; 10 – flood plain of the Belbek River in the vicinity of the villages of Fruktovoe and Povorotnoe, N 44.68° E 33.59°, 26.07.2014, 22.05.2018; 11 – between the villages of Frontovoe and Verkhnesadovoe, Mount Kermenchik, N 44.66°, E 33.71°, 2005, 24.04.2010; 12 – vicinity of the village of Pirogovka, slope of Mount Chatyr-Tau, N 44.70°, E 33.64°, 14.09.1997 (Kukushkin, 2003a, 2003b); 13 – vicinity of the village of Verkhnesadovoe, Kallan Mound, N 44.71°, E 33.72°, 26.05.2018; 14 – vicinity of the village of Verkhnesadovoe, Azizler locality, N 44.71° E 33.68°, 26.05.2018; Balaklava District: 15 – W coast Balaklava Bay, Mount Psilerakhi

and Mytileno Rocks, N 44.49°, E 33.59°, 30.05.2001, 25.07.2007; 16 – Gerakleyiskyi Peninsula, landslide on the coast between Vinoogradnyi and Dzhanshiev capes, N 44.53°, E 33.46°, 26.04.1996, 01.05.1996, 02.04.1998, 28.05.2006, 12.06.2006, 30.05.2012 (Kukushkin, 2003a, 2003b); 17 – Fiolent Cape, vicinity of Georgievsky Monastery, N 44.50°, E 33.52°, 5.11.1998, 28.05.2006, 16.05.2018, 22.05.2018 (Kukushkin, 2003a, 2003b); 18 – SE slope of Mount Sapun-gora, N 44.54°, E 33.58°, 1996–2001, 10–13.12.1999 (Kukushkin, 2003a, 2003b); 19 – Mekenzievskoe Forestry, Kleopina Gully, N 44.63°, E 33.61°, 29.04.2018, 02.05.2018, 04.05.2018; 20 – in Inkerman near the Kalamita fortress, N 44.61°, E 33.61°, 1989–1995, 04.05.2018; 21 – Mekenzievskoe Forestry, Martynova Gully near the 3rd forest cordon, N 44.62°, E 33.64°, 1998, 2008, 24.04.2018 (Karmyshev, 1999b); 22 – Temnaya Gully, N 44.65°, E 33.66°, 22.05.2018; 23 – Kara-Koba Rocks, and vicinity of the 2nd forest cordon of Mekenzievskoe forestry, N 44.62°, E 33.69°, 2001, 02.05.2018, 05.05.2018; 24 – vicinity of the village of Ternovka, cave monastery Chelter-Marmara, N 44.59°, E 33.74° (Sukhareva and Oskolskaya, 2009); 25 – everywhere in the vicinity of the village of Rodnoe, N 44.57°, E 33.72°, 07.04.1998, 13.04.1998, 05.05.2014, 13.05.2018; 26 – between the villages of Rodnoe and Ternovka, Zybuk-Tepe Plateau, N 44.56°, E 33.76°, 1998, 2013–2017 (Kukushkin, 2003a, 2003b); 27 – Mount Dzhilek slopes and ruins of the village of Uzenbash near Su-Bashi spring, N 44.56°, E 33.77°, 1996–1997, 13.07.1998, 19–20.04.2001 (Kukushkin, 2003a, 2003b); 28 – right side of the Chernorechenskyi Canyon, ""Manstein's" road, N 44.54°, E 33.71°, 05.05.2014; 29 – exit from the Chernorechenskyi Canyon upstream of the village of Chernorechie and within the village, N 44.54°, E 33.69°, 1996–1998 (Kukushkin, 2003a, 2003b); 30 – Mount Gasforta, bank of Gasfortinskoe Reservoir and Mount Isar on the left bank of the Chernorechenskyi Canyon, N 44.53°, E 33.67°, 31.05.1998, 11.05.2002, 18.05.2018, 26.06.2018 (Kukushkin, 2003a, 2003b); 31 – vicinity of the village of Oboronnoe, Orta-Kaya Ridge, N 44.52°, E 33.68°, 1998; 32 – Varnutskaya Valley, vicinity of the village of Reservnoe, entrance to the Sukhaya Rechka River Canyon, Murkum-Ulle Ridge, N 44.48°, E 33.69°, 1997, 23.03.1996, 04.05.2015 (Kukushkin, 2003a, 2003b); 33 – vicinity of the settlement of Blagodatnoe, Vitmer's Gully, slopes of the Spilia Ridge, Mount Kayu, N 44.50°, E 33.64°, 07.05.1998, 21.05.2003, 14.06.2006 (Kukushkin, 2003a, 2003b); 34 – Balaklava Valley, Canrobert's Hill, vineyards of agricultural company "Zolotaya balka", N 44.52°, E 33.63°, 1998 and 1999, 16.04.2000; 35 – Kefalo-Vrissi Gully, "Balaklava Severnyi" Fort, NW slope of Mount Asketi near the English cemetery, N 44.49°, E 33.61°, 15–16.04.1996, 05.05.1996, 05.05.1998, 07.05.1998, 27.05.2018, 18.09.2018 (Kukushkin, 2003a, 2003b); 36 – Mikro-Yalo locality and region of the Kamara-Bogaz Pass, N 44.49°, E 33.62°, regular observations in 1996–2016 (in particular, 02.11.1996, 14.11.1996, 03.03.1998), 27.05.2018 (Kukushkin, 2003a, 2003b); 37 – "Cape Aya" state regional landscape sanctuary, Ayazma locality and nearby terraced slopes, Megalo-Yalo locality, N 44.49°, E 33.63°, regular observations в 1996–2017 (in particular, 04.04.1998, 18.06.2006), 23.05.2018 (Kukushkin, 2003a, 2003b); 38 – "Cape Aya" state regional landscape sanctuary, top of Mount Kalafatlar, near the Gekkonovaya Cave, N 44.46° E 33.65°, 23.05.2018; 39 – "Cape Aya" state regional landscape sanctuary, Batiliman locality and Laspi amphitheater, N 44.43°, E 33.71°, 1996–2006, 20.05.2018 (Kukushkin, 2003a, 2003b); 40 – Sarych Cape, N 44.39°, E 33.74°, 1998 and 1999; 42 – Laspi Sanctuary, Choban-Tash Rocks and Comperia locality, N 44.40°, E 33.75°, 14.06.1998, 15.06.2000, 20.05.2018 (Kukushkin, 2003a, 2003b); 42 – along the road below the Baydarskie Vorota Pass and on the coast near the village of Foros, N 44.41°, E 33.79°, 23.05.1996 (Kukushkin, 2003a, 2003b), 23.11.2014, 23.05.2019; 43 – S of the village of Rodnikovskoe, at the beginning of a Roman road, N 44.46°, E 33.86°, 28.05.1998; 44 – Baydarskaya Valley; 0.6 km N–NW of the village of Ozernoe, N 44.49° E 33.79°, 03.06.2018; 45 – vicinity of the village of Shirokoe, entrace to the Chernorechenskyi Canyon, Mount Kizyl-Kaya, N 44.49°, E 33.79°, 17–18.04.2005, 22.05.2018 (Kukushkin, 2003a, 2003b); 46 – vicinity of the village of Peredovoe, canyons of the S slope of Mount Machu, also along unpaved roads above the village, N 44.53°, E 33.84°, 28.05.1998, 12.07.2011, 02.06.2017 (Kukushkin, 2003a, 2003b); Yalta urban territory, Republic of Crimea: 47 – vicinity of the settlements of Melas and Kastropol, N 44.40°, E 33.90°, 21.05.1996, 12.06.1997, 20.05.2018; 48 – vicinity of the village of Opolznevoe, vineyards in the upper vicinity of the village, bank of reservoir "250" SE of the village, N 44.41°, E 33.96°, 21.04.2018, 07.04.2019; Bakhchysarai District, Republic of Crimea: 49 – Belbek Valley, on the road between the village of Tankovoe and Krasnyi Mak, N 44.66°, E 33.78°, 22.05.2005; 50 – between the villages of Verkhnesadovoe and Krasnaya Zarya, Kara-Tau locality, N 44.74°, E 33.73°; 13.09.1997, 26.05.2018 (Kukushkin, 2003a, 2003b); 51 – valley of the Kacha River, rocks above the road between the villages of Nekrasovka and Krasnaya Zarya, N 44.75°, E 33.70°; 21.05.2018; 52 – valley of the Alma River, height Seferbi-Bair 0.5 km W of the village of Otradnoe, N 44.86°, E 33.72°, 27.06.2018.

Darevskia lindholmi: Gagarinsky District: 1 – coastal cliffs of the isthmus of Mayachnyi Peninsula, N 44.56, EE 33.40, latest record 14.10.2018 (Kukushkin and Sviridenko, 2002); Leninsky District:

2 – base of the breakwater in the Karantinnaya Bay (E coast) and laboratory building of the Institute of Biology of Southern seas, N 44.62, E 33.51, early 1990s; Balaklava District: 3 – Inkerman, Kalamita fortress, N 44.60°, E 33.61°, 1989–2018; Nakhimovsky District: 4 – vicinity of the village of Fruktovoe, banks of the Belbek River, N 44.68°, E 33.60°, 18.06.2009; Bakhchysarai District, Republic of Crimea: 5 – Kara-Tau locality, Mount Kermanchik, N 44.73°, E 33.73°, 21.05.2018; 6 – Kacha River Valley rocky ridge above the village of Furmanovka, N 44.77°, E 33.75°, 21.05.2018 (due to the almost continuous distribution of the species over most of Sevastopol area, only the westernmost and northernmost points of the range in the region are listed).

