

SALAMANDRA SALAMANDRA (LINNAEUS, 1758) IN THE GETIC PIEDMONT, ROMANIA: GEOGRAPHIC DISTRIBUTION, STATUS AND CONSERVATION

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Abstract: In 2009 and 2010 we identified seven *Salamandra salamandra* populations in the Getic Piedmont from south-western Romania. The salamanders come down to the southern limit of the piedmont, reaching altitudes of 201 meters. All of the seven populations are found in afforested areas. The *S. salamandra* populations from the Getic Piedmont seem to be in contact with those from the Southern Carpathians, indicating a continuous distribution range of the species in the region. The salamanders are directly exposed to anthropogenic pressure in the form of clearings of forests, road kills and waste dumping. The future survival of the salamanders in the Getic Piedmont depends on the protection of the forest habitats that they live in.

Key words: *Salamandra salamandra*, Getic Piedmont, geographic distribution, conservation, low altitude

1. INTRODUCTION

The central and east European countries still present a high biodiversity found in a relatively good conservation state (Cogălniceanu & Cogălniceanu 2010). Romania is part of this region, but, despite this, knowledge on the biodiversity and its status in Romania are absent at the European level (Hartel et al., 2008). Therefore, the distribution of a numerous number of species that are apparently common is little known in Romania. It has been recommended to periodically re-evaluate the status of the species considering the results of the recent studies (Cogălniceanu & Cogălniceanu 2010).

Salamandra salamandra is a species common in Romania, where it is present in the entire Carpathian arch and inside it (Iftime, 2005a). The situation is similar in Europe, too, where the salamander is well represented in woody areas, especially deciduous forests are rarer in coniferous ones (Veith, 1997).

The species was classically indicated for the forest hill and mountain areas in Romania, being

pointed out at altitudes of over 200m a.s.l. (Fuhn, 1960, Cogălniceanu et al., 2000, Iftime, 2005a). Only on a few occasions it was identified under the 200m altitude level, in some areas of western Romania (Paşcovschi, 1956, Iftime, 2005b, Covaciu-Marcov et al., 2007, 2008a). Just recently, the altitude limit of the salamander for Romania was set at 100 m a.s.l., in the Iron Gates area (Covaciu-Marcov et al., 2009a).

Although this point is situated at the eastern limit of the mountains with the low areas from the Oltenia Platform, the species was not identified in the Getic Platform, its distribution limit seeming logically to be the southern versant of Southern Carpathians (Fuhn, 1960, Cogălniceanu et al., 2000, Iftime, 2005a). Unlike these, the present study indicates the species in more locations from the Getic Platform, contributing to the knowledge of the distribution of the salamander in Romania.

2. MATERIAL AND METHODS

The field trips were made in 2009 and 2010. The research area is represented by the Getic

Piedmont found between the Jiu and Olt Rivers and belonging to the Gorj and Vâlcea Counties. The Getic Piedmont is situated to the south of the Getic Sub-Carpathians, between them and the Oltenia Plain (Mândruț, 2006). Our study method was that of transects (Cogălniceanu, 1997), making numerous passes through each analyzed habitat. We searched for the larvae in the typical aquatic habitats for the species (Fuhn, 1960), from where they were captured with different nets. After determining them, the animals were set back free in their habitats. Furthermore, we also identified animals killed on the road, a method recently used in other herpetological studies in Romania (Covaciu-Marcov et al., 2009 a,b,c).

3. RESULTS AND DISCUSSIONS

We identified *S. salamandra* populations in seven localities from the Getic Piedmont (Tab. 1.). These localities are distributed in the entire area of the investigated region, comprising more subdivisions of the piedmont. The lowest altitude at which the salamanders were identified at was of 201 m, near the Arpadia locality. This is close to the normal altitude limit of the species in Romania (Iftime, 2005a). What's important is the discovery of the species between the Gorj and Dolj Counties, at about 80 km south from the previously known distribution limit, which were the mountains (Cogălniceanu et al., 2000, Iftime, 2005a).

Table 1. *Salamandra salamandra* distribution locality in Getic Piedmont (Gj- Gorj County, VI – Vâlcea County)

Locality	Altitude	Geographic coordinates
Arpadia – Gj	201	44°37'45.70"N/23°34'27.46"E
Bărbătești – Gj	267	44°45'50.77"N/23°29'39.47"E
Jupânești – Gj	203	44°55'00.60"N/23°31'39.96"E
Scoarța – Gj	331	45°02'00.05"N/23°27'48.80"E
Țicleni – Gj	296	44°57'24.74"N/23°28'16.64"E
Botorani – VI	299	44°43'51.01"N/24°04'33.58"E
Dăești – VI	290	44°57'02.30"N/24°06'25.59"E

This fact indicates a wide distribution of the salamanders in the Getic Piedmont, all the way to its southern limit. The discovery of the species at Scoarța suggests that the *S. salamandra* populations from the Getic Piedmont are in fact in contact with those from the Carpathian arch, forming a single unit. This fact is plausible because, although the Târgu Jiu Depression is a cleared, smooth area, thus unfavorable for the salamanders, the continuity of

the wavy relief is ensured to the east, by the Oltețului Platform area.

