

***DOLICHOPHIS CASPIUS* (GMELIN, 1789) IS INDEED CONTINUOUSLY DISTRIBUTED IN SOUTHERN ROMANIA: ZOOGEOGRAPHICAL AND CONSERVATIONAL IMPLICATIONS OF IDENTIFYING NEW POPULATIONS**

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Abstract: *Dolichophis caspius* was indicated for two new localities in southern Romania: Pietrosani and Suhaia. This new data confirms a continuous distribution of the species in southern Romania, near the areas around the Danube's meadow. In the new localities, too, the large whip snake populates the loess walls that border the northern side of the Danube's meadow, in areas surrounded by vines. The identified populations are under a great deal of anthropogenic stress, road kills being identified in both locations. The survival of the species in the region is conditioned by the conservation of its habitat, which needs to be done first. Thus, the entire meadow of the Danube needs to be investigated as soon as possible, the existent populations need to be monitored and measures need to be taken for their protection.

Key words: *Dolichophis caspius*, southern Romania, distribution, conservation, large whip snake

1. INTRODUCTION

According with the Romanian conservation law *Dolichophis caspius* is a species of community interest in need of strict protection (OUG 57/2007), while in the Red book of Vertebrates from Romania it is considered vulnerable (Iftime, 2005). This situation is a consequence of the absence of the species from most of Romania, the whip snake being in our country at its northern limit of its areal (Szczerbak, 1997). In Romania, *D. caspius* is present only in the southern part of the country, mostly in Dobrudja, the extreme south of Moldavia and some areas of Oltenia and Banat (Fuhn & Vancea, 1961, Iftime, 2005, Lazăr et al., 2005, Covaciu-Marcov et al., 2005, 2006, 2009a, Strugariu & Gherghel, 2007, 2008).

Recently though, the species was indicated for two other locations from southern Romania (Covaciu-Marcov & David, 2010, Sahlean et al., 2010) which seem to complete the image of the species' distribution in the country.

On these new findings, it was suggested that the species' areal in the southern part of Romania isn't really fragmented in 3 main parts, but

continuous. The narrow ribbon that borders to the north the Danube's meadow ensures this continuity. In that particular territory, the species finds its suitable habitat even if it's surrounded by agricultural areas (Covaciu-Marcov & David, 2010). We confirm this hypothesis, completing the scenario of the species' distribution in southern Romania with two new localities, which fill in the gaps of the species' areal, almost unifying the territory from Oltenia with one from Dobrudja and southern Moldavia.

2. MATERIAL AND METHODS

The study took place in the summer of 2009, in the month of August. During this time, our team crossed the entire length of the Danube's meadow, from Fetesti all the way to Calafat, following mostly the main road that goes along it.

A dead snake initially drew our attention on the road and from that point on we monitored this section carefully. Field searching was done as well, in habitats suitable for the whip snake in both areas where we found road kills and in other sectors that looked promising in terms of meeting the species' ecological needs.

We used the transect method, performing random encounter surveys, a method recently used in other similar studies regarding the herpetofauna (Ficetola et al., 2010).

3. RESULTS AND DISCUSSIONS

By the end of August 2009, we identified the whip snake in two new localities from southern Romania (Fig. 1). They are the Pietrosani and Suhaia localities, both from Teleorman County localities where, according to previous data, the species hadn't been indicated before (Iftime, 2005).

In both cases we noticed a specimen of this species killed by the traffic on the main road that follows alongside to the Danube. At Suhaia, we quickly investigated the habitats bordering the road and managed to identify a live specimen as well.

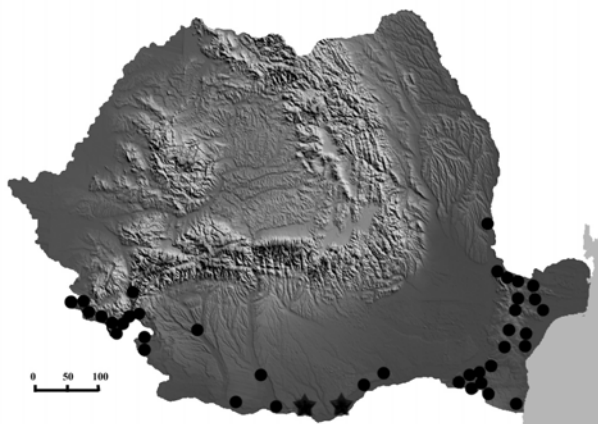


Figure 1. The new localities of *Dolicophis caspius* in southern Romania (*), and the previously known localities (●) (Iftime, 2005; Lazăr et al., 2005; Covaciu-Marcov et al., 2005, 2006, 2009a; Strugariu & Gherghel, 2007, 2008, Covaciu-Marcov & David 2010, Sahlean et al., 2010) (Map source: Covaciu-Marcov & David 2010, modified).

The habitat of both these populations isn't really represented by the areas alongside the road, but more by the sectors situated to the south of the road. Thus, the whip snakes inhabit the loess walls that border the Danube's meadow to the north, a habitat in which *D. caspius* was indicated in before (Covaciu-Marcov & David, 2010). The situation seems to be general for the entire northern limit of its areal, the species' utilizing the same biotopes in Hungary, too (Bellaagh et al., 2008).

