

**On the presence of *Rana (Pelophylax) lessonae*
in south-western Romania:
distribution, biogeographical signification and status**

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Abstract. During 2006 and 2007 we encountered in south-western Romania four populations of *Rana lessonae*. Their determination was made on the basis of both the morphological and chromatic features. All of the pool frog records in Romania are found at the proximity of the species' general range; being practically in connection with it. Thus, aside from the glacial refuge from Italy, the populations from south-western Romania are amongst the most southerly populations of the species at entire Europe level, making up the south-eastern limit of its range. The populations from south-western Romania seem to be isolated from the other populations from Romania both geographically, ecologically (temperature and humidity), and as habitat type (mountain brook). It can therefore be theorized that the species *Rana lessonae* had in south-western Romania a secondary glacial refuge.

Key Words: *Rana lessonae*, distribution, south-eastern limit, isolated, Romania, econdary refuge

Rana lessonae is a European species, distributed through a large part of the continent. In southern Europe it is present in Italy where it had the glacial refuge (Uzzel 1982). Starting from this refuge it had passed the Alps Mountains advancing both north-east and north-west, reaching over into Russia and France (Günther 1997). Romania makes up a sector of the south-eastern limit of the species' natural range. After the year 1993 the records for these species in Romania have significantly increased (Cogălniceanu & Tesio 1993, Covaciu-Marcov, Sas & Cicort-Lucaciu 2007, Covaciu-

Marcov et al. 2006a,b, Strugariu et al. 2006). However, in almost all the cases, the new localities are found at the proximity of the species' general range, being practically in connection with it. The exception to this pattern is found in the locality of Mehedinți county, at Plavișevița (see Fig.1, Loc 0.) in south-western Romania, in the Danube Gorge (Fuhn 1975). The presence of the species in south-western Romania was not reconfirmed for a long time; with its occurrence appearing improbable due to the distance from the remainder of its range (see in: Günther 1997) and the warmer climate found here

compared to other regions in Romania populated by this species (Stoenescu et al. 1966). Nevertheless, through the years 2006 and 2007 we have encountered in Mehedinți county (Fig.1 - A) four populations of *Rana lessonae*.

Their determination was made on the basis of both the morphological and chromatic features confirmed using bioacoustics and some biochemical parameters (comparative data – manuscript in preparation, Sas et al.).

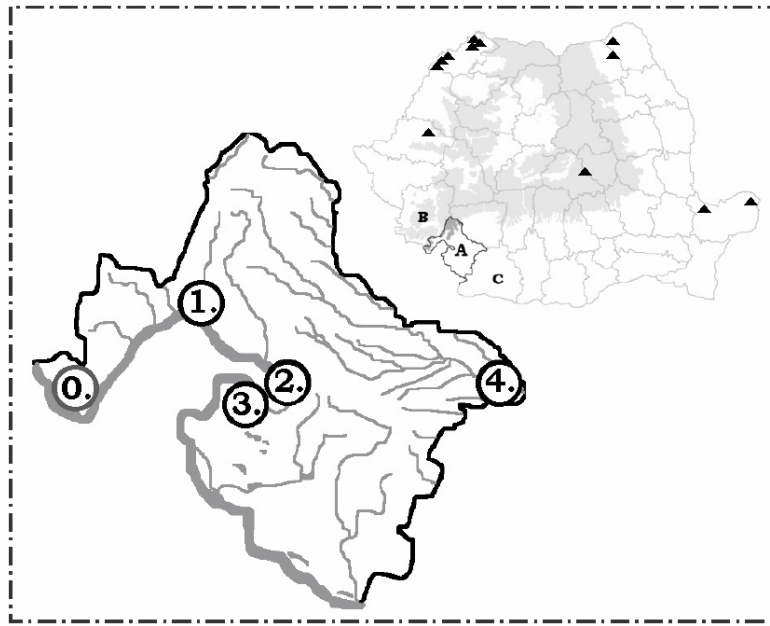


Figure 1. Distribution of *Rana (Pelophylax) lessonae* in south-western Romania (A.-Mehedinți county, and the neighbour counties: B.-Caraș-Severin county, C.-Dolj county – for references see in text). The triangles indicate the position of sure pool frog populations in the other parts of Romania (for references see in text). Locality records: 0.-Plavișevița, 86 m asl. (Fuhn 1975), 1.-Vodița Monastery, 91 m asl., 2.-Hinova, 80 m asl., 3.-Ostrovul Corbului, 70 m asl., 4.-Arginești, 94 m asl. (present paper)

