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RESEARCH ON ISOLATED POPULATIONS OF COMMON WALL LIZARD *PODARCIS MURALIS* (LAURENTI, 1768) (REPTILIA) FROM DOBROGEA (ROMANIA AND BULGARIA)

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Abstract. The isolated populations of common wall lizard *Podarcis muralis* from Dobrogea are strictly located in a few rocky habitats situated in the southern area of this geographical province. The sizes of these populations are small, compared to the populations from the rest of the area occupied by the species. This aspect, together with their strict location, makes them suitable for complex population studies. The work hypothesis was that the common wall lizard populations in Dobrogea are not connected to those from the Carpathians, the Danube and the Romanian Plain being bio-geographical barriers. In light of this hypothesis, the colonization of Dobrogea by the common wall lizard occurred from the south with individuals coming from populations located in the Balkan Peninsula.

Résumé. Les populations du lézard de muraille (*Podarcis muralis*) de la Dobrogea sont isolées et strictement localisées en certains habitats rocheux situés au sud de la province géographique mentionnée. La dimension des populations est petite surtout en comparaison avec les populations trouvées dans le reste de son aire naturelle de répartition. Cette caractéristique, jointe à leur stricte localisation recommande cette population à des études complexes de dynamique populationnelle. Selon l'hypothèse de travail, les populations du lézard de muraille de Dobrogea ne viennent pas en contact avec celles de la région Sous-Carpatique, le Danube et la Plaine Roumaine ayant le rôle de barrière géographique et, conséquemment, la colonisation de la Dobrogea par le lézard de muraille s'est réalisée par des individus appartenant aux populations du sud des Balkans.

Key words: common wall lizard, isolated population, Dobrogea.

INTRODUCTION

The presence of the common wall lizard (*Podarcis muralis*) in Dobrogea raises several questions that have not yet received satisfactory answers. The area covered by this species includes central and southern Europe, and extends into Turkey. In Romania, it can be found along the Carpathian range, from the Iron Gates to Bicaz, in the valleys of the Apuseni Mountains where it occurs at lower altitude (Fuhn & Vancea, 1961; Fuhn, 1969; Gherghel et al., 2009). In Dobrogea (the Romanian side), in the present, its presence is confirmed only in the limestone areas from Dumbrăveni, Canarua Fetii (Fuhn & Vancea, 1961), from Canarale in Hârșova (Török, 2010), Negrești-Conacu (Skolka, pers. comm.) and Rariștea (Covaciu-Marcov et al., 2006). Also, in the Bulgarian side of Dobrogea, the species was reported at Yailata (43°26.555' N, 28°32.677' E), Kaliakra (43°22.234' N, 28°28.175' E), Rusalka (43°25.747' N, 28°31.459' E), Camen Bryag (43°27.310' N, 28°33.548' E) (Lepși, 1927; Cogălniceanu et al., 2008; as well as by Beshkov & Nanev, 2006 and Biserkov et al., 2007). The coordinates of each location are given in WGS 84 system.

However, the populations of common wall lizard in Dobrogea are small and more or less strictly localized. Also, the specimens of these populations differ from the phenotypical point of view from those present in the rest of the areas covered by this species (Fuhn, 1969).

MATERIALS AND METHODS

During 2008 and 2009 research seasons, the populations from the following zones were investigated: Dumbrăveni Natural Reservation (Romania), Canaraua Fetii Natural Reservation (Romania), Yailata Natural Reservation (Bulgaria) and the area between Rusalka and Cape Kaliakra (Bulgaria) (Fig. 1).

Field trips took place at the following dates: April 21-26, 2009 and August 10-13, 2009 in Dumbrăveni Natural Reserve, May 6, 2009 in Canaraua Fetii and May 10, 2008-May 10, 2009 in Yailata and Kaliakra Natural Reserves, which makes up a total of 264 field hours. Data from literature were used to compare the data obtained by us.

The methods used for capturing the specimens were visual transects and active search. In order to collect, capture and study the samples and specimens, the following materials and devices were used:

- the herpetological capturing loop;
- herpetological bags for transport from the capturing site to the research camp;
- Ruler and digital caliper for the collection of biometric data;
- Kern electronic balances for measuring weight;
- Nikon D80 digital camera;
- GPS Garmin 60 CSX system.

For comparison, the biometric data and photographs of 20 specimens of *Podarcis muralis muralis* belonging to populations from Jiu Gorge were used. These data were collected by the authors in 2008. Each individual was photographed and measured biometrically (Fig. 2). In addition to the data provided above, the femoral pores were counted in all the specimens captured and also a pholidosis analysis, the coloring and habitus in general was accomplished.

