

## HERPETOFAUNA FROM THE UPPER TOPOLOG RIVER BASIN (ROMANIA)

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**Abstract.** In the current paper we present our results from a herpetological survey that took place along one of the Southern Carpathians river systems. The survey was conducted over a period of two days in the summer of 2008 and in spring 2011 and a four-day period in the summer of 2013, following the upper course of the Topolog River and one of its tributaries, the Topologel stream. We documented ten species of amphibians (and one hybrid) and four species of reptiles, all except two, being previously recorded from the neighboring area. The “exceptions” are the Agile Frog (*Rana dalmatina*) and the Marsh Frog (*Pelophylax ridibundus*) which we observed in sites located in the lowermost areas.

**Keywords:** Southern Carpathians, herpetofauna, upper Topolog River.

**Rezumat. Herpetofauna din bazinul superior al râului Topolog (România).** În lucrarea de față prezentăm rezultatele unui studiu herpetofaunistic ce s-a desfășurat de-a lungul unui bazin hidrografic din Carpații Meridionali. Studiul de față a fost efectuat pe o perioadă de două zile în vara anului 2008 și primăvara anului 2011, și patru zile, în vara anului 2013, de-a lungul cursului superior al râului Topolog și al unuia dintre afluenții acestuia, pârâul Topologel. Am înregistrat zece specii de amfibieni (și o formă hibridă) și patru de reptile, toate cu excepția a două specii, fiind înregistrate în prealabil într-o zonă învecinată. “Excepțiile” sunt broasca roșie de pădure (*Rana dalmatina*) și broasca mare de lac (*Pelophylax ridibundus*), pe care le-am observat în zonele cele mai joase.

**Cuvinte cheie:** Carpații Meridionali, herpetofaună, cursul superior al râului Topolog.

### Introduction

The Carpathian Mountains represent one of the most pristine ecosystems in Romania and probably of all Europe (Vološčuk, 2013). The Southern Carpathians host a large array of habitats, from the bold high peaks through the dense coniferous forests to the long and narrow corridors carved by rapids. Although gone are the days when access in this types of habitats was difficult, some areas of the Carpathian arch are still insufficiently known in terms of herpetofaunal distribution. The Southern Carpathians are no exception, although extensive herpetological data from the area exist (e.g. Fuhn, 1960; Fuhn & Vancea, 1961; Iftime *et al.*, 2009; Iftime & Iftime, 2006; 2007; 2010; 2011; 2013; Strugariu *et al.*, 2009), and an overall view over the distribution of herpetofauna in the Carpathian arch is emerging (Cogălniceanu *et al.*, 2013a; 2013b), more faunistical and long-term studies are needed in order to assess conservation priorities and make possible management activities that would counteract the loss and degradation of habitats.

The Topolog River is one of the tributaries of the Olt River, originating high up in the Făgăraș mountain chain. The uppermost reaches of its valley are comprised in the

Munții Făgăraș Site of Community Interest (ROSCI0122). For this reason, but also because of the known vulnerability of herpetofauna (e.g., Alford & Richards, 1999 for amphibians and Gibbons *et al.*, 2000 for reptiles) and because of the wide protective coverage of amphibians and reptiles by Romanian law, the knowledge of the herpetofauna of the Topolog basin has practical conservation importance.

The herpetofauna of the Topolog drainage basin is poorly studied – the recent review by Cogălniceanu *et al.* (2013b) lists three amphibian species: *Bombina variegata* (Linnaeus, 1758), *Bufo bufo* (Linnaeus, 1758), and *Rana temporaria* (Linnaeus, 1758) on the Topolog valley, all in the same point, while Cogălniceanu *et al.* (2013a,b) indicate the presence of 15 species of herpetofauna: *Salamandra salamandra* (Linnaeus, 1758), *Triturus cristatus* (Laurenti, 1768), *Lissotriton vulgaris* (Linnaeus, 1758), *Ichthyosaura alpestris* (Laurenti, 1768), *Bombina variegata* (Linnaeus, 1758), *Bufo bufo* (Linnaeus, 1758), *Hyla arborea* (Linnaeus, 1758), *Rana temporaria* (Linnaeus, 1758), *Pelophylax* kl. *esculentus* (Linnaeus, 1758), *Lacerta agilis* Linnaeus, 1758, *Podarcis muralis* (Laurenti, 1768), *Zootoca vivipara* (von Jacquin, 1787), *Anguis (fragilis) colchica* (Nordmann, 1840), *Natrix natrix* (Linnaeus, 1758) and *Vipera berus* (Linnaeus, 1758) in a similar habitat on the next valley to the East (the Argeș valley). Our observations from the Topolog River and Topologel stream conclude the first dedicated investigations of the upper Topolog basin.

