

tending approximately 6.500 km in an east-west direction (from Iran to Morocco) and about 1.600 km in a north-south direction (from Romania to Libya) (van der Kuyl et al. 2005, Fritz et al. 2007). Within this range, it can be found from the sea level up to approximately 1.300 m a.s.l. in Bulgaria and 2.000 m a.s.l. in Turkey (Soler et al. 2009). The species reaches its northern range limit in Romania, where *T. g. iberica* Pallas, 1814 is present. It inhabits only the Dobrogea region, S-E Romania (Fuhn & Vancea 1961), bordered on the north and west by the Danube River (Fuhn & Vancea 1961, Soler et al. 2009).

Testudo graeca is listed in CITES (Appendix II), in Annex C1 (Appendix II) of the EU Wildlife Trade Regulation 3626/82, Annex II of the E.U. Habitat Directive, and is considered vulnerable (VU) at a global level, according to the IUCN Red List (Tortoise & Freshwater Turtle Specialist Group 1996). Although 20 years have passed since this latter evaluation, available knowledge and published data concerning *Testudo* species are still scarce. Additionally, according to a CITES evaluation of the illegal trade in *Testudo* tortoises during 1975–2005, *T. graeca* individuals comprise 37% of poached tortoises, surpassed only by *Testudo horsfieldi* (48%) (Türkozan et al. 2008).

Many of the species' habitats in Romania have been lost or degraded under the constant pressure of ever expanding agricultural areas and infrastructure development and direct human persecution (Sos 2012, Bruică et al. 2014). As a result, in the Red Data Book of Romanian Vertebrates, *T. graeca iberica* is listed as an endangered (EN) species (Iftime 2005). Nationally, *T. graeca iberica* is legally a strictly protected species of community interest, the conservation of which requires the designation of special areas of conservation (OUG 57/ 2007, Law 11/ 2011). As detailed information on a species' distribution is crucial for effective conservation measures (e.g. Sas et al. 2006), we aimed to update the knowledge on the current distribution of *T. graeca iberica* at its northern range limit, in Romania, based on previously published and newly recorded localities.

We conducted field surveys between March 2012 and May 2015, covering most of continental Romanian Dobrogea (i.e. without the Danube Delta *per se*). We inspected line transects through different habitat types and conducted active searches in order to identify *T. graeca iberica* populations. Most of the occurrence records were registered using various hand-held GPS units. However, because precise GPS data were not available for all literature

The spur-thighed tortoise (*Testudo graeca iberica*) in Romania: new locality records suggest a more optimistic situation

The spur-thighed tortoise, *Testudo graeca* Linnaeus, 1758 has a highly fragmented range covering parts of three continents (Europe, Asia and Africa), ex-

records, as well as for conservation reasons, we herein used the nearest localities next to which the observations took place. We produced an updated distribution map of the species (Fig. 1), using both our records as well as the previously published ones from the literature (see Appendix). We used a geospatial platform in order to reference our information (ArcGIS 10.3, ESRI, 2015). The base map was the EU-DEM project, together with the boundaries of the Natura 2000 sites within the study area (92/43/EEC).

Our database currently comprises 162 localities, of which 103 lie within Constanța County (CT) and 59 are in Tulcea County (TL). From the grand total, 71 (43.8%) represent new localities: 46 from CT and 25 from TL (Appendix). Most of the newly identified *T. graeca ibera* habitats are on hillsides covered with steppe vegetation (Fig. 2-A). In some areas, rocky formations are present on the hills, in variable coverage (Fig. 2-B). A smaller number of habitats were represented by bushy, woodland (Fig. 2-C), and sandy areas (Fig. 2-D). Tortoises were occasionally found at the edges of such habitats, e.g. in road ditches (Fig. 2-E). Many were found on farmlands, on roads, or in grazed areas (Fig. 2-F). Most of the newly identified habitats are strongly modified through anthropic activities.