Lacerta agilis tauridica: Balaklava District: 1 – Ai-Petri Yayla between Mounts Kastropolskaya and Morcheka, N 44.43°, E 33.89°, 22.05.2012; 2 – Ai-Petri Yayla between the Mounts Balchik-Kaya and Merdven-Kayasy, N 44.42°, E 33.88°, 22.05.2012, 15.05.2018 (Sviridenko and Kukushkin, 2005); 3 – vicinity of the village of Kolkhznoe, Trapan-Bair Ridge, N 44.46°, E 33.90°, 07.06.2005, 01.05.2016 (Sviridenko and Kukushkin, 2005; Kukushkin, 2013); 4 – between Mount Chuvash-Koi and Trapan-Bair Ridge, N 44.46°, E 33.90°, 15.05.2018; 5 – foot of the Baydarskaya Yayla between the villages of Tylovoe and Kizilovoe, on a strip between the summit of Mount Kanalykh-Kaya to the Mount Pska-Bair traverse, N 44.42°, E 33.75°, 06.04.2013, 09.03.2016; 6 – Baydarskaya Valley, foothills of the W slope of Mount Kukuman-Bair and along the road from the village of Kizilovoe to the village of Orlinoe, N 44.43°, E 33.75°, 08.04.2014; 7 – vicinity of the village of Peredovoe, Mount Bechko-Kaya and adjacent areas of the Gyulyustan-Bair Plateau, saddle between Mounts Bechko-Kaya and Lysaya (in the Bakhchysarai District), N 44.53°, E 33.86°, 12.07.2011, 19.05.2012, 23.04.2018 (Kukushkin, 2013); 8 – between the abundant village Goristoe and Mount Kaladzhi, N 44°55°, E 33°81°, 01.06.2002 (Sviridenko and Kukushkin, 2005); 9 – 2 km E–NE of the village of Ternovka, valley opposite Mount Shuldan-Burun, N 44.58°, E 33.79°, 26.04.2016; 10 – vicinity of the village of Ternovka, Ay-Todorskaya Valley, dam of a large pond and a glade W Mount Belaya, N 44.56°, E 33.79°, 09.04.2016, 28.04.2018; Bakhchysarai District, Republic of Crimea: 11 – Mount Karaul-Kaya, N 44.53°, E 33.88°, 12.07.2011, 19.05.2012, 23.04.2018 (Kukushkin, 2013); 12 – Kordon-Bair Ridge and Mount Irita-Kaya, N 44.54°, E 33.87°, 11.07.2011, 23.04.2018 (Kukushkin, 2013); 13 – vicinity of the village of Kolkhznoe, Mount Sarpakha, N 44.49, E 33.93, 12.06.2018, Mount Yany-Kyl, Mount Villya-Burun, N 44.48°, E 33.94°, 29.04.2019; 14 – Mount Borsuk-Burun, N 44.46°, E 33.92°, 29.04.2019.

Coronella austriaca: Balaklava District: 1 – "Baydarskaya Valley", N 44.42°, E 33.77°, 1906 (Dotsenko, 2003); 2 – vicinity of the village of Kolkhznoe, on the way from Uzundzhi to the village of Sokolinoe via the Ai-Dimitriy locality, N 44.48°, E 33.88°, 24.05.1957 (Dotsenko, 2003; Voinstevensky, 2006); 3 – Inkerman, Kalamita fortress, N 44.60°, E 33.61°, 1990 (Kukushkin and Kotenko, 2003; Kotenko et al., 2008); 4 – vicinity of the village of Ternovka, upper reaches of the Ai-Todorskaya Valley, N 44.60°, E 33.61°, 09.04.2016; 5 – Ai-Petri Yayla between the Mounts Kastropolskaya and Balchik-Kaya, N 44.43°, E 33.89°, 22.05.2012; Bakhchysarai District, Republic of Crimea: 6 – vicinity of the village of Ternovka, upper reaches of Adym-Chokrak Valley near Ilki-Chokrak spring, N 44.58°, E 33.83°, 23.05.2010; 7 – vicinity of the Bechku Pass, Kordon-Bair Ridge, N 44.54°, E 33.88°, 11.07.2011; 9 – Mount Yalpakh-Kaya, on the way down to the canyon of the Su-Akhande River, N 44.54°, E 33.92°, 22.04.2012; Yalta urban territory: 8 – Ai-Petri Yayla, Medovaya Cave, 19.06.2006, Druzhba Cave, 22.09.2018, N 44.42°, E 33.92° (Turbanov et al., 2019).

Dolichophis caspius: Balaklava District: 1 – vicinity of the village of Peredovoe, Mount Doburdzhin-Kaya canyon, N 44.53°, E 33.86°, 19.05.2012, 29.08.2017; 2 – "Cape Aya" state regional landscape sanctuary, Mount Kalafatlar, Cave Gekkonovaya, N 44.46°, E 33.65°, 16.07.1997, 20.03.2016; 3 – vicinity of the village of Peredovoe, Urkusta-Chokrak-Koba Cave, N 44.53°, E 33.83°, 06.08.2017 (Turbanov et al., 2019); 4 – vicinity of the village of Chernorechie, N 44.54°, E 33.69°, 1998; 5 – «Baydarskaya Valley», N 44.45°, E 33.78° (Dotsenko, 2003); 6 – "vicinity of Inkerman, Mekenzievy Gory", 2000 (Shcherbak, 1966; Dotsenko, 2003); 7 – "between Sevastopol and Fiolent Cape", N 44.54°, E 33.48°(Vedmederya et al., 2007); 8 – "in a rather dense and shaded beech-hornbeam forest around Baydarskaya Valley", N 44.42°, E 33.78° (Shcherbak, 1966); 9 – 2 km SE of Balaklava, Mikro-Yalo locality, N 44.49°, E 33.62°, 05.11.1996, 29.09.1997; 10 – "Cape Aya" state regional landscape sanctuary, Mount Gurush and Ayazma locality, N 44.47°, E 33.64°, 12–13.10.1997, 12.04.1998, 1999–2006; 11 – S slope of Mount Asketi near Balaklava, N 44.49°, E 33.62°, 06.11.1997, 30.03.2009; 12 – Chernorechenskyi Canyon, Mount Eli-Eli, N 44.51°, E 33.78°, 1997 and 1998; 13 – Baydaro-Kastropolskaya Wall, ledge of Mount Mshatka-Kauasy, N 44.40°, E 33.80°, 2001; 14 – Baydarskie Vorota Pass and E part of Baydarskaya Yayla, N 44.41°, E 33.78°, 14.06.1998, 23.04.2018; 15 – vicinity of the village of Rodnoe, Khvorostyanka locality, plateau of Mount Zybuk-Tepe, N 44.56°, E 33.76°, 1996 and 1997, 13.04.1998, 13.06.2013, 28.07.2016; 16 – seaside landslides between Vinogradnyi and Fiolent capes, N 44.52°,