Each individual was then released back in the area where it was captured from.

Also, as we did not have access to detailed photographs of the holotype *Podarcis muralis maculiventris* (Werner, 1891), the photographs of the studied specimens were compared to those of the holotype *Lacerta muralis borromeica* Mertens, 1932, junior synonym of *Podarcis muralis maculiventris*. For data processing, including the image processing, the following programs were used: Microsoft Office Excel, SigmaPlot 11.0, Map Source for Garmin and R.O.A.D. 2009, B.G Topo Maps and Google Earth Pro, version 4.2.

RESULTS

A total of 72 specimens were captured as follows: 52 specimens in the Dumbrăveni area; 10 between Rusalka and Cape Kaliakra and 10 in Canaraua Fetii. (Fig. 1).

Among the 10 specimens captured from the area between Rusalka and Kaliakra (two from Kaliakra and eight from Yailata), seven had the length (SVL) between 61 and 70 mm, one between 51 and 60 mm and two specimens had the length between 41 and 50 mm (Fig. 3). Among these specimens, six were males with weights between 2 and 6.3 g, three were females with weights between 5.2 and 8.3 g and one was a juvenile weighing 1.3 g.

Among the 10 specimens captured from the Canaraua Fetii Natural Reserve, the lengths were as follows: two were between 61 and 70 mm, five between 51 and

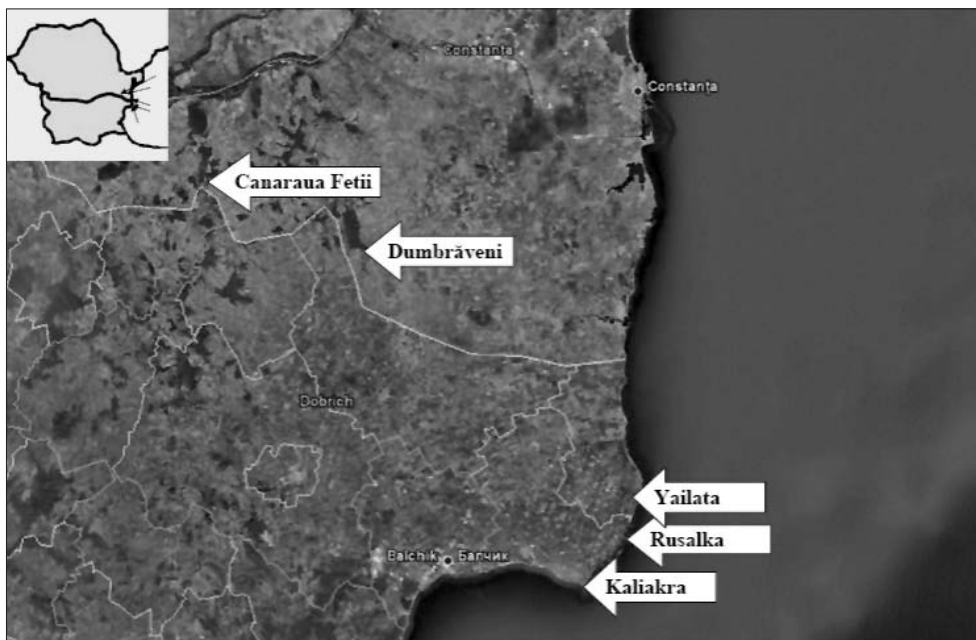


Fig. 1 - Map with the areas where the field research took place.

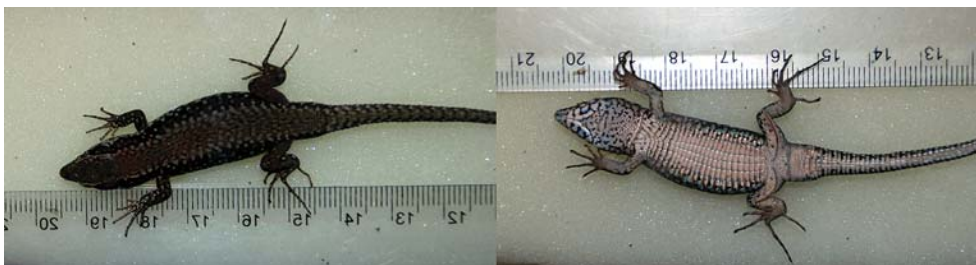


Fig. 2 - Specimen of *Podarcis muralis* from Dumbrăveni population (dorsal and ventral view).