Generally, the distribution of the herpetofauna from many Romanian regions remains poorly studied (e.g. Strugariu et al. 2011), but Dobrogea has always been an area very popular among herpetologists (e.g. Covaciu-Marcov et al. 2006, Székely et al. 2009). The most recent comprehensive field studies on the distribution of Dobrogean mainland herpetofauna (Covaciu-Marcov et al. 2006, 2008, Strugariu et al. 2008) have indicated a high species richness in two important regions: the north (comprising much of the Northern Dobrogean Plateau: the Măcin Mountains area, the Niculițel Hills, and the Babadag Plateau) and the south-west. As *T. graeca ibera* is listed in Annex 2 of the Habitat Directive, the established broad distribution of the species in these regions was helpful in declaring several Natura 2000 sites (www.natura2000.ro). Central Dobrogea, on the other hand, is the area strongly affected by widespread and intense anthropogenic activities, represented mainly by agriculture and overgrazing. Previous field research revealed considerably lower herpetofaunal diversity in the region, in contrast to the situation from the above mentioned 'hot spots' (Covaciu-Marcov et al. 2006).

It is believed that, during past decades or centuries, *T. graeca* occurred throughout most of con-

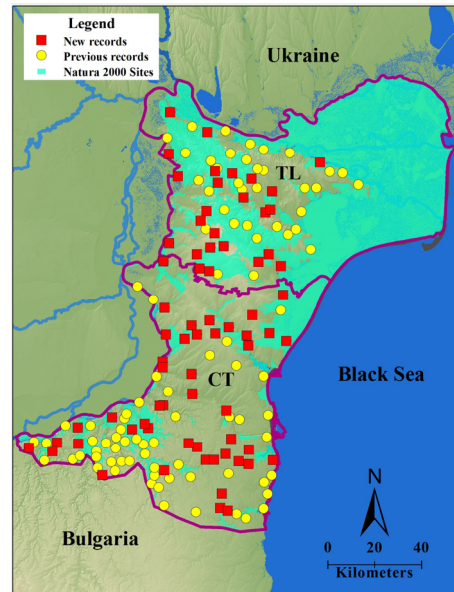


Figure 1. Distribution of *Testudo graeca ibera* in Romania.

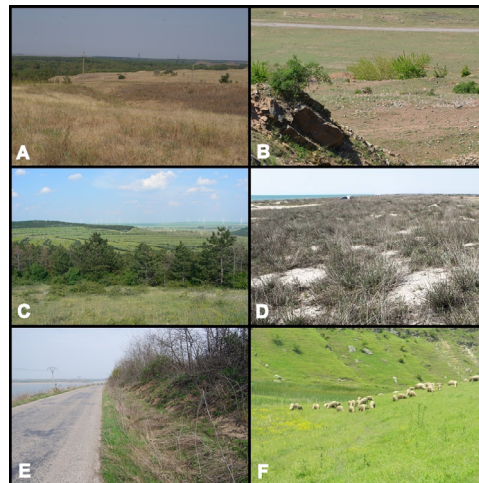


Figure 2. Various newly recorded habitats of *Testudo graeca ibera* in Romania: (A) Dăeni (TL) photo by EB, (B) Lăstuni (TL) photo by DSM, (C) Crucea (CT) photo by VEM (D) Vadu (CT) photo by AS, (E) Gârlița (CT) photo by VEM, (F) Almalău (CT) photo by EB.

tinental Dobrogea (Fuhn & Vancea 1961, Andrei 2002, Iftime 2005), but recently it was reported only from very few localities from Central Dobrogea (Covaciu-Marcov et al. 2006). The majority of our new records for the species are also from Central Dobrogea and from areas which are not included in the Natura 2000 conservation network

(Fig. 1). Although more abundant and more widely distributed than previously considered, *T. graeca*'s conservation status should not be demoted from endangered on a national level, at least until more detailed data on population dynamics are available.

Agriculture is regarded as the most important factor that negatively affects reptile diversity (Ribeiro 2009). While most of continental Dobrogea was once covered by various types (e.g. Danubian, west-pontic or petrophilous) of natural steppe grasslands and several types of forest habitats (e.g. forest-steppes and Moesian-west-Pontic forests) are present to a lesser extent, large parts of the vegetation have been altered and consequently substituted by weedy communities (Chifu et al. 2014 a,b,c,d). However, the use of anthropogenic environments, similar to those from Central Dobrogea by several reptile species has been previously reported from the Măcin Mountains area (Strugariu et al. 2008). Future studies should thus focus on more detailed relationships between distinct types of agricultural practices and *T. graeca* populations. Unlike large scale agriculture, traditional farming practices have been, on numerous occasions, frequently shown to be beneficial to biodiversity (Dorresteijn et al. 2015).