E 33.46°, 1996–1998, 2011; 17 – slope and top of Mount Ilyas-Kaya, N 44.41°, E 33.74°, 1998 and 1999; 18 – Ai-Petri Yayla to W of Shaitan-Merdven Pass, N 44.41°, E 33.80°, 23.05.2012; 19 – vicinity of the village of Ternovka, cave monastery Chelter-Marmara, N 44.59°, E 33.74° (Sukhareva and Oskolskaya, 2009); 20 – Laspi Bay and Batiliman locality, N 44.42°, E 33.67°, 1997–2017; 21 – Mount Gasforta, N 44.52°, E 33.67°, 1998–2017, 18.05.2018, 03.06.2018, 26.06.2018; 22 – vicinity of the settlement of Blagodatnoe and village of Oboronnoe, N 44.50°, E 33.63°, 1998–2016; Balaklava Valley, Fedyukhiny Vysoty heights, N 44.52°, E 33.64°, 1996–2001; 23 – W coast Balaklava Bay, Mytileno Rocks, N 44.49°, E 33.59°, 2007, 11.06.2016; 24 – vicinity of the village of Reservnoe, near the dam of the lower pond, N 44.48°, E 33.68°, 04.05.2015; 25 – vicinity of the settlement of Alsu and adjacent plot of the left side of the Chernorechenskyi Canyon, N 44.53°, E 33.71°, 1996–2001; 26 – Cape Fiolent below the Georgievsky Monastery, N 44.50°, E 33.51°, 1998; 27 – vicinity of the village of Shirokoe, Chernorechenskyi Canyon, N 44.51°, E 33.75°, 1996, 10.05.2018; 28 – Varnutskaya Valley, 0.5 km NE of the village of Reservnoe, N 44.48°, E 33.68°, 24.05.2018; 29 – Balaklava, Mount Kastron, N 44.50°, E 33.61°, 27.05.2018; 30 – "Baydarsky" state regional landscape sanctuary, N coast of the Chernorechenskoe reservoir, N 44.50°, E 33.81°, 03.06.2018; 31 – vicinity of the village of Ternovka, upper reaches of the Ay-Todorskaya Valley, N 44.57°, E 33.80°, 13.05.2018; 32 – Baydarskaya Valley, vicinity of the village of Ozernoe, N 44.49°, E 33.79°, 30.05.2018; Nakhimovsky District: 33 – village of Verkhnesadovoe, N 44.70°, E 33.70°, 30.05.1957 (Shcherbak, 1966); 34 – vicinity of the village of Andreevka, N 44.82°, E 33.56°, 11.09.1997; 35 – coastal cliffs between the villages of Orlovka and Kacha, N 44.75°, E 33.54°, 28.05.2006; 36 – steppe areas E of the Kacha settlement, N 44.79°, E 33.59°, 28.05.2006; 37 – vicinity of the village of Verkhnesadovoe, Kara-Tau upland, N 44.70°, E 33.69°, 14.09.1997; 38 – near Lukull Cape, N 44.83°, E 33.57°, 28.05.2006; 39 – uplands in the valley of the Belbek River E of the settlement of Lyubimovka, N 44.66°, E 33.56°, 2004; Leninsky District: 40 – central area of the Gerakleyiskyi Peninsula, N 44.56°, E 33.54° (Shcherbak, 1966); 42 – Kilen-balka Gully, N 44.60°, E 33.57°, 1995; 42 – Maksimova Dacha landscape park and adjacent areas of the Khomutova Gully, N 44.57°, E 33.54°, 1991–2000; Gagarinsky District: 43 – coast of the Solenaya Bay, N 44.57°, E 33.41°, 2006; 44 – ruins of ancient town of Khersonesos of Taurida, N 44.61°, E 33.50°, 1990, 1984, 1998; 45 – Streletskaya Bay, N 44.59°, E 33.48°, 1989–1990; Bakhchysarai District, Republic of Crimea: 46 – vicinity of the village of Peredovoe, saddle between Mounts Bechko-Kaya and Lysaya, N 44.53°, E 33.86°, 19.05.2012, 29.08.2017, 23.04.2018; 47 – vicinity of the village of Kolkhznoe, meteorological station in the Ai-Dimitriy locality, N 44.51°, E 33.91°, 19.05.2018; 48 – village of Tankovoe, N 44.65°, E 33.81°, 24.05.1961 (Shcherbak, 1966); 49 – Mount Eski-Kermen, N 44.60°, E 33.74°, 16–18.10.1997; 50 – Kacha River valley, vicinity of the village of Furmanovka, N 44.77°, E 33.75°, 24.05.2018; 51 – Kacha River valley, vicinity of the village of Dolinnoe, N 44.76°, E 33.79°, 24.05.2018; 52 – highway between the villages of Vilino and Uglovoe, N 44.82°, E 33.64°, 24.05.2018; 53 – Mount Baba-Dag, Mangup-Kale Cave Town, N 44.61°, E 33.79°, 1998; 54 – vicinity of the village of Peschanoe, Cape Kermenchik neat the mouth of the Alma River, N 44.84°, E 33.59°, 27.05.2014.

Elaphe sauromates: Gagarinsky District: 1 – Sevastopol Forestry, 3 km N of Fiolent Cape, N 44.53°, E 33.51°, 2016; Balaklava District: 2 – vicinity of the village of Kizilovoe, near the entrance of the Mamut-Chokrak Cave, N 44.42°, E 33.76°, 13.05.2013 (Turbanov et al., 2019); 3 – Baydarskaya Valley, highway between the village of Pavlovka and poultry farm, N 44.45°, E 33.80°, 2011; 4 – the Mount Shaburla at the top of the Laspi amphitheater, N 44.43°, E 33.74°, 2012; 5 – Baydarskie Vorota Pass, N 44.41°, E 33.78°, 2011; 6 – right bank of the Chernorechenskyi Canyon, N slope of Mount Eli-Eli, N 44.51°, E 33.78°, 2010; 7 – "Baydarskaya Valley", N 44.46°, E 33.77°, 07.06.1906 (Shcherbak, 1966; Dotsenko, 2003); 8 – vicinity of the village of Oboronnoe, Kamara-Bogaz Pass, N 44.49°, E 33.65°, 2006; 9 – 1 km W of the village of Khmelnitskoe, Fedyukhiny Vysoty heights, N 44.55°, E 33.64°, 1997 (Kukushkin and Karmyshev, 2002; Kukushkin and Kotenko, 2003); 10 – rocky areas in the vicinity of the village of Rodnoe, N 44.55°, E 33.75°, 20.04.1996, 13.04.1998; 11 – 2 km E of the village of Rodnoe, Mount Dzhilek, N 44.56°, E 33.77°, 16.04.1998, 13.07.1999; 12 – vicinity of the village of Peredovoe, canyons of the S slope of Mount Machu, N 44.53°, E 33.84°, 28.05.1998, 13.07.2011 (Kukushkin and Karmyshev, 2002); 13 – 2 km NW of the village of Peredovoe, near Skadzh-Chokrak spring, N 44.52°, E 33.80°, 26.06.2018; 14 – Varnutskaya Valley, 2–3 km W of the village of Reservnoe, N 44.47°, E 33.67°, 03.05.1997, 13.07.1997, 23.06.1998 (Kukushkin and Karmyshev, 2002) and territory of "Cape Aya" state regional landscape sanctuary, Ayazma locality, 10.06.2019; 15 – between the villages of Rodnikovskoe and Kolkhznoe, N 44.46°, E 33.87°, 27.06.2004; 16 – vicinity of the village of Ternovka, Chelter cave monastery, N 44.59°, E 33.74° (Sukhareva and Oskolskaya, 2009); 17 – vicinity of Inkerman, Mekenzievskoe Forestry, half way between the village of Dalnee and "Mekenzievy Gory" railway station, N 44.65°, E 33.62°, 12.07.1998, 02.05.2018 (Kukushkin and Karmyshev, 2002); 18 –

Mekenzievskoe Forestry, near 3rd forest cordon, N 44.62°, E 33.64°, 01–06.06.2000, 11.10.2018; 19 – near 2nd forest cordon Mekenzievskoe Forestry and along Ekaterininskoe highway, N 44.62°, E 33.69°, 24.08.2001, 2009 (Kukushkin and Karmyshev, 2002); Nakhimovsky District: 20 – ruins of the Transfiguration of the Lord church in Kokoraki homestead, SW of the village of Verkhnesadovoe, N 44.68°, E 33.69°, 1995; near the village of Verkhnesadovoe, 2019 (communication by local inhabitants, 10.05.2019); Bakhchysarai District, Republic of Crimea: 21 – Kara-Tau locality, Tash-Oba Mound, N 44.71°, E 33.72°, 2005; 22 – W slope of Mount Baba-Dag, N 44.59°, E 33.79°, 1997 (Kukushkin and Karmyshev, 2002).