Actually, in the southern part of Moldavia, *D. caspius* was found in the same habitats as well, situated here in the Prut River's meadow (Strugariu & Gherghel, 2007). If in Dobrudja and in the Danube's narrow path the species is common and occupies a greater variety of habitats (Covaciu-

Marcov et al., 2006, 2009a), in the mediator area, situated between the two sectors, *D. caspius* has retreated only to the loess walls.

This fact cannot be a consequence of some climate factors, as they are not very different to those in areas of Romania where the species is abundant (Stoenescu et al., 1966). Frankly, the annual thermal averages are actually higher in the Danube's meadow than in some areas of Dobrudja (Mândruț, 2006), fact that should favor the whip snakes. Thus, the limitation of the species to the loess walls is determined by the impact on the terrain bordering the Danube's meadow and automatically by the massive and continuous reduction of its habitat, a similar situation with other areas, too (Bellaagh et al., 2008). Thus, the areas found beyond upper side of the loess walls are used for agriculture in the southern Romania, too, while those found under the lower limit of the loess walls are affected by flooding, being generally wet areas – not in correspondence with the species' ecological needs.

In its very limited habitat, where people's economical interests are small, the species seems to be favored by the presence of vines, the occurrence of whip snakes in vine areas being reported before (Covaciu-Marcov & David, 2010). Thus, in this type of agro-ecosystems the impact isn't that direct and the look of the habitat is actually rather similar to the one characteristic for the species than in comparison with other agricultural fields. In one of the two localities the road is actually bordered on both sides by vines. In this case, the road practically divides the habitat of the whip snakes that was most likely trying to cross from one part of its biotope to another when it was killed. Probably both victims were searching for food.

Despite the fact that this study confirms a wider distribution for a rare species in the country, indicating a more logical geographic distribution, it also draws a strong alarm signal. Thus, just like in a previous study (Covaciu-Marcov & David, 2010), two of the samples that were observed and practically those that triggered our attention were found killed by traffic. This fact can have grave repercussions on an already natural reduced small population and localized on a very narrow ribbon on favorable habitat.

On the other side, the road mortality generally affects this species, being signaled in areas where this snake is common, too (Covaciu-Marcov et al., 2006). This phenomenon has a very strong negative impact on other snake species from the country, as well (Krecsák et al., 2004, Covaciu-Marcov et al., 2009b,c). For this rare species, its large size and behavior represent a great disadvantage, favoring its contact with cars.

In order to protect the *D. caspius* populations outside Dobrudja, we should immediately take measures for conserving its habitat, represented by the loess walls.

Furthermore, we should investigate the entire region around the Danube's meadow with a result in identifying all the populations and the sectors in which the species lives and a following monitoring of them.

Also, we must establish the sectors where the whip snake frequently crosses roads or where the roads are very close to its habitat. In these areas something has to be done in order to limit the snakes' chances of coming to contact with cars. Such measures are vital to ensure the survival of the populations of this species, which needs strict protection in Romania (OUG 57/2007). Measures of the protection of these snakes can be taken by creating some fences and underpasses and by elevating the road in the area that divides the snakes' habitat. Similar measures were proposed in other area with successful results (Dodd et al., 2004, Roe et al., 2006).

Thus, even if the development of human civilization cannot be stopped, it can take into account the biodiversity around it, incorporating landscape ecology in its development plans (Hartel et al., 2008). This way, the survival of the *D. caspius* populations from southern Romania can be ensured.

4. CONCLUSIONS

Our study indicates two new *D. caspius* populations in southern Romania. The species was identified in Teleorman County, as a premiere for the localities of Pietrosani and Suhaia. Practically, these new locations seem to definitively solve the problem of the distribution of this species in southern Romania, the outer-Dobrudjan territory, demonstrating the continuous distribution of the whip snake in the Danube's meadow – from southern Moldavia all the way to the Danube's defile. *D. caspius* inhabits in this case the loess walls situated on the northern side of the Danube's meadow, between it and the smooth plain sectors right above them. Through this habitat, the species occupies the entire area from the Danube's meadow. Thus, the ribbon favorable for the snake is very narrow, the agricultural areas found to the north being many times degraded. Furthermore, with all the reduced surface of its available territory, the species is under even more anthropogenic stress represented by road killings – in both localities we found a specimen killed by traffic. The future survival of the species depends on the conservation

of its habitat, with an immediate investigation of the whole Danube meadow territory being compulsory, in order to identify other and all populations.