Therefore, we suggest that human-altered habitats should become a priority in future regional surveys, as they can still harbor populations of rare and conservation priority species. This suggestion has been recently underlined by the rediscovery in Romania of the Javelin sand boa (*Eryx jaculus*), a species which has been considered regionally extinct for nearly 30 years (Covaciu-Marcov et al. 2012, Sahlean et al. 2015).

Acknowledgements. We thank Iulian Gherghel, Tiberiu C. Sahlean, Andrea C. Staicu for helpful comments during the initial preparation of the manuscript. Dr. Severus D. Covaciu-Marcov and two anonymous reviewers offered useful critical comments that significantly improved this paper. This study was partially funded by the Moldavia Herpetological Group, the S.E.O.P.M.M. Oceanic-Club, the Romanian Academy - through Project 4 (RO1567-IBB04/2015) (to VDG), and the "Alexandru Ioan Cuza" University of Iași - through the project 06/3.12.2015, code: GI-2015-03, Grant Competition for Young Researchers of UAIC (to AS).

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- Appendix.** List of Romanian localities where *Testudo graeca iberica* was recorded.
- CONSTANȚA COUNTY**
23-August - Fuhn & Vancea 1961, Abdrud - New record, Adamclisi - Fuhn & Vancea 1961, Adâncata - New record, Agigea - New record, Albești - Fuhn & Vancea 1961, Aliman - Fuhn & Vancea 1961, Almalău - New record, Amzacea - Fuhn & Vancea 1961, Băltăgești - New record, Băneasa - Fuhn & Vancea 1961, Bărăganu - New record, Biruința - New record, Bugeac - Fuhn & Vancea 1961, Căpădava - New record, Carvăn - Covaciu-Marcov et al. 2008, Cernavodă - Fuhn & Vancea 1961, Cheia - New record, Ciobănița - New record, Cobadin - New record, Coșeală - New record, Constanța - Fuhn & Vancea 1961, Cotu Văii - New record, Crângu - Covaciu-Marcov et al. 2006, Crucea - New record, Deleni - Fuhn & Vancea 1961, Dobromir - Fuhn & Vancea 1961, Dobromir din Deal - Covaciu-Marcov et al. 2008, Dorobanțu - Covaciu-Marcov et al. 2006, Dumbrăveni - Fuhn & Vancea 1961, Dunăreni - New record, Esecchioi - Iftime 2002, Făurei - Covaciu-Marcov et al. 2006, Fântâna Mare - new record, Floriile - Covaciu-Marcov et al. 2006, Furnica - Covaciu-Marcov et al. 2006, Gălbiori - New record, Gărlicu - New record, Galița - New record, Gărlia - New record, Ghindărești - Fuhn & Vancea 1961, Goruni - Covaciu-Marcov et al. 2008, Gura Dobrogei - New record, Hagjeni - Fuhn & Vancea 1961, Hațeg - New record, Hârșova - Fuhn & Vancea 1961, Independența - Fuhn & Vancea 1961, Ion Corvin - Covaciu-Marcov et al. 2006, Istria - Covaciu-Marcov et al. 2006, Ivirezu Mare - New record, Ivirezu Mic - New record, Izvoarele - Covaciu-Marcov et al. 2006, Lespezi - Covaciu-Marcov et al. 2006, Lipnița - New record, Mangalia - Fuhn & Vancea 1961, Măgura - Fuhn & Vancea 1961, Mereni - New record, Mihail Kogălniceanu - Fuhn & Vancea 1961, Mireasa - New record, Movilița - New record, Murfatlar - Fuhn & Vancea 1961, Năvodari - Fuhn & Vancea 1961, Negrești - Fuhn & Vancea 1961, Negru Vodă - Fuhn & Vancea 1961, Negureni - Fuhn & Vancea 1961, Neptun - Fuhn & Vancea 1961, Olteni - Fuhn & Vancea 1961, Oltina - Fuhn & Vancea 1961, Osmanca - New record, Ostrov - Fuhn & Vancea 1961, Palazu Mic - New record, Pantelimon - New record, Peștera - Fuhn & Vancea 1961, Plopeni - Fuhn & Vancea 1961, Poarta Albă - New record, Rariștea - Covaciu-Marcov et al. 2006, Rasova - Fuhn & Vancea 1961, Răzoarele - Covaciu-Marcov et al. 2006, Saligny - Fuhn & Vancea 1961, Satu Nou (Mircea Vodă) - New record, Satu Nou (Oltina) - New record, Săcele - New record, Schitu - Fuhn & Vancea 1961, Seimeni - New record, Seimenii Mici - New record, Sinoe - New record, Șipotele - Fuhn & Vancea 1961, Tătaru - New record, Târgușor - Covaciu-Marcov et al. 2006, Tichilești - New record, Topraisar - New record, Tortoman - New record, Tudor Vladimirescu - Covaciu-Marcov et al. 2006, Tufani - Covaciu-Marcov et al. 2006, Tuzla - New record, Urlaia - Covaciu-Marcov et al. 2006, Vadu - New record, Valea Tapului - New record, Valul lui Traian - Fuhn & Vancea 1961, Văleni - Fuhn & Vancea 1961, Vărtop - New record, Vișoara - New record, Vlahii - Covaciu-Marcov et al. 2006.
- TULCEA COUNTY**
Agighiol - Oțel 1998, Alba - Covaciu-Marcov et al. 2006, Atmagea - Covaciu-Marcov et al. 2006, Babadag - Fuhn & Vancea 1961, Balabanca - New record, Beidaud - Fuhn & Vancea 1961, Beștepe - Oțel 1998, Calfa - New record, Carcaliu - New record, Casimcea - Fuhn & Vancea 1961, Căugăgia - New record, Căprioara - Fuhn & Vancea 1961, Cârjelari - New record, Ceamurlia de Jos - New record, Ceamurlia de Sus - New record, Cerbu - New record, Cerna - Fuhn & Vancea 1961, Ciucurova - Fuhn & Vancea 1961, Corugea - New record, Dăeni - New record, Enisala - Fuhn & Vancea 1961, Frecăței - Covaciu-Marcov et al. 2006, Garvăn - New record, Greci - Fuhn & Vancea 1961, Hamcearca - New record, Isaccea - Fuhn & Vancea 1961, Iulia - New record, Izvoarele - Fuhn & Vancea 1961, Lăstuni - New record, Luminița - Fuhn & Vancea 1961, Luncavița - Fuhn & Vancea 1961, Mahmudia - Török 1998, Măcin - Fuhn & Vancea 1961, Meșteru - New record, Mihai Bravu - New record, Mircea Vodă - Fuhn & Vancea 1961, Murghiol - Török 1998, Nalbant - Fuhn & Vancea 1961, Niculițel - Fuhn & Vancea 1961, Nifon - Covaciu-Marcov et al. 2006, Parcheș - Oțel 1998, Poșta - Covaciu-Marcov et al. 2006, Rahman - New record, Sarichioi - Oțel 1998, Satu Nou - New record, Sălchioara - Oțel 1998, Slava Cercheză - Covaciu-Marcov et al. 2006, Slava Rusă - Fuhn & Vancea 1961, Somova - Fuhn & Vancea 1961, Stâncă - New record, Telița - Covaciu-Marcov et al. 2006, Tichilești - New record, Topolog - New record, Trestenic - New record, Tulcea - Fuhn & Vancea 1961, Turcoaia - New record, Valea Nucanilor - Oțel 1998, Valea Teilor - New record, Victoria - New record, Vișterna - Covaciu-Marcov et al. 2006.
- Key words:** reptiles, species distribution, *Testudo graeca*, anthropic habitats.
- Article No.: e162502
Received: 05. October 2015 / Accepted: 28. January 2016
Available online: 29. March 2016 / Printed: December 2016
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