

**Hybrid without a hybrid zone?
Intermediate between
Lissotriton montandoni and *Lissotriton vulgaris*
from north-western Romania**

Alfred-Ștefan CICORT-LUCACIU*,
Severus-Daniel COVACIU-MARCOV and Istvan SAS

University of Oradea, Faculty of Sciences, Department of Biology;
1 Universității str., Oradea 410087, Romania.

* Corresponding author - E-mail address: cicort.alfred@yahoo.com

Abstract. In 2007 we identified a specimen with mixed characters between *Lissotriton montandoni* and *Lissotriton vulgaris* in the Oaș region from the north-western part of Romania, in an area where *L. vulgaris* is absent from. Its appearance is considered a proof of contact between the two species that are previous to the last glacial maximum, because the Oaș region probably represented a refuge for *Lissotriton montandoni* but not for *Lissotriton vulgaris* as well.

Key words: *Lissotriton montandoni*, *L. vulgaris*, hybrid, Romania.

Lissotriton montandoni and *Lissotriton vulgaris* are two sister species, very genetically similar (Babik et al. 2003, 2005). However, the differences between the distribution range of the two species are great, *L. vulgaris* being very widespread in Europe whereas *Lissotriton montandoni* is endemic to the Tatra Mountains and to some regions of the Carpathian Mountains (Babik et al. 2005). In Romania it is present only in the Eastern Carpathians and in a small part of the Southern Carpathians (Cogalniceanu et al. 2000), recently being encountered in new area from Iezer Mountains (Covaciu-Marcov et al. 2009a). In many areas, at the limit between the areals of the two species, hybrids were signaled (e.g. Kotlik & Zavadil 1999, Litvinchuk et al. 2003, Babik et al. 2003, Mikuliček & Zavadil 2008). Hybrids between *Lissotriton montandoni* and *Lissotriton vulgaris* were also found in Romania (e.g. Fuhn 1963, Fuhn et al. 1975, Iftime 2004, Gherghel et al. 2008).

To our best knowledge until now, hybrids between the two species were never indicated in the north-western Romania. Thus, in the present paper we are signaling the identification of an intermediary specimen between *Lissotriton montandoni* and *Lissotriton vulgaris* in the north-western Romania, specifically near Turț locality, in the Oaș Mountains (Fig. 1). In 2007 we've identified a male that presented transitional characters between the two species, being similar with the hybrids described between the two species in other regions (see in: Litvinchuk et al. 2003, Mikuliček & Zavadil 2008). The intermediate aspect of the underbelly is obvious in Figure 2 and 3. where the specimen in present in the middle, being compared to *Lissotriton montandoni* on the right and *Lissotriton vulgaris* on the left.

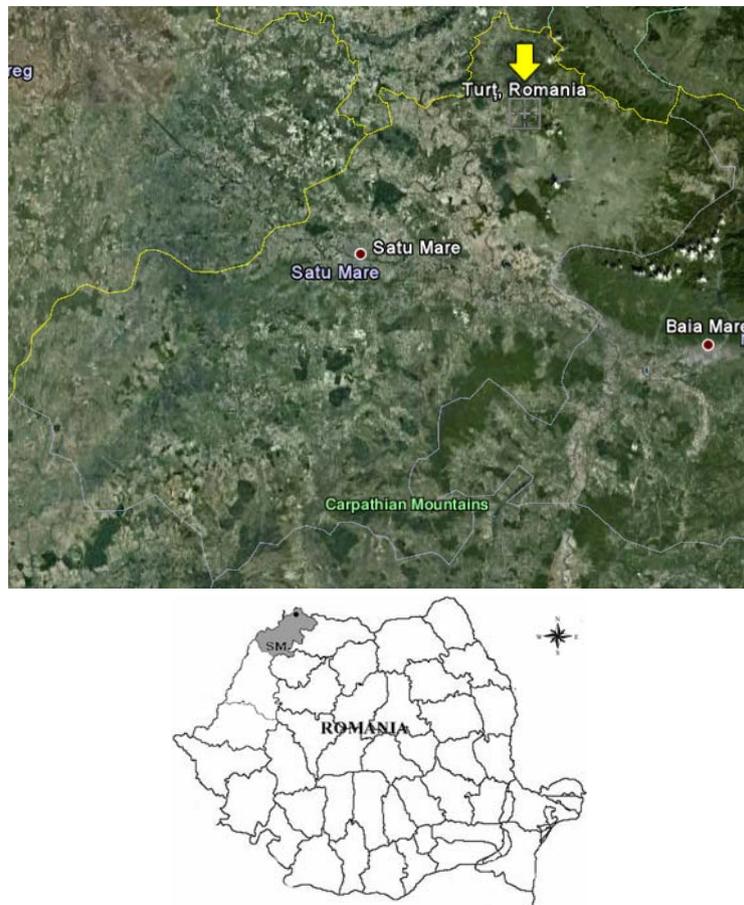


Figure 1. Geographical position of Turț locality in Satu-Mare county, Romania.