The salamanders inhabit, in all the cases, afforested sectors, being mostly present in valleys alongside some permanent water courses, with a lower flow. More straightforward, the salamanders are found in the humid areas from within woods, mainly near streams or torrents. This fact is concordant with the species' ecological needs, which populates the same wet sectors from inside forests in other regions, too (Manenti et al., 2009a,b). In the sectors inhabited by the salamanders in the Getic Piedmont, the forests mainly consist of different species of oak that alternate with pastures, grasslands and agricultural fields. However, in many cases, in the salamanders' habitats, in the wet areas from near streams, beech trees are also present. Isolated beech stations were also indicated in Oltenia and more to the south, all the way near Craiova (Pașcovshi, 1967).

The previous distribution limit for the salamanders from the southern versants of the mountains may seem logical. Although the altitudes from the Getic Platform are high enough to permit the existence of the species, the area is more arid in comparison to western Romania (Stoenescu et al., 1966) where the species is present at low altitude in hilly areas (Covaciu-Marcov et al., 2007, 2008a). The link with the populations from the mountain areas seems to indicate a uniform and continuous distribution range, though. Thus, the presence of the salamanders in the Getic Platform is not a result of a recent entry of the species, its prior absence being only the outcome of the lack of studies in this region of Romania. The survival of the species in the region is ensured by some steams and slow flowing water courses situated in forest sectors, where their larvae may develop.

Therefore, despite the fact that the Getic Platform is situated at the limit of the sub-Mediterranean climate zone (Mândruț, 2006), containing some southern, thermophilic elements of the herpetofauna (Covaciu-Marcov 2010), it also contains some species associated with a colder and more humid climate present at low altitude as well. Recently, in the western Oltenia area, at 20 km from the habitat from Arpadia, in the Arginești region, *Pelophylax lessonae* populations were discovered (Covaciu-Marcov et al., 2008b). So overall, it would seem that a conglomerate of forms tied to different climate conditions is present in the region, with colder and more humid species being present here together with species linked with a warmer and drier climate.

Classically for Romania, *S. salamandra* is considered to belong to the sylvan postglacial wave

(Stugren, 1957), spreading throughout the country together with the deciduous forests right after the last glacial period. The refuge from where those populations dispersed can be considered as being localized in the Danube Defile – a place where, recently, refuges for other species like *Bombina variegata* were indicated (Hofman et al., 2007). The existence of a refuge in the area can be deduced from the very low altitude at which the species is present in the region. From here, the populations migrated to the north-east and east as the temperatures rose. The populations from the Getic Platform probably represent relicts of these initial expansions. Nowadays, they survive in forest islands due to climate changes and anthropogenic activities (e.g. clearings of forests) and thus have a relict character just like the beech that they accompany (Paşcovshi, 1967).

The salamanders' larvae are present, just like in the majority of the distribution range (Caspers et al., 2009), in small slow flowing stream from inside forests. In some cases, these streams have a rocky substratum, but due to the low altitude of the region, most of them have a muddy or sandy substratum, being thus relatively homogenous despite the fact that usually the habitats of salamander larvae are heterogeneous (Manenti et al., 2009a). Generally though, these flowing water lack fish, a fact that is a common rule as they would be predators of the salamander larvae (Manenti et al., 2009a). Also, the macrozoobenthonic invertebrates are numerous in these waters, which also favor the species' larvae (Manenti et al., 2009a).

S. salamandra is presently affected by human activities in two ways in the Getic Piedmont. Firstly, the clearings of forests are definitely an issue that affects the species all over the country, reason why it is also considered vulnerable (Iftime, 2005a). Such activities take place, for example, at Dăeşti. The conservation of forests is of great importance for the survival of the salamander populations from arid areas (Egea-Serrano et al., 2006), many forestry activities negatively affecting other salamandride species (Harpole & Haas 1999). Secondly, adults frequently fall victim to traffic, in all the areas where their habitat is crossed by roads. We noticed such cases at Țicleni and at Dăeşti. At Țicleni, the situation repeated in both years, with 2 or 3 dead bodies observed in the rainy days. The salamanders are exposed to road kills because of their slow motion, but the phenomenon is general for amphibians, being lately signalled for other amphibian species in Romania (Hartel et al., 2009). The road mortality demonstrates that the salamanders travel great distances from their main habitats. It was recently documented that salamanders actually use a wide

territory (Schmidt et al., 2007). Meanwhile, their larvae are also affected by human activities, the waters that they populate being used for dumping wastes and as waterholes for cattle. The future survival of the *S. salamandra* populations from the Getic Piedmont depends greatly on limiting the clearings of forests. The continuous fragmentation of forests will drastically affect the low numbered salamander populations.

4. CONCLUSIONS

The seven *S. salamandra* populations identified in the Getic Piedmont are present in afforested areas, in shaded valleys. Our results broaden the known distribution range for the species in the Oltenia region. This is how, the previously set limit – at the southern edge of the Southern Carpathians – was stretched all the way to the southern edge of the Getic Platform. The species was identified at its lowest at 201 m altitude, near Arpadia locality. The salamanders' larvae inhabit the slow flowing streams from the region, being present only in the sectors that lack fish. The greatest danger that lurks around the *S. salamandra* populations from the area is clearings of forests. Furthermore, the species is also affected through road killings by the traffic. The survival of the species in the Getic Piedmont is conditioned by the conservation of the forest biotopes it inhabits.

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