Zamenis situla (after: Kukushkin and Tsvelykh, 2004; Turbanov et al., 2019, supplemented): Gagarinsky District: 1 – Mayachnyi Peninsula isthmus, shooting range above the Golubaya Bukhta Beach, N 44.57°, E 33.40°, 2002–2005, 27.03.2012; 2 – Khersonesos archaeological reserve, N 44.61°, E 33.49°, 15.10.1999; Leninsky District: 3 – within the city of Sevastopol including the city center, N 44.59°, E 33.44°, N 44.60°, E 33.52°, 19.04.1987, 15.10.1998, 12.12.1999, 14.11.2000, 31.12.2000, 21.02.2001, 09.05.2002, 10.05.2002, 14.05.2002, 19.05.2002, 30.05.2002, 05.08.2002, 09.10.2002, 21.11.2002, 12.04.2003, 04.05.2003, April 2006, 22.05.2006 et al.; 4 – within the city of Sevastopol, Mount Krasnaya Gorka, N 44.59°, E 33.53°, end of the 1990s; 5 – Sevastopol Forestry, near the TV tower, N 44.59°, E 33.59°, end of the 1990s; 6 – Maksimova Dacha landscape park, N 44.56°, E 33.55°, repeatedly during the 1990s and in May 2002; Nakhimovsky District: 7 – Sevastopol, Korabelnaya Side, Ushakova Gully, N 44.61°, E 33.55°, 1990; 8 – small upland E of the settlement of Lyubimovka, N 44.66°, E 33.56°, 2002–2005; 9 – village of Dalnee, Kamyshlovsky Ravine, N 44.66°, E 33.64°, end of the 1990s; 10 – Belbek River valley near the village of Povorotnoe, N 44.68°, E 33.61°, 2002; 11 – village of Verkhnesadovoe, N 44.68°, E 33.71°; 12 – vicinity of the “1519 km” railway station, ruins of the Transfiguration of the Lord church, N 44.68°, E 33.66°, 1989; Balaklava District: 13 – landslide coast E of Vinogradnyi Cape, N 44.52°, E 33.47°, 16.01.1998, 04.04.1998; 14 – area of Fiolent Cape, summer cottage village and coastal slopes, N 44.50°, E 33.49°,01.11.2001; 15 – 2.5 km NE of Fiolent Cape, N 44.51° E 33.52°, 27.05.2018; 16 – Inkerman, N 44.60°, E 33.64°, 12.05.2003; 17 – Mekenzievskoe Forestry, 3rd forest cordon, N 44.62°, E 33.65°, 1999–2002; 18 – vicinity of the village of Ternovka, cave monastery Chelter-Marmara, N 44.59°, E 33.73° (Sukhareva and Oskolskaya, 2009); 19 – between the village of Ternovka and village of Rodnoe, Zybuk-Tepe Plateau, N 44.56°, E 33.76°, 1996, 1997, 27.06.2013; 20 – ruins of the abandoned village of Uzenbash, N 44.56°, E 33.77°, 07.03.1999, 13.04.1998, 16.04.1998, 13–14.07.1998, 06.06.2002; 21 – within the borders of the village of Rodnoe, N 44.56°, E 33.74°, 22.04.1996; 22 – village of Chernorechie, N 44.54°, E 33.68°, 1999; 23 – vicinity of the village of Goncharnoe, N 44.46°, E 33.72°, 23.08.2002; 24 – vicinity of the village of Oboronnoe, N 44.51°, E 33.66°, 1999; 25 – Mikro-Yalo locality, N 44.49°, E 33.63°, 24.02.1998, 01.03.1998; 26 – near the summit of Mount Asketi, near the entrance of the Asketi-2 Cave, N 44.49°, E 33.62°, 26.09.2015; 27 – “Cape Aya” state regional landscape sanctuary, near Ayazma-Chokrak spring, N 44.47°, E 33.64°, 24.11.1993, 18.06.2006; 28 – “Cape Aya” state regional landscape sanctuary, Mount Gurush, Dvukhkupolnaya Cave, and nameless grotto near the base of the cliffs, N 44.48°, E 33.65°, 02.12.2012, 26.09.2015; 29 – “Cape Aya” state regional landscape sanctuary, SW slope and top area of Mount Kalafatlar near the Kurshum-Bogaz Pass, Gekkonovaya Cave, Gnomov Cave, N 44.47°, E 33.65°, 01–02.05.1997, 05.12.2012, 31.03.2016; 30 – “Cape Aya” state regional landscape sanctuary, Batiliman locality, N 44.43°, E 33.69°, 1997; 31 – Laspi Bay, N 44.42°, E 33.73°, 1996 and 1998, 23.05.2005; 32 – “Laspi” state regional landscape sanctuary, summit and SE cliffs of Mount Ilyas-Kaya, N 44.40°, E 33.74°, 20.06.1998, 02.07.1998, 03.08.1998, 09.10.2001, 03.05.2018; 33 – Baydarskie Vorota Pass, N 44.41°, E 33.79°, 27.05.2004; 34 – vicinity of the settlement of Foros, near the Parus Rock, N 44.40°, E 33.77°, 2001; 35 – Ai-Petri Yayla, near the summit of Mount Merdven-Kaya, N 44.42°, E 33.85°, 23.05.2012; 36 – westernmost region of the Ai-Petri Yayla, in the stonewall of ancient road, N 44.41°, E 33.81°, 29.05.1998; 37 – Ai-Petri Yayla, N slope of Mount Kilse-Burun, N 44.41°, E 33.83°, 2012; 38 – summit of Mount Biyuk-Sinor, 2002, Mount Kuchuk-Sinor, Sakhtykh Cave, 11.08.2012; 39 – Baydarskaya Valley, in the village of Rodnikovskoe, N 44.46°, E 33.86°, 2005; 40 – Baydarskaya Valley, vicinity of the village of Tylovoe, N 44.45°, E 33.73°, 27.05.2004, 2010; 42 – vicinity of the village of Shirokoe, Chernorechenskyi Canyon, N 44.50°, E 33.78°, 01–02.06.1997, 13–14.06.1999, 2013; 42 – vicinity of the settlement of Alsu, N 44.53°, E 33.71°, 2000s; 43 – vicinity of the Atlaus forest cordon, W slope of Mount Khlama, N 44.53°, E 33.78°, 2010; 44 – Mount Machu canyons above the village of Peredovoe, N 44.53°, E 33.83°, 28.05.1998; 45 – village of Peredovoe, Kobalar-Su River valley, N 44.51°, E 33.82°, 2010s; Bakhchysarai District, Republic of Crimea: 46 – 5 km S of the village of Krasnyi Mak, N 44.60°, E 33.78°, 13.08.2001 (Karmyshev, 2001); 47 – vicinity of the village of Krasnyi Mak, Karalezskie Rocks (= Sphinxes), N 44.65°, E 33.79°, 16.10.2010; 48 – Mount Baba-Dag, Mangup-Kale-14 Cave, N 44.60°, E 33.80°, 02.05.2018; 49 – Mount Eski-Kermen, N 44.61°, E 33.77°, 1998; Yalta urban territory, Republic of Crimea: 50 – near the

village of Katsiveli, N 44.40°, E 33.98°, 17.03.2013; 51 – Baydaro-Kastropolskaya Wall below Mount Kilse-Burun, N 44.41°, E 33.82°, 07.04.2019.

Natrix tessellata: Balaklava District: 1 – estuary of the Chernaya River and reedbed where the river meets the Sevastopol Bay, N 44.61°, E 33.57°, 1858 (Kessler, 1860); 2 – Inkerman, flooded limestone quarry, N 44.61°, E 33.61°, 05.05.2018; 3 – Gasfortinskoe reservoir, coast and dam, N 44.53°, E 33.68°, 1997–2002, 18.05.2018 (Kotenko and Kukushkin, 2003); 4 – Chernorechenskyi Canyon in the vicinity of the village of Shirokoe, N 44.50°, E 33.79°, 31.05.1997, 28.05.1998 (Kotenko and Kukushkin, 2003); 5 – 1.5 km SW of the village of Rodnoe, N 44.55°, E 33.74°, 1996, 05.05.2014; 6 – 2 km E of the village of Rodnoe, ruins of the abandoned village of Uzenbash, N 44.55°, E 33.73°, 02.05.1996; 7 – vicinity of the village of Peredovoe, dam of Mulovskoe Lake, N 44.53°, E 33.82°, 10.06.2016; 8 – Baydarskaya Valley, vicinity of the village of Ozernoe, near Chernorechenskoe reservoir, N 44.48°, E 33.79°, 08.06.2005; 9 – vicinity of the village of Ternovka, Ay-Todor Valley, pond near the abandoned village of Goristoe, N 44.56°, E 33.80°, 02.06.2002; 10 – vicinity of the village of Alsu, N 44.52°, E 33.72°, 1997 (Kotenko and Kukushkin, 2003); 11 – village of Kmelnitskoe, Chernaya River Valley, N 44.55°, E 33.65°, 1996 (Kotenko and Kukushkin, 2003); Nakhimovsky District: 12 – drainage channel of the Belbek River within the borders of the village of Verkhnesadovoe, N 44.69°, E 33.69°, 1995; Gagarinsky District: 13 – Mayachnyi Peninsula isthmus, E coast of the Solenaya Bay, cape between Solenaya and Kazachya bays, N 44.58°, E 33.41°, 1989 (Kotenko and Kukushkin, 2003), 08.09.2019 (V.E. Giragosov, pers. comm.); 14 – shallow-water part of the Kazachya Bay, near the “Kazachya Bukhta” microdistrict, N 44.58°, E 33.41°, 18.04.2006, 28.05.2006, 02.05.2018, 25.05.2019; 15 – Streletskaya Bay, N 44.59°, E 33.47°, 1989; 16 – flooded plain near the end of the Kamyshovaya Bay (not any longer existent), N 44.58°, E 33.43°, 1950 (Kotenko and Kukushkin, 2003); 17 – rocky S coast of Cape Khersones, Golubaya Bukhta coast, N 44.56°, E 33.40°, 2013.

Vipera renardi: Balaklava District (?): 1 – SE vicinity of Sevastopol city, N 44.59°, E 33.60° (Shcherbak, 1966); Nakhimovsky District: 2 – vicinity of the Kacha settlement, N 44.78°, E 33.58° (Shcherbak, 1966); Bakhchysarai District, Republic of Crimea: 3 – vicinity of a vineyard between the villages of Uglovoe and Tyubek Cape, N 44.83°, E 33.57°, 11.09.1997 (Kukushkin, 2004b); 4 – vicinity of the village of Peschanoe, Kermenchik Cape, N 44.85°, E 33.59°, 1998 (Kukushkin, 2004b).