60 mm, one between 41 and 50 mm and two between 31 and 40 mm. Among these, four were males weighing between 4.1 and 6.7 g, four were females weighing between 6.2 and 8.2 g and two were juveniles weighing 1.1 g and 1.8 g, respectively.

Among the 52 specimens captured from the Dumbrăveni Natural Reserve, the lengths were as follows: 10 were between 61 and 70 mm, 24 between 51 and 60 mm, 12 between 41 and 50 mm, and six between 31 and 40 mm. Among these, 20 were males weighing 2.1 and 8.3 g, 21 were females weighing between 2 and 8.3 g and 11 were juveniles weighing between 1.2 and 1.9 g.

Also, the 20 specimens captured from the Jiu Gorge National Park, the lengths were as follows: 8 were between 61 and 70 mm, one between 51 and 60 mm, 10 between 41 and 50 mm, and one between 31 and 40 mm. Among these, 8 were males weighing 2.1 and 8.3 g, 9 were females weighing between 2 and 8.3 g and 3 were juveniles weighing between 1.2 and 1.9 g.

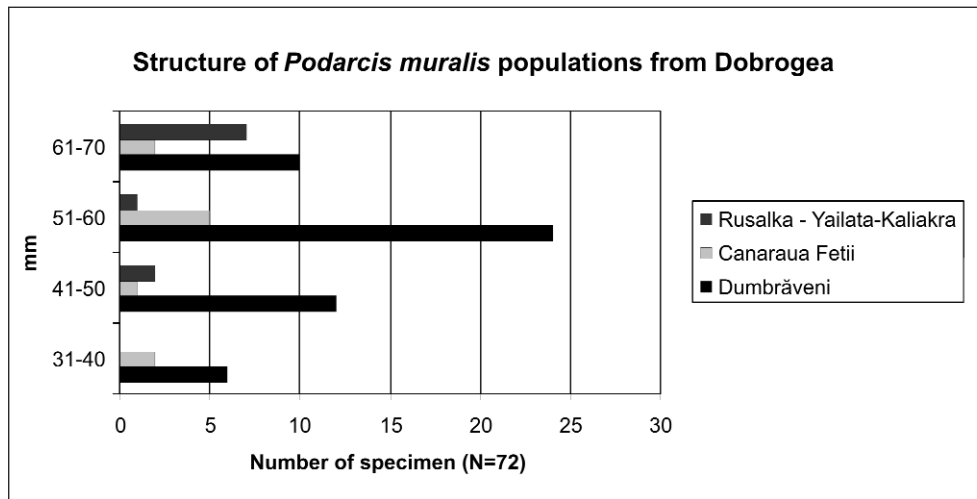


Fig. 3 - The structure of specimens from Dobrogea on length classes.

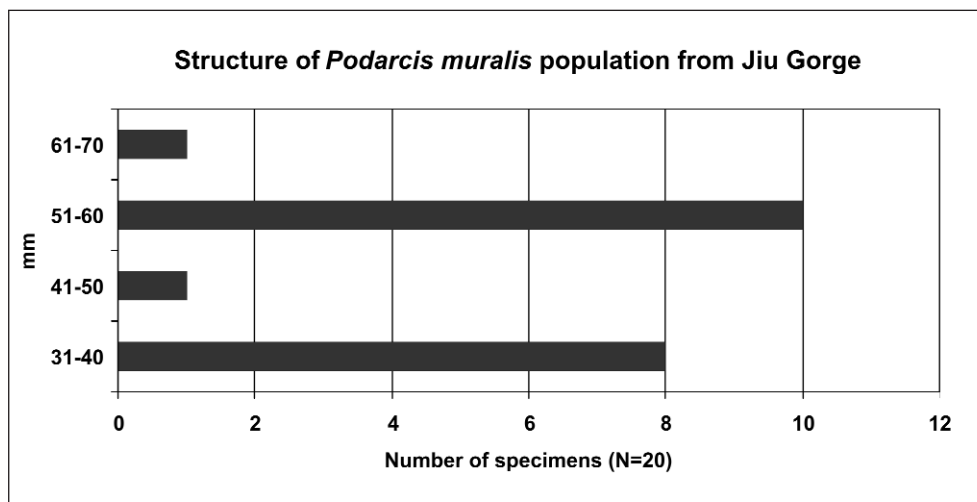


Fig. 4 - The structure of specimens from Jiu Gorge on length classes.