REFERENCES

- Bellaagh, M., Korsós, Z. & Szelényi, G.,** 2008. *New occurrences of the Caspian Whipsnake, Dolichophis caspius (Reptilia: Serpentes: Colubridae) along the River Danube in Hungary.* Acta Zoologica Bulgarica, 60, 2, 213-217.
- Covaciu-Marcov, S.-D. & David, A.,** 2010. *Dolichophis caspius (Serpentes: Colubridae) in Romania: New distribution records from the northern limit of its range.* Turkish Journal of Zoology, 34, 1, 199-121.
- Covaciu-Marcov, S.-D., Sas, I., Cicort-Lucaciu, A.-Șt., Peter, I. & Bogdan, H.,** 2005. *Notes upon the herpetofauna of the county of Caraș - Severin, Romania.* Revue Roumaine de Biologie, serie de Biologie Animale, 49, 1-2, 47-56.
- Covaciu-Marcov, S.-D., Ghira, I., Cicort-Lucaciu, A.-Șt., Sas, I., Strugariu, A. & Bogdan, H. V.,** 2006. *Contributions to knowledge regarding the geographical distribution of the herpetofauna of Dobrudja, Romania.* North Western Journal of Zoology, 2, 2, 88-125.
- Covaciu-Marcov, S.-D., Cicort-Lucaciu, A.-Șt., Gaceu, O., Sas, I., Ferenți, S. & Bogdan, H. V.,** 2009a. *The herpetofauna of the south-western part of Mehedinți County, Romania.* North Western Journal of Zoology, 5, 1, 142-164.
- Covaciu-Marcov, S.-D., Cicort-Lucaciu, A.-Șt., Dobre, F., Ferenți, S., Birceanu, M., Mihut, R. & Strugariu, A.,** 2009b. *The herpetofauna of the Jiului Gorge National Park, Romania.* North-Western Journal of Zoology, 5, Suppl. 1, S01-S78.
- Covaciu-Marcov, S.-D., Sas, I., Cicort-Lucaciu, A.-Șt., Kovacs, E.H. & Pinte, C.,** 2009c. *Herpetofauna of the Natural Reserves from Carei Plain: zoogeographical significance, ecology, statute and conservation.* Carpathian Journal of Earth and Environmental Sciences, 4, 1, 69-80.
- Dodd, C.K., Barichivich, W.J. & Smith, L.L.,** 2004. *Effectiveness of a barrier wall and culverts in reducing wildlife mortality on a heavily travelled highway in Florida.* Biological Conservation 118, 619-631.
- Ficetola, G. F., Crottini, A., Casiraghi, M. & Padoa-Schioppa, E.,** 2010. *New data on amphibians and reptile son the Northern Areas of Pakistan: distribution, genetic variability and conservation issues.* North Western Journal of Zoology, 6, 1, 1-12.
- Fuhn, I. & Vancea, Șt.,** 1961. *"Fauna R.P.R.", vol. XIV, Fascicola II, Reptilia.* Ed. Academiei R.P.R. Bucharest, pp. 1-352. [in Romanian].
- Hartel, T. R., Moga, C. I., Öllerer, K., Demeter, L., Sas, I., Ruști, D. M. & Balog, A.,** 2008. *A proposal towards the incorporation of spatial heterogeneity into animal distribution studies in*

- Romanian landscapes*. North Western Journal of Zoology, 4, 1, 173-188.
- Iftime, Al.**, 2005. *Amphibians and Reptiles*. In: The red book of the vertebrates in Romania, editors: Botnariuc & Tatole. Ed. Academiei Române, Bucharest, pp. 1-325. [in Romanian].
- Krecsák, L., Sike, T. & Sos T.**, 2004. *Distribution of the herpetofauna in the Lotrioara river basin, Sibiu district (Romania)*. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa", 47, 285-295.
- Lazăr, V., Covaciu-Marcov, S.-D., Sas, I., Pusta, C. & Kovacs, E.-H.**, 2005. *The herpetofauna in the district of Dolj (Romania)*. Analele Științifice ale Universității "Al. I. Cuza" Iași, Seria Biologie Animală, 51, 169-178.
- Mândruț, O.**, 2006. *Small geographic atlas of Romania*. Ed. Corint, Bucharest, pp. 1-48 [in Romanian].
- Roe, J. H., Gibson, J. & Kingsbury, B. A.**, 2006. *Beyond the wetland border: Estimating the impacts of road for two species of water snakes*. Biological Conservation, 130, 161-168.
- Sahlean, T. C., Mester, L. E. & Craciun, N.**, 2010. *First distribution record for the large whip snake (Dolicophis caspius Gmelin, 1789) in the county of Teleorman (Islaz, Romania)*. Bihorean Biologist, 4, 2, 181-183.
- Stoenescu, Ș. M., Șchiop, A., Dica, I., Popescu, E., Patrichi, E. & Țepeș, E.**, 1966. *The climatologic atlas of R. S. R.*, Bucharest. [in Romanian].
- Strugariu, A. & Gherghel, I.**, 2007. *New record on the occurrence Dolichophis caspius (Reptilia: Colubridae) in Romanian Moldavia*. North Western Journal of Zoology, 3, 1, 57-61.
- Strugariu, A. & Gherghel, I.**, 2008. *A preliminary report on the composition and distribution of the herpetofauna in the Lower Prut River Basin (Romania)*. North Western Journal of Zoology, 4, Suppl. 1, 49-69.
- Szczerbak, N.**, 1997. *Coluber caspius Gmelin, 1789*. In: Atlas of Amphibians and Reptiles in Europe, editor: Gasc J. P., pp. 328-329. Museum National D'Histoire Naturelle, Paris.

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