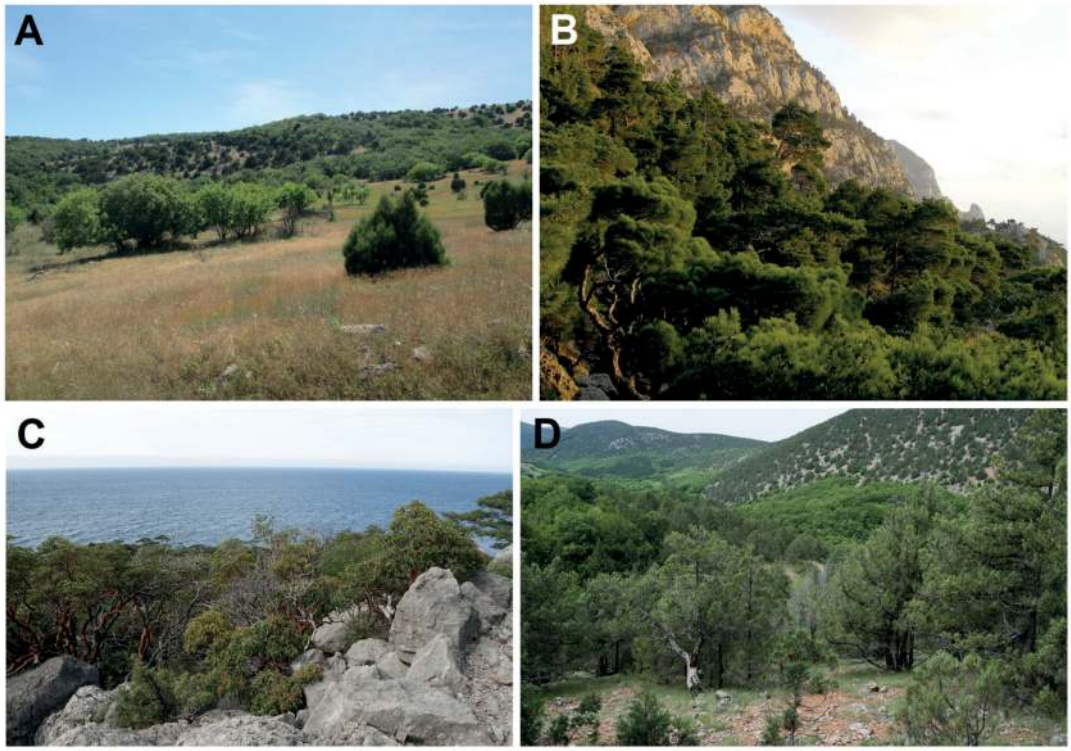

Fig. S1. Some specially protected natural areas of the Sevastopol city, valuable for the preservation of herpetofauna: **A** – "Karanskyi" State Landscape Sanctuary, juniper-oak sparse forest, savannah-like association; **B** – "Cape Aya" state sanctuary, locality Ayazma, forest of Turkish pine; **C** – "Cape Aya" State Landscape Sanctuary, Batiliman locality, maquis-like association with Greek strawberry tree; **D** – "Baydarskyi" State Landscape Sanctuary, a forest of Greek juniper. Photo by O.V. Kukushkin (**A**), M.M. Beskaravayinyi (**B**), M.A. Khrisanova (**C**, **D**).

Fig. S2. *Triturus karelinii* specimens from the southwestern Crimea: **A** – "Laspi" State Landscape Sanctuary, Sevastopol; **B** – Baydarskaya Valley, vicinity of the village of Orlinoe (= Baydar), Sevastopol; **C** – Ai-Petri Yayla Plateau, Balchikh-Kuyu spring, Sevastopol; **D** – Adym-Chokrak Valley, vicinity of the village of Ternovka (= Shulyu), Bakhchisarai District of Republic of the Crimea. Photo by M. A. Khrisanova (**A**, **B**), O.V. Kukushkin (**C**, **D**).

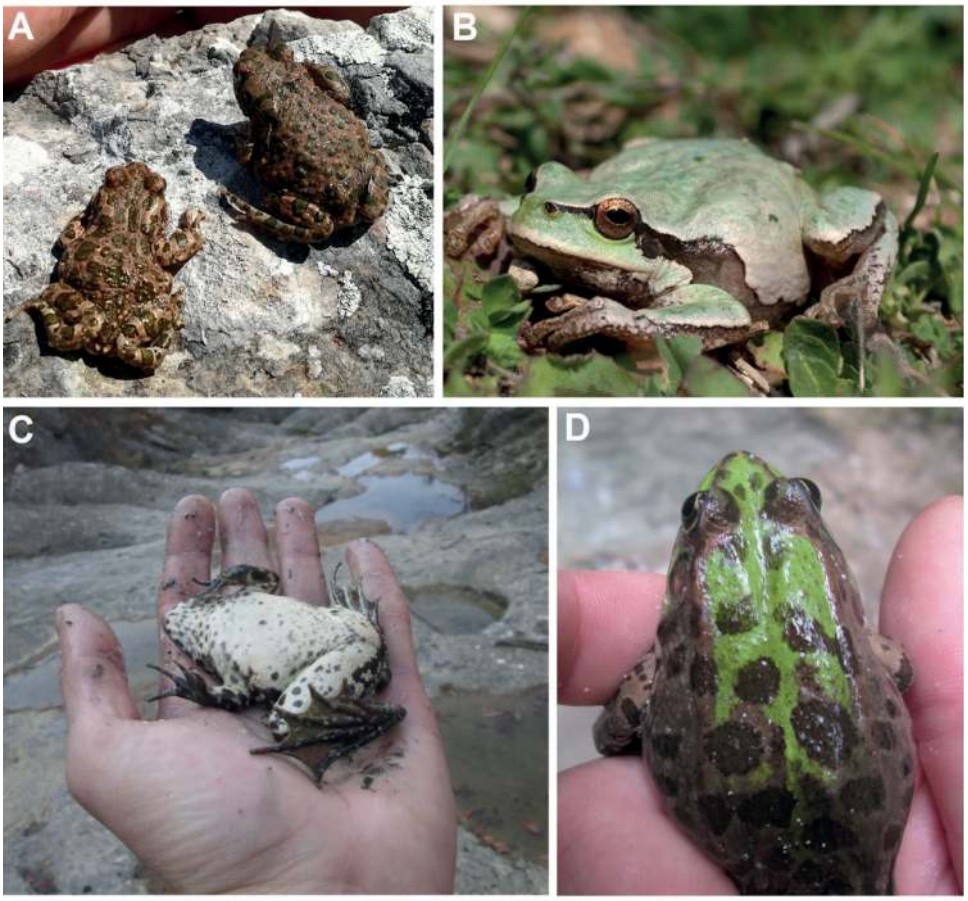

Fig. S3. Anurans from the southwestern Crimea: **A** – *Bufotes viridis*, Ai-Petri Yayla Plateau, Mount Balchik-Kaya, Sevastopol; **B** – *Hyla orientalis*, Mekenzievskoe forestry, surroundings of the town of Inkerman, Sevastopol; **C** – specimen of *Pelophylax* (*ridibundus*) complex from the "mixed" population, represented by individuals of two mitotypes (*Pe. ridibundus* s. str. and *Pe.* cf. *bedriagae*), Deimen-Dere Gorge, vicinity of the village of Orlinoe, Sevastopol; **D** – specimen of *Pelophylax* (*ridibundus*) complex from the "mixed" population, represented by individuals of two mitotypes (*Pe. ridibundus* s. str. and *Pe.* cf. *bedriagae*), Canyon of Uzundzha River, Bakhchisarai District of Republic of the Crimea. Photo by O.V. Kukushkin (**A**, **C**, **D**), M.A. Khrisanova (**B**).

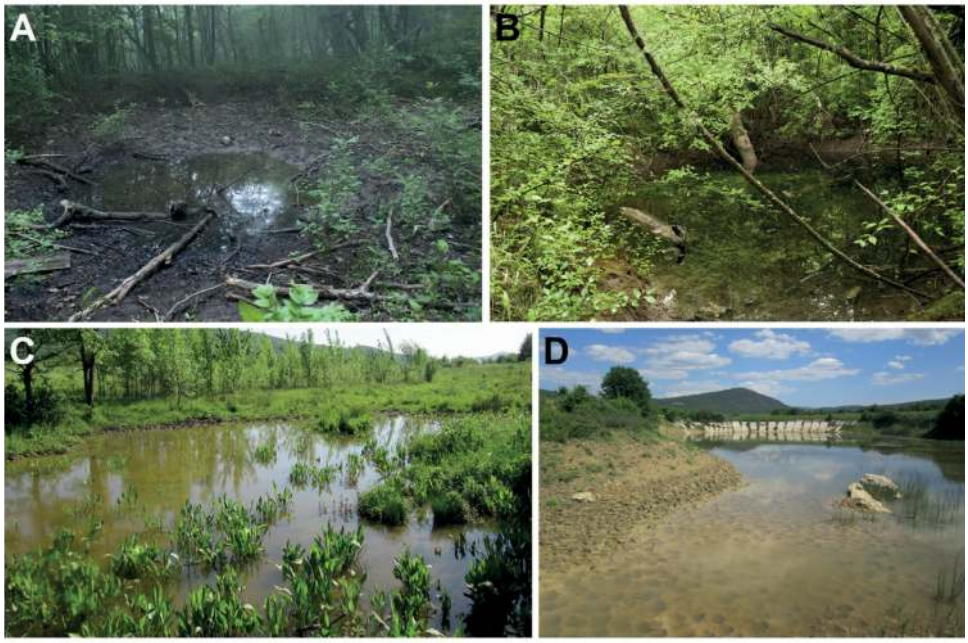

Fig. S4. Habitats of *Triturus karelinii* at the Sevastopol city territory: **A** – "Laspi" State Landscape Sanctuary; **B** – Baydarskaya Valley, vicinity of the village of Orlinoe; **C** – Baydarskaya Valley, small wetland between the villages of Podgornoe (= Kalendi) and Rodnikovskoe (= Skelya); D – Varnutskaya Valley, vicinity of the village of Rezervnoe (= Kuchuk-Muskomiya). Photo by O.V. Kukushkin (**A**, **D**), M.A. Khrisanova (**B**, **C**).