All the given lengths and weights refer to class intervals.

The analysis of the data obtained emphasized the following aspects:

Podarcis muralis in Dobrogea has smaller sizes, being 1.2 – 1.5 mm (SVL) smaller on average than *P. muralis* from Jiu Gorge (see fig. 4). The weight of *P. muralis* from Dobrogea is smaller on average by 1.03 grams than *P. muralis* from Jiu Gorge.

In none of the cases *P. muralis* in Dobrogea displays the red pigment on the ventral side, the coloring in these specimens varying from grayish-white to white with black transversal spots and stripes.

The number of femoral pores in the Dobrogea specimens varies between 16 and 19, compared to 15 – 22 in the Jiu Gorge population. This aspect, as well as the coloring and habitus, brings them closer to the *maculiventris* subspecies. In Dobrogea, there is no habitat continuity (as in Jiu Gorge), this leading to isolation and to more or less strict localization of the populations.

DISCUSSION

The populations of common wall lizard in Dobrogea are small and more or less strictly localized, probably because of the rarity of specific habitats. Also, the specimens of these populations differ from the phenotypical point of view from the ones in the rest of the areas covered by this species. Fuhn & Vancea (1961) categorizes the specimens of common wall lizards in the Dobrogea populations as *Podarcis muralis* affinity *maculiventris*, but avoids clear specifications regarding the taxonomic status of these populations. Subsequently, the authors that mentioned this taxon in Dobrogea use Fuhn's opinion without bringing any other additional specifications. Iftime (2005), quoting Török (2001), mentions the presence of the common wall lizard in the vicinity of the medieval fortress from Gostinu, in Giurgiu county, and adds his own observations connected to the possibility of this population to belong to the Dobrogea nucleus. The basis of this hypothesis is again the habitus type *maculiventris*. Tsankov (in Biserkov et al., 2007) states that the populations of common wall lizard from Bulgaria belong to the subspecies *albanica* Bolkay, 1919. This classification raises a question regarding the taxonomic status of the populations in Dobrogea because we have not discovered, yet, any notable difference between the specimens from the populations in the Romanian and Bulgarian Dobrogea. This could suggest that the specimens from the populations in the south of Romanian Dobrogea also belong to the *albanica* subspecies. However, the main taxonomic feature of the *albanica* subspecies, namely the number of abdominal plates (26 on average in the case of *P. m. albanica*), differs from the average 24.2 observed by the authors in the Dobrogea specimens (both the Bulgarian and the Romanian side) and in the Jiu Gorge population (*P. m. muralis*). More elaborate analyses (DNA testing) are needed in order to clarify the taxonomic status of the populations of common wall lizard in Dobrogea.

Conclusions

The Dobrogea specimens (Romania and Bulgaria) display a remarkable similarity in regards to the analyzed parameters, but they are different from those in Jiu Gorge. This fact supports the hypothesis according to which the colonization of the Romanian Dobrogea was accomplished with specimens from the Balkan Peninsula. Further investigations (DNA barcoding) are necessary to confirm or invalidate this hypothesis.

There are important differences between the specimens of the nominated subspecies of common wall lizard and the specimens of the Dobrogea populations. These differences are reflected in the biometric, number of femoral pores and coloring data. The populations of common wall lizard in Dobrogea are quasi-isolated, strictly localized and dependent on a particular type of habitat (rocky slopes, rocky areas in the silvosteppe, small gorges and steep slopes).

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CERCETĂRI ASUPRA POPULAȚIILOR IZOLATE DE ȘOPĂRLĂ DE ZID *PODARCIS MURALIS* (LAURENTI, 1768) (REPTILIA) DIN DOBROGEA (ROMÂNIA ȘI BULGARIA)

REZUMAT

Populațiile izolate de șopărlă de zid *Podarcis muralis* din Dobrogea sunt strict localizate în câteva habitate stâncoase situate în sudul acestei provincii geografice. Dimensiunile acestor populații sunt mici, în comparație cu cele din restul arealului. Acest aspect, împreună cu stricta lor localizare, le face pretabile la studii populaționale complexe.

Ipoteza de lucru a fost aceea că populațiile de șopărlă de zid din Dobrogea nu au legătură cu cele din Carpați, Dunărea și Câmpia Română acționând în acest caz ca bariere biogeografice. În lumina acestei ipoteze, colonizarea Dobrogei de către șopărlă de zid s-a făcut cu exemplare provenind din sudul Peninsulei Balcanice.

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