Rana lessonae has a wider range in Mehedinți county than was previously thought (Fig.1). The species' area includes both the Danube Gorge and the low places situated downstream of it (but still located in the Danube meadow) as well as the damp zones

coterminous to some secondary tributaries of the Jiu River (at Arginești, Fig.1 - Loc 4.). Presumably, all the populations have connections between them, even nowadays, at least the populations from Vodița Monastery, Hinova and Ostrovu Corbului (Fig.1 -

Loc 1.-3.) being at 30 km one from the other. The populations from the low region occupy broad, permanent marshes with specific vegetation or moist afforested zones, the species' typical habitats (Covaciu-Marcov, Sas & Cicort-Lucaciu 2007, Rybacki & Berger 1994). But, at the Danube Gorge region, *Rana lessonae* is present in atypical habitats. So, at Vodița Monastery the species inhabit atypical mountain brook with fast flowing and rocky substratum, that flows into the Danube, upstream of the Iron Gate Dam. In Mehedinți the species was not observed higher than 100 m altitude, although in other regions of the country the species can be found much higher (Covaciu-Marcov Sas & Cicort-Lucaciu 2007, Strugariu et al. 2006). In the studied zone *Rana lessonae* appears with *Rana ridibunda* and *Rana* kl. *esculenta*. In the large habitats from the afforested zones *Rana lessonae* or *Rana* kl. *Esculenta* dominates, but at Vodița Valley *Rana ridibunda*, *Rana lessonae* dominates, these species being the rarest (manuscript in preparation).

The presence of the pool frog in Mehedinți County raises some biogeographical issues. Therefore, aside from the glacial refuge from Italy, the populations from south-western Romania are amongst the most southerly populations of the species at entire Europe level, making up the south-eastern limit of its range. At the same time, the populations from Mehedinți county seem to be isolated from the other populations in Romania both geographically, ecologically (temperature and humidity), and by habitat type

(mountain brook), (comparative biogeographical - manuscript in preparation, Sas et al.). All the other populations from Romania are living in colder and moister regions and can be encountered at the proximity of the European range, in marshy habitats and not mountain brooks (Cogălniceanu & Tesio 1993, Covaciu-Marcov, Sas & Cicort-Lucaciu 2007, Covaciu-Marcov et al. 2006a, Strugariu et al. 2006). In Danube George the pool frog, occupies a zone with submediterranean influences with a yearly temperature average over 11° C (Stoenescu et al. 1966).

We consider that the presence of *Rana lessonae* species in south-western Romania and other populations from Romania might have two explanations. Consequently, it can be theorized that the populations have been here as a result of a secondary glacial refuge of the species. Evidence for the Carpathian Basin being an important glacial refuge in the past is supported by: Willis et al. 2000, Willis & van Andel 2004, Babik et al. 2005. In this period of time the species might have adapted to use the atypical habitats. When the climate warmed up, these populations, slightly numerous, did not manage to spread very much to the north. Yet, at the same time, it can be considered that the populations from Mehedinți county are much more recently separated from the remainder of their range, with the species reaching this place in the colder and moister postglacial period. Afterwards, the range was interrupted either by modifications of the climate or from

human activities. The populations from Mehedinți were able to survive as an isolated population due to the existence of some favourable habitats. In this case, the use of mountain valleys is likely to be a recent solution, adopted because the habitats were modified by humans. However, in our opinion the first theory is supported both by the ecological preference and by the existence of some pool frogs with unusual colouring, completely brown (comparative colour pattern data – Sas et al. in preparation), suggesting that the isolation is relatively old. Nevertheless, studies for precisely defining the territory occupied by the species in the region are absolutely necessary. Its isolation in Mehedinți is confirmed by its absence from the neighbouring zones like Dolj and Caraș-Severin counties (Fig.1 – B-C) (Lazăr et al. 2005, Covaciu-Marcov et al. 2005) (the position of these counties see in Fig.1).

Previously, Fuhn (1975) had signalled the species only in a well from Plavișevița, probably observing an isolated sample. Otherwise, until 1993 in Romania, only isolated individuals and not populations were found, the first population being recorded at Reci (Cogălniceanu & Tesio 1993). Thus, the few populations, with large numbers of individuals from Mehedinți are noted by us in premiere. In Vodița frogs can be found only sporadically in the brook, but in the ponds from the forest at Arginești frogs can be captured many tens per hour. At least for the moment, the species is not directly affected by human activities.

However, is very likely that *Rana lessonae* was affected by the building of the Iron Gate Dam. So, the Plavișevița locality, where the species was observed in 1975 is covered by the lake's waters. The lake probably separated the populations from different valleys, breaking up the range in the Danube gorge region. Taking into account the small number of localities where this species was recorded and the fact that the populations from Mehedinți are isolated we deemed that the species is vulnerable.

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