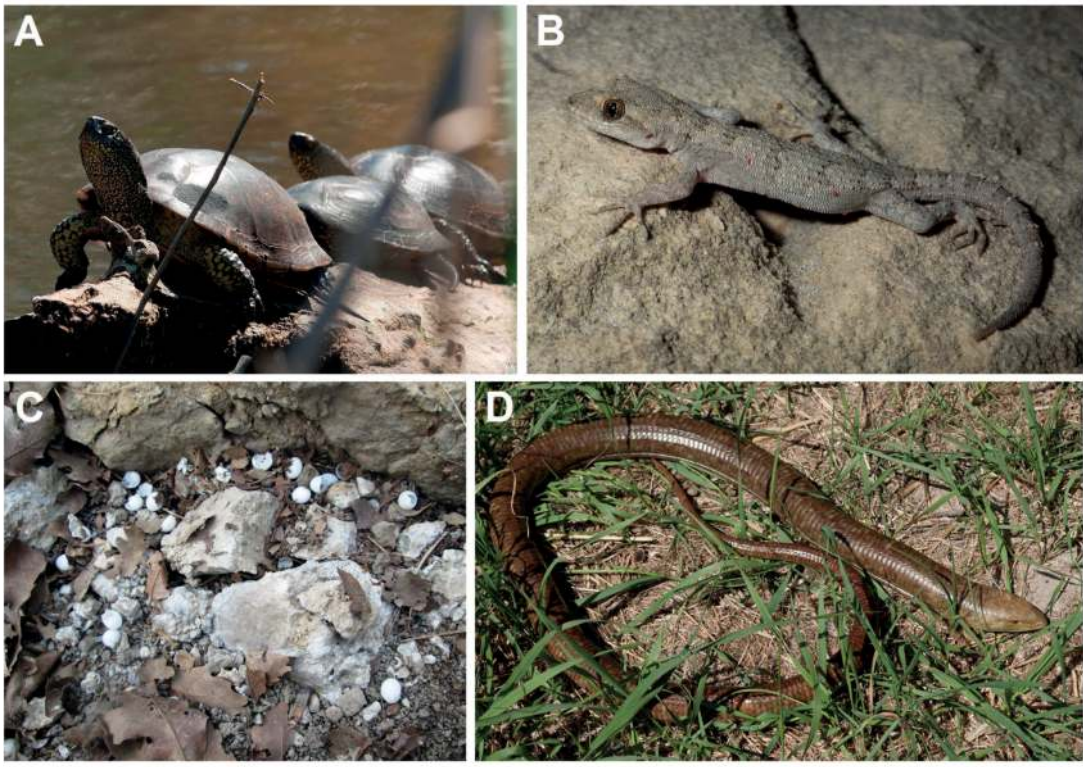

Fig. S5. Turtles, Gekkonidae and Anguidae lizards of the Sevastopol territory: **A** – *Emys orbicularis* in a reservoir in the valley of the Belbek River, vicinity of the village of Dalnee (= Kamyshly); **B** – *Mediodactylus danilewskii*, ancient town Khersonesos of Taurida; **C** – eggshell of *Mediodactylus danilewskii* communal clutch, Mikro-Yalo locality, surroundings of the town of Balaklava; **D** – *Pseudopus apodus*, "Cape Aya" State Landscape Sanctuary, near the top of Mount Kalafatlar. Photo by M.A. Khrisanova (**A**, **D**), I.S. Turbanov (**B**), O.V. Kukushkin (**C**).

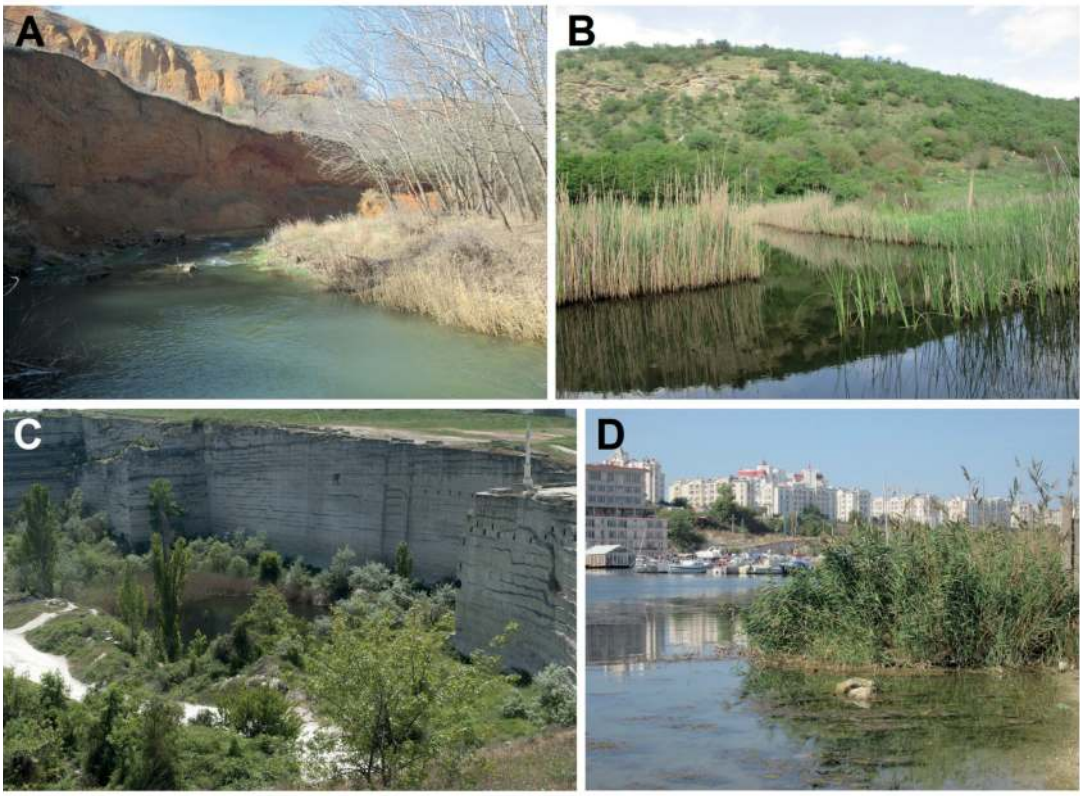

Fig. S6. Habitats of *Emys orbicularis* in the southwestern Crimea: **A** – near the mouth of Alma River, vicinity of the village of Peschanoe (= Alma-Tamaq), Bakhchisarai District of Republic of the Crimea; **B** – a large pond in the valley of the Belbek River, vicinity of the village of Dalnee, Sevastopol; **C** – flooded limestone quarry near the town of Inkerman, Sevastopol; **D** – the top of Streletskaya Bay, Gerakleyiskyi Peninsula, Sevastopol. Photo by O.V. Kukushkin (**A**, **B**, **D**), M.A. Khrisanova (**C**).

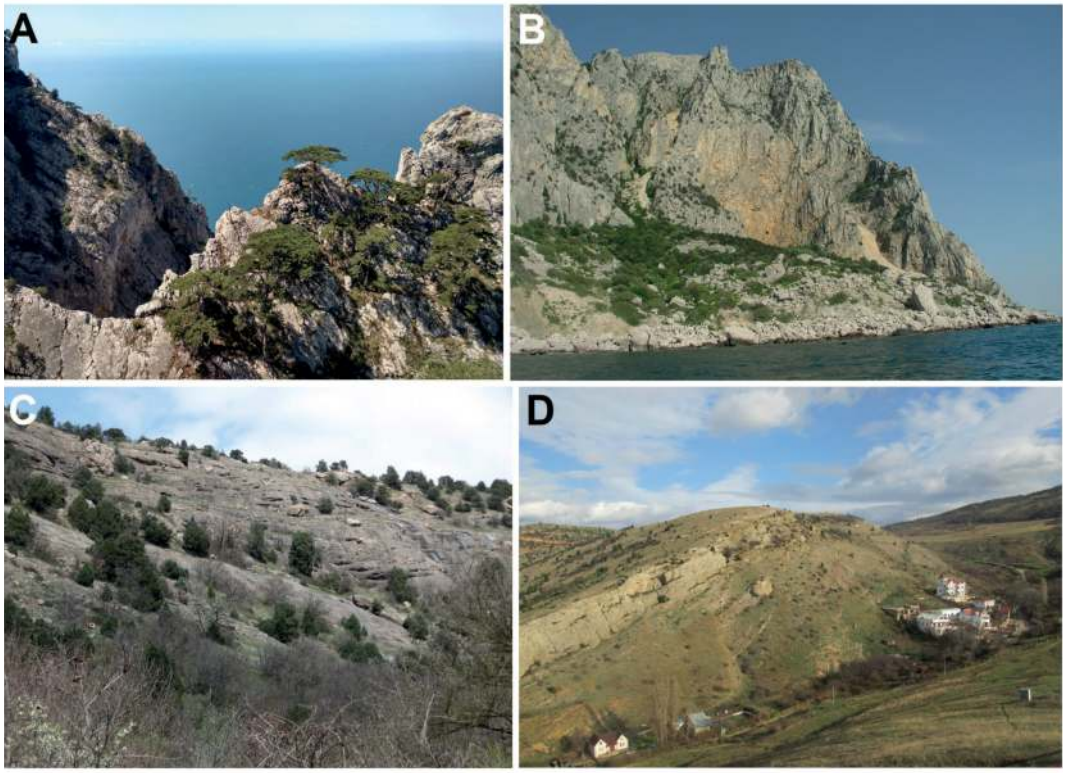

Fig. S7. Some types of *Mediodactylus danilewskii* habitats on the territory of Sevastopol: **A** – near the top of Mount Kokiya-Kala, "Cape Aya" State Landscape Sanctuary; **B** – the locality (seaside couloir) of Shaitan-Dere near the Cape Aya; **C** – outcrops of conglomerate in Vitmer's Gully, northern macroslope of the Main Range, surroundings of the town of Balaklava; **D** – Kefalo-Vrissi Gully in the town of Balaklava. Photo by O.V. Kukushkin.