Figure 2. Underbelly comparison between *Lissotriton vulgaris* (left), *Lissotriton montandoni* (right) and the intermediary form (in the middle) from the same pond near Turt locality.



Figure 3. Comparison of the heads of *Lissotriton vulgaris* (left), *Lissotriton montandoni* (right) and the intermediary form (in the middle) from the same pond near Turt locality.

Other visible transition characters are found on and around the head. The size and number of spots on the gill is one of them and the lines that cross the sides and upper part of the head are the others. Both these features are well visible in Figure 3.

The specimen was captured by chance, while studying population sizes for *Lissotriton montandoni* in that area (Cicort-Lucaciu et al. 2010). The habitat is represented by a permanent pool constantly supplied with water from a close by stream, right near a beech forest. This pond has a width of about 4m and the length of about 20m, while its maximum depth reaches about 1m. Alongside with *Lissotriton montandoni* in the pond there are present numerous *Triturus cristatus* specimens (Cicort-Lucaciu et al. 2010).

Despite the fact that the intermediary specimen looks similar to those described in the literature, there is a very important fact that dethatches the Turț case from other previously mentioned in the literature: *Lissotriton vulgaris* is absent from the Turț region. Thus, in the habitat where this go-between specimen was found, we managed to capture, in more heats, some few hundred *Lissotriton montandoni* samples without catching any *Lissotriton vulgaris*. Including the surrounding regions, on an area of few kilometers, we've investigated numerous habitats but never came across any *Lissotriton vulgaris*. The situation is general for the entire Oaș region, where the two species were never indicated in the same habitat, *Lissotriton montandoni* occurring either alone or next to *Triturus cristatus* (Covaciu-Marcov et al. 2007). Consequently, the closest *Lissotriton vulgaris* population is located at about 25km away, at the limit with the plain. The situation is different then the one recorded in northern Moldova, where the two species appear together in the same pond (Covaciu-Marcov et al. 2008).

In this context the occurrence of the intermediary specimen seems to be difficult to explain. *Lissotriton vulgaris*' absence from some hybrid populations was explained by human activities (Babik et al. 2003). This doesn't seem to be the case here either if we look at the history of the region, this absence appearing real and old, being previously explained through the history of the two species in the last glacial period. Thus, it seems like a group of *Lissotriton montandoni* had its refuge in Oaș, one from which *Lissotriton vulgaris* was absent from (Covaciu-Marcov et al. 2007). So the identification of this intermediate form indirectly confirms that. As such, this is not the result of a recent hybridizing, but probably the image of a contact between the two species prior to the isolation from the last glacial period.

The appearance of an intermediary form in the absence and at distance from one of the parent species confirms the occurrence of different successive contacts between the two species, or more precisely between different groups of these species, in certain inter-glacial periods (Babik et al. 2005, Steinfartz et al. 2007). Thus the identification of the specimen with mixed characters indicates the existence of a refuge in the Oaş region for a group of *Lissotriton montandoni* populations, suggesting the importance of studying these populations from the genetic point of view as well. It was recently confirmed that the carpathian basin was indeed a refuge for different species (e.g. Wallis & Arntzen 1989, Hofman et al. 2007, Fijarczyk et al. 2011). Also, glacial refugium was situated in the Pannonian Basin, situated in the proximity, where some plant species survived in the last glacial maximum (Willis et al. 2000). Also in the past years in the Romanian Carpathians, several newt species was encountered at altitudes lower than normal (Covaciu-Marcov et al. 2007, 2009b, 2010, Ghiurca et al. 2005, Gherghel et al. 2008). This situation was also explained by the existence of glacial refuges in these areas (Covaciu-Marcov et al. 2009b, 2010).

The last data regarding *Lissotriton montandoni* in Romania pointed the existence in the country of certain groups of populations that had different glacial refuges (Babik et al 2005). The Carpathian Basin, recently postulated as a glacial refuge (e.g. Wallis & Arntzen 1989, Hofman et al. 2007, Fijarczyk et al. 2011) was definitely subdivided in more sub-refuges, as was the case of other refuges (Gomez & Lunt 2006). Thus, in the country we have more groups of *Lissotriton montandoni* coming from different refuges. The existence of newt populations that have different refuge in Romanian Carpathians was previously speculated (Covaciu-Marcov et al. 2009b, 2010). In Romania there are areas where the two species occur in the same habitats together with hybrids (Gherghel et al. 2008), but also in areas where although they were indicated for the same habitats, there weren't any hybrids signaled (Covaciu-Marcov et al. 2008). Furthermore, in the north-western part of the country, the two species don't occur together but as a result of prior contacts some specimens with mixed characters appear exceptionally. And as one more fact, the populations from Oaş and those from Ukraine come down the very low altitudes (Litvinchuk et al. 2003, Covaciu-Marcov et al. 2007), a distinct case from all the other populations from Romania. This fact underlines the differences between the ecology and history of the species form different regions of the country.

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