NEW RECORDS OF *TESTUDO GRAECA* (PALLAS, 1814) IN REPUBLIC OF SERBIA

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The autochthonous distribution range of the Greek tortoise (*Testudo graeca*) stretches through the Mediterranean and sub-Mediterranean parts of southern Spain, the Balearic Islands, northern Africa (from Morocco to Libya), south-eastern part of the Balkan Peninsula, through Turkey and the Caucasus, and towards the east, through Iran, Syria, Lebanon, Jordan and Israel (Fritz & Havaš 2007). It occurs from sea level up to 1,300 m a.s.l. (in Bulgaria), but certain subspecies beyond the European part of the range occupy habitats above 2,500 m a.s.l. (Lambert 1997).

The Greek tortoise in the Republic of Serbia has an extremely narrow and apparently disjunct range. It was recorded in only several localities in south-eastern and southern Serbia, as well as in Kosovo province (Buskirk *et al.* 2001, Tomović *et al.* 2004, Ralev *et al.* 2013, Tomović *et al.* 2014); its altitudinal distribution ranges from 370 to 600 m a.s.l. (Tomović 2015). In this paper, we present new field records of *Testudo graeca* in Serbia.

Until now, this species was only found at the following sites: Starac Mt., village Starac (record no. 11 – Tomović *et al.* 2004), Preševo Valley, village Miratovac (record no. 12 – Ralev *et al.* 2013) and Šar Planina Mts.,

village Đeneral Janković (record no. 13 – Tomović *et al.* 2014); in all locations, only one individual was recorded. The finding from Kosovska Mitrovica (record no. 14 – Buskirk *et al.* 2001) is questionable because of rational suspicion concerning the origin of individuals deposited in the collection of the Zoologische Staatssammlung Museum, in Munich. Moreover, the Greek tortoise's occurrence in the surroundings of Kosovska Mitrovica was not confirmed during the recent intensive field research of herpetofauna of this region (Tomović *et al.* 2018).

From 2014 until 2017, comprehensive field research of southern and south-eastern Serbia was conducted in order to provide detailed distribution data for reptile species in the centres of diversity of our country (Tomović *et al.* 2015). Faunistic studies resulted in 10 new records of *Testudo graeca* in these regions: two in southern (Preševo Valley) and eight in south-eastern Serbia (Starac Mt.) (Table 1, Figs 1–2) with an altitudinal range from 400 to 600 m a.s.l. (Table 1). Characteristic plant species at these sites are *Quercus pubescens*, *Quercus cerris*, *Carpinus orientalis* and *Juniperus oxycedrus* (Tomović *et al.* 2004, Ralev *et al.* 2013). This is in accordance with general habitat preferences of this species in Serbia: broadleaved deciduous xerophytic forests and scrubs, dry grasslands, woodland fringes and tall forb habitats, fallow land and embankments (Tomović & Lakušić 2015).

The Greek Tortoise is listed in Annexes II and IV of the Habitats Directive (92/43/EEC), in Appendix II of the Berne convention and in Appendix II of the CITES convention. At the global level, it is considered 'Vulnerable' in the IUCN Red list (Tortoise & Freshwater Turtle Specialist Group 1996). In the Red Book of Fauna of Serbia II – Reptiles (Tomović *et al.* 2015), based on both IUCN criteria and upon analyses of distribution, ecology and life-history traits (DELH), *Testudo graeca* was assessed as Critically Endangered (CR) at a national level. This species is assigned as 'Strictly Protected' by law in Serbia (Anonymous 2010a, 2010b).

According to this updated distribution of the Greek tortoise, we estimated its Extent of Occurrence (EOO – 449 km²) and Area of Occupancy (AOO – 10 km²) in Serbia, following IUCN criteria (Niketić 2019). Since in all published and new localities, only individual adult specimens were found, we infer that population densities are very low. Additionally, sites where the species was observed are situated at its distribution edge and migrations from the south (North Macedonia) are probably very restricted, giving the fact that tortoises are slow-moving animals. Therefore, regional rescue effects are only remotely possible; this makes Serbian populations of *Testudo graeca* very fragile in terms of viability. More comprehensive field research is needed to evaluate the accurate population status of this species in Serbia.

Table 1. – Precise information about published and new field data of *Testudo graeca* in Republic of Serbia.