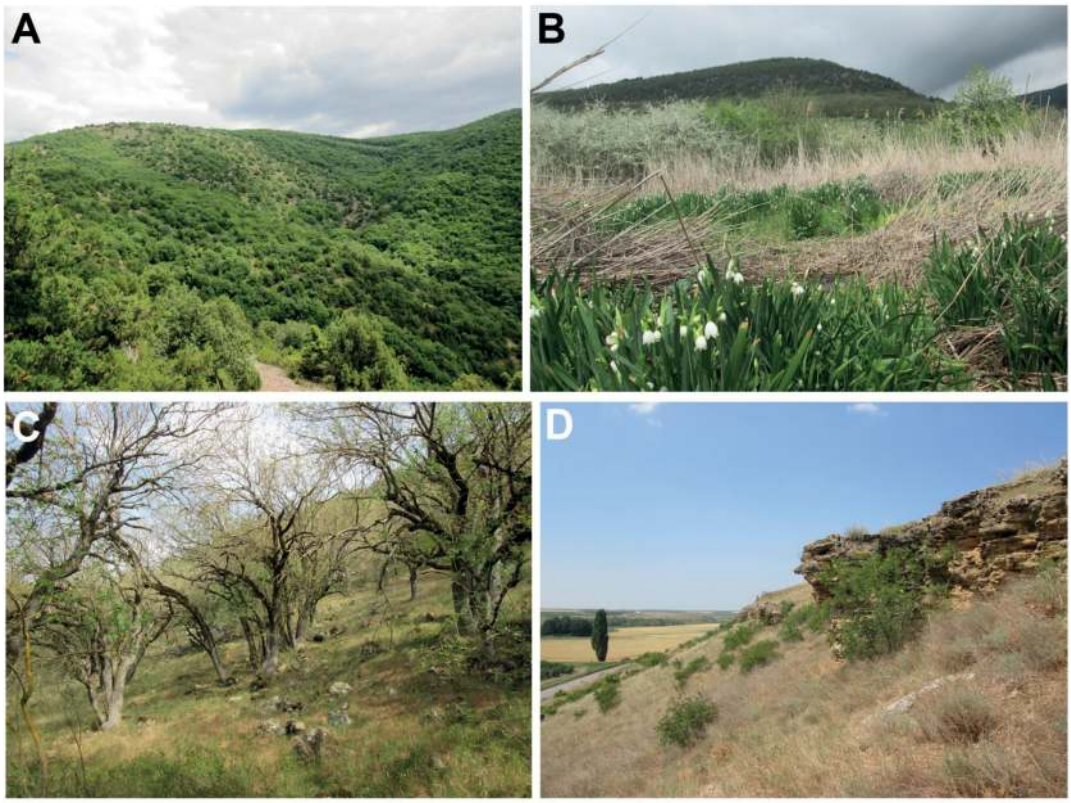

Fig. S8. Habitats of *Pseudopus apodus* in the southwestern Crimea: **A** – Kayu Ridge, vicinity of the village of Oboronnoe (= Kamara); **B** – Varnutskaya Valley, vicinity of the village of Reservnoe; **C** – Temnaya Gully, Mekenzievskoe Forestry; D – Seferbi-Eli height, the Alma River Valley. Photo by O.V. Kukushkin.

Fig. S9. True lizards (Lacertidae) from Sevastopol city borders: **A –** *Darevskia lindholmi*, the historical center of Sevastopol, remnants of 19th century military fortifications; **B** – *Darevskia lindholmi*, gorge of Chernaya River (Chernorechenskyi Canyon); **C** – *Podarcis tauricus*, Ai-Petri Yaila Plateau, Mount Kilse-Burun; **D** – *Lacerta agilis tauridica*, the Bechku Pass area, vicinity of the village of Peredovoe (= Urkusta). Photo by V.E. Giragosov (**A**), A.A. Nadolnyi (**B**), M.A. Khrisanova (**C**), O.V. Kukushkin (**D**).

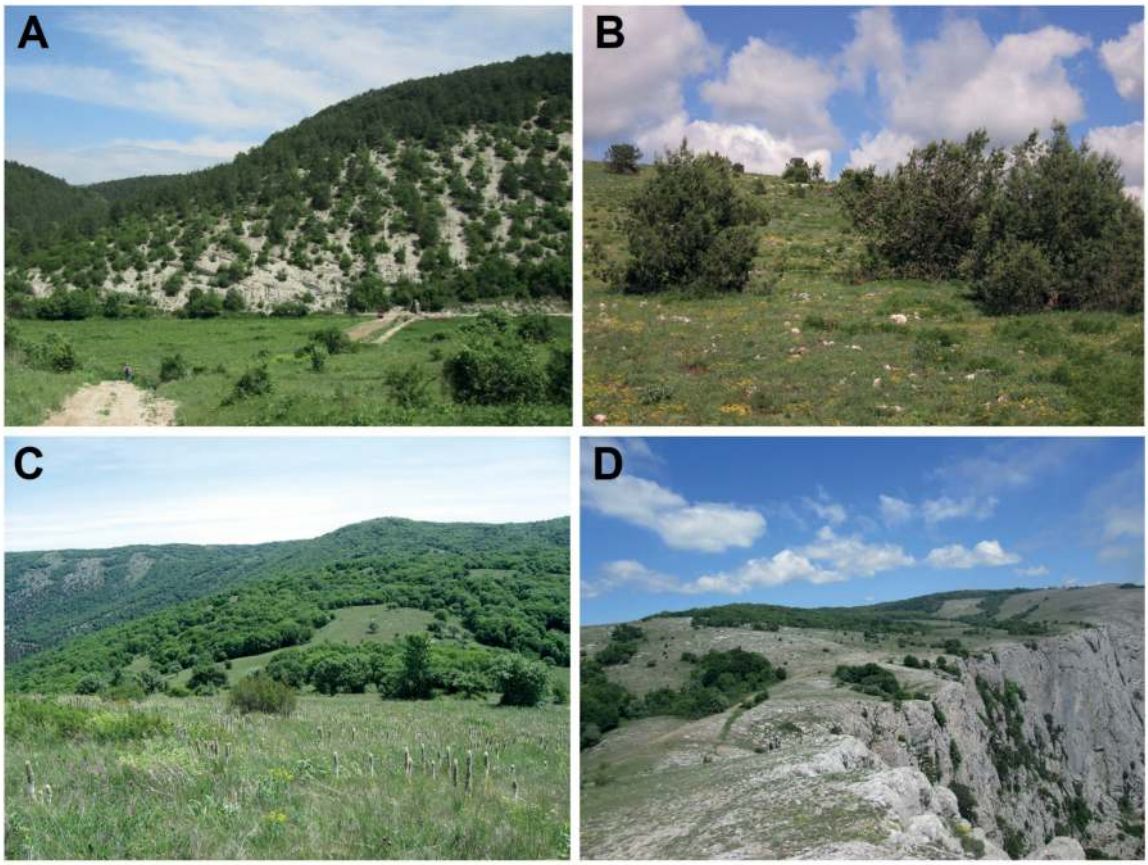

Fig. S10. Habitats of *Lacerta agilis tauridica* in the southwestern Crimea: **A** – Ay-Todorskaya Valley near the Mount Belaya, vicinity of the village of Ternovka, Sevastopol; **B** – Mount Bechko-Kaya, vicinity of the village of Peredovoe, at the border of Sevastopol territory and Bakhchisarai District of Republic of Crimea; **C** – Ridge Trapan-Bayir, vicinity of the village of Rodnikovskoe, at the border of Sevastopol territory and Bakhchisarai District of Republic of Crimea; D – Ai-Petri Yayla Plateau, Mount Balchik-Kaya, Sevastopol. Photo by O.V. Kukushkin.

Fig. S11. Racers (whipsnake and ratsnakes) from the southwestern Crimea: **A** – *Dolichophis caspius*, Mount Kyz-Kermen, Bakhchisarai District of Republic of Crimea; **B** – *Elaphe sauromates*, Mekenzievskoe Forestry, vicinity of Inkerman, Sevastopol; **C** – *Zamenis situla* var. *leopardina*, "Laspi" State Landscape Sanctuary, Mount Ilyas-Kaya, Sevastopol; **D** – *Zamenis situla* var. *situla*, Opolznevskoe Forestry, Yalta Mountain-Forest State Nature Reserve, the territory of the Sevastopol City. Photo by O.V. Kukushkin (**A**, **D**), Yu.A. Krasylenko (**B**), M.A. Khrisanova (**C**).

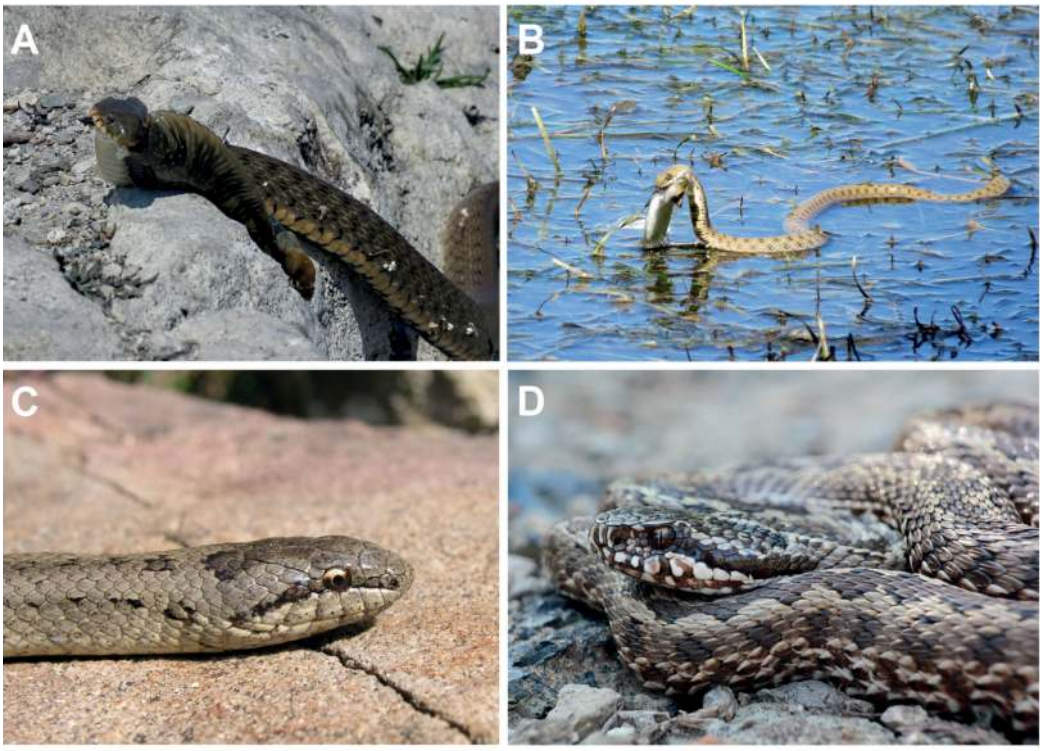

Fig. S12. Water snakes and the rarest representatives of Sevastopol's ophidiofauna (Colubridae, Viperidae): **A** – *Natrix nartix* aberr. *persa* with a prey (peacock blenny, *Salaria pavo*, Blenniidae), the coast of Streletskaya Bay, Gerakleyiskyi Peninsula; **B** – *Natrix tessellata* with a prey, the top of Solyonaya Bay, Gerakleyiskyi Peninsula; **C** – *Coronella austriaca*, western part of the Crimean Mountains; **D** – *Vipera renardi*, extrem southern edge of the Crimean Plain. Photo by V.E. Giragosov (**A**, **B**), S.V. Leonov (**C**, **D**).

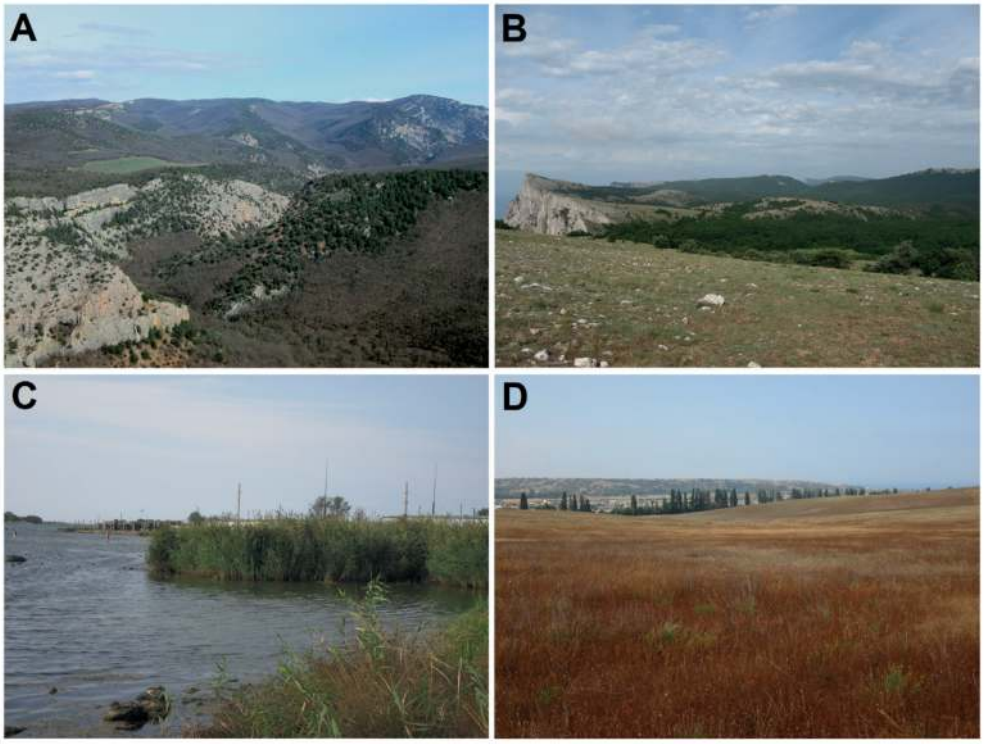

Fig. S13. Habitats of some snake species at the Sevastopol city territory: **A** – *Zamenis situla*, *Dolichophis caspius*, *Elaphe sauromates*, *Natrix tesselata*, *Natrix natrix*, canyon of the River Chernaya, vicinity of Alsu settlement; **B** – *Zamenis situla*, *Dolichophis caspius*, Ai-Petri Yayla Plateau, Mount Merdven-Kaya; **C** – *Natrix tessellata, N. natrix*, Kazachya Bay, Gerakleyiskyi Peninsula; **D** – *Vipera renardi* (presumably), *Dolichophis caspius*, the steppe plot between the village of Orlovka (= Mamashayi) and Kacha settlement. Photo by O.V. Kukushkin.

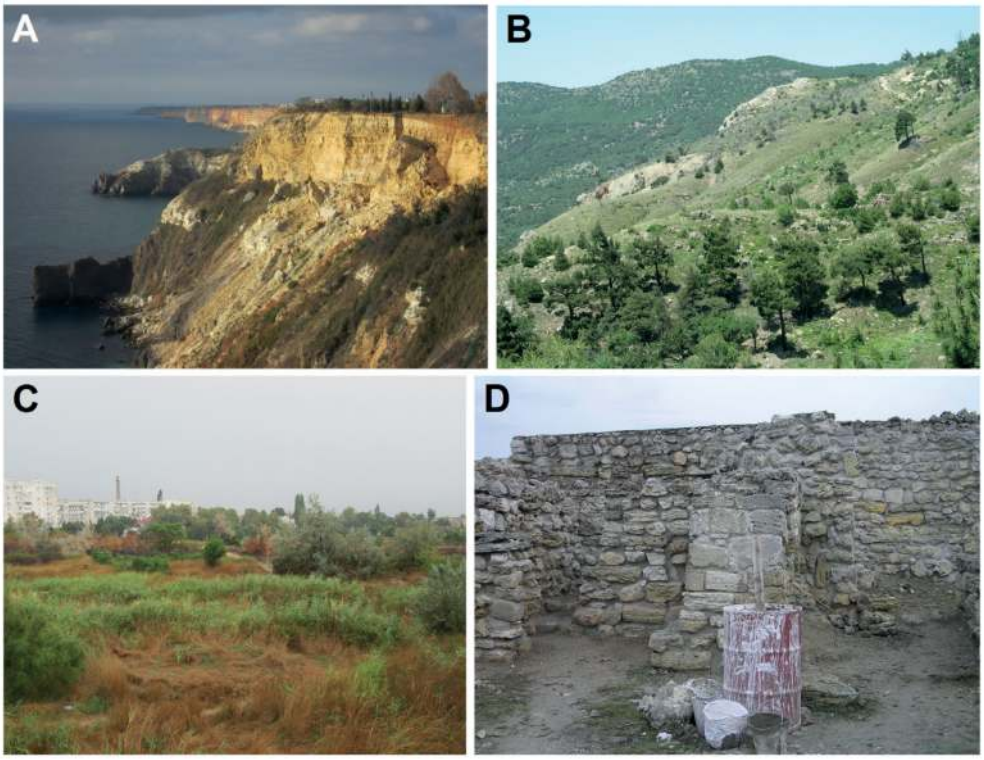

Fig. S14. Some examples of negative anthropogenic impact on the natural complexes of the Sevastopol city: **A** – the collapse of the coast under the housing estate near Cape Fiolent, November 2018; **B** – consequences of a forest fires in 1997 and 2001 in the "Cape Aya" State Landscape Sanctuary, May 2018; **C** – drying up of *Ttiturus karelinii* spawning reservoir due to the city development and changes in hydrological regime of the territory, Northern Side of Sevastopol City, Radiogorka mocrodistrict, June 2018; **D** – destruction of *Mediodactylus danilewskii* habitat during the conservation of the archaeological site in the ancient town of Khersonesos of Taurida, winter of 2005. Photo by O.V. Kukushkin (**A**, **B**, **C**), M.M. Beskaravaynyi (**D**).