No.	Region	Locality 1	Locality 2	Toponym	Data	UTM	Latit.	Longit.	Alt.	Sex	Date
1	Southern	Preševo Valley	v. Miratovac	r. Suva Reka, before the village	field	EM58	42.2737	21.6497	607	female	10-05-2014
2	Southern	Preševo Valley	v. Miratovac	near the border line	field	EM57	42.2521	21.6582	588	female	01-06-2014
3	South-eastern	Starac Mt.	Prohor Pčinjski Monastery	path to Gornji Starac	field	EM78	42.3267	21.8933	523	male	28-06-2017
4	South-eastern	Starac Mt.	v. Starac	patrol line, path to Čivčije	field	EM78	42.311	21.8738	415	male	06-05-2015
5	South-eastern	Starac Mt.	v. Starac	patrol line, path to Čivčije	field	EM78	42.3128	21.8796	421	female	16-05-2017
6	South-eastern	Starac Mt.	v. Starac	patrol line, path to Čivčije	field	EM78	42.3104	21.8763	404	female	17-05-2017
7	South-eastern	Starac Mt.	v. Starac	path Čivčije - Gornji Starac	field	EM78	42.3124	21.8727	466	female	24-07-2016
8	South-eastern	Starac Mt.	v. Starac	path Čivčije - Gornji Starac	field	EM78	42.3199	21.8713	606	female	26-07-2016
9	South-eastern	Starac Mt.	v. Ljanik	near the border line	field	EM68	42.3117	21.8357	477	female	26-07-2016
10	South-eastern	Starac Mt.	v. Uzovo		field	EM68	42.3313	21.8341	550	female	26-07-2016
11	South-eastern	Starac Mt.	v. Starac	near Čivčije	literature	EM78	42.3157	21.8811	520	male	11-04-2004
12	Southern	Preševo Valley	v. Miratovac	1 km NW	literature	EM58	42.2721	21.6524	550	male	13-05-2011
13	Kosovo	Šar Planina Mts.	v. Đeneral Janković		literature	EM26	42.1475	21.2992			28-08-1977
14	Kosovo	Kosovska Mitrovica			literature	DN84

Fig. 1. – Records of *Testudo graeca* (Pallas, 1814) in Republic of Serbia. Red dots – reconfirmed published data; red-black dots – published data; red-white dots – new data; question mark – doubtful record.

Fig. 2. – Records of *Testudo graeca* (Pallas, 1814) in the area marked by the rectangle in Figure 1. The dot legend corresponds to Figure 1.

The southernmost part of Serbia is one of the main refugia and a corridor for reptile species in our country, due to Mediterranean influences via the Pčinja and Moravica River Valleys from the Republic of North Macedonia (Matvejev 1961, Radovanović 1964, Matvejev & Puncer 1989, Crnobrnja-Isailović & Aleksić 1999, Tomović *et al.* 2004, Ralev *et al.* 2013). The presence of some Mediterranean reptile species in Pčinja River Valley e. g. *Podarcis erhardii*, *Platyceps najadum*, *Elaphe quatuorlineata* (Crnobrnja-Isailović & Aleksić 1999, Ristić *et al.* 2006) support the assumption that some species which occur in North Macedonia, could also be found in Pčinja and Moravica River Valleys. Furthermore, the occurrence of some Mediterranean reptiles (e. g. *Lacerta trilineata*, *Zamenis situla*, *Malpolon insignitus*) have been confirmed for North Macedonia relatively close to the borderline with Serbia (Sterijovski *et al.* 2014 and references therein).

According to analyses of centres of diversity of herpetofauna of Serbia (Tomović *et al.* 2015 – Figure 4.), Pčinja River Valley, Starac Mt., Rujan Mt., Moravica River Valley (i.e. Preševo Valley) and Karadag Mt. are regions with the highest diversity of reptile fauna in our country. Also, the presence of several Mediterranean species (with probably northernmost populations) is the main argument that these regions should be included in the list of ‘Important Herpetological Areas’ in Serbia and on the Balkan Peninsula. The occurrence of four species listed in Annex II of the Habitats Directive (*Emys orbicularis*, *Testudo hermanni*, *Testudo graeca* and *Elaphe quatuorlineata*) nominates the abovementioned regions as priorities for faunistic and conservation studies as part of the future designation of ‘Natura 2000’ sites in the Republic of Serbia.

Acknowledgments

We are grateful to J. Pokrajac, V. Bjelica, G. Danon, S. Nikolić, I. Krizmanić, A. Simović, G. Tomović and B. Zlatković for company in the field. M. Niketić provided us the maps of distribution in Serbia. This paper was funded by Ministry of Education, Sciences and Technological Development (grant No. 173043) of Serbia and the Rufford Small Grants Foundation (grant no. 20507-B).

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НОВИ ПОДАЦИ ЗА *TESTUDO GRAECA* (PALLAS, 1814) У СРБИЈИ

ЉИЉАНА ТОМОВИЋ, РАСТКО АЈТИЋ, АНА ГОЛУБОВИЋ

Р Е З И М Е

Грчка корњача (*Testudo graeca*) има веома узак и дисјунктан ареал у Републици Србији. Ова врста је до сада забележена на само неколико локалитета у јужној (планина Карадаг, село Миратовац) и југоисточној Србији (планина Старац, село Старац), као и на Косову (Шар планина, село Ђенерал Јанковић). У овом раду представљени су нови фаунистички налази грчке корњаче у нашој земљи. У периоду од 2014. до 2017. године, интензивна истраживања херпетофауне у регионима јужне и југоисточне Србије, резултирала су открићем 10 нових локалитета на којима је присутна врста *Testudo graeca*. У Црвеној књизи фауне Србије II – гмизавци, грчка корњача је категоризована као критично угрожена врста (Critically Endangered – CR) на територији Србије. Иако је конзервациони статус ове врсте дефинисан, додатна теренска истраживања су неопходна како би се одредио популациони статус ове врсте, која се иначе налази Анексима II и IV Директиве о стаништима (Habitats Directive, 92/43/ЕЕЦ).