### Material and Methods

The present survey was conducted on the Topolog and Topologel valleys, in the central part of the Southern Carpathians (Sâna Mare – Mâzgavu – Culmea Marginii Mountains, southern cline of the Făgăraș massif). Data was collected on the 24<sup>th</sup> of August 2008, the 2<sup>nd</sup> of April 2011 and between the 3<sup>rd</sup> and 6<sup>th</sup> of July 2013, along a 30 Km path following the upper course of the Topolog River and one of its tributaries, the Topologel stream. Altitude of the studied area ranged from around 500 m A.S.L. to over 1500 m A.S.L. Taking into consideration the size of the area we collected data from 20 randomly selected sites (Table 1; Fig. 1). Mostly, the areas we investigated were temporary ponds, the rocky banks of the rivers, screes, areas covered with scrubs and the forest edge.

Live individuals were primarily identified via direct observation but some animals were captured by hand and subsequently released back into their habitats. Individuals of the *Pelophylax esculentus* complex were determined according to morphological and chromatic features described in the literature (e.g. Berger, 1966; 1973; Cogălniceanu *et al.*, 2000).

### Results and Discussion

We documented ten species of amphibians: *Salamandra salamandra* (Linnaeus, 1758), *Triturus cristatus* (Laurenti, 1768), *Lissotriton vulgaris* (Linnaeus, 1758), *Ichthyosaura alpestris* (Laurenti, 1768), *Bombina variegata* (Linnaeus, 1758), *Bufo bufo* (Linnaeus, 1758), *Hyla arborea* (Linnaeus, 1758), *Rana dalmatina* (Fitzinger in Bonaparte, 1839), *Rana temporaria* (Linnaeus, 1758), *Pelophylax ridibundus* (Pallas, 1771), the kleptotaxon *Pelophylax* kl. *esculentus* (Linnaeus, 1758), and four species of reptiles: *Lacerta agilis* (Linnaeus, 1758), *Podarcis muralis* (Laurenti, 1768), *Zootoca vivipara* (von Jacquin, 1787), and *Vipera berus* (Linnaeus, 1758) (Figs. 2, 3). According to the data we collected, the most common amphibian species in the area was *Bombina variegata*, found in ten of the twenty sites, while the most widespread reptile species being *Zootoca vivipara*, with presence in six of the twenty sites investigated (Table 1).

**Table 1.** Site records for the amphibian and reptile species identified on the Topolog river basin during the present survey; sites numbers correspond to the ones from Figure 1.

Investigated site no.	Coordinates	Habitat type	Species found
1	45°16'7.57" N 24°31'19.1" E	Deep, permanent ponds with alder thickets in mixed deciduous forest	<i>Lissotriton vulgaris</i> , <i>Bufo bufo</i> , <i>Rana dalmatina</i> , <i>Rana temporaria</i> , <i>Pelophylax ridibundus</i> , <i>Pelophylax kl. esculentus</i> , <i>Lacerta agilis</i>
2	45°20'7.66" N 24°30'50.6" E	Mixed deciduous forest, small ponds	<i>Salamandra salamandra</i> , <i>Rana temporaria</i>
3	45°16'9.71" N 24°30'45.5" E	Mixed deciduous forest, small ponds	<i>Lissotriton vulgaris</i> , <i>Rana dalmatina</i> , <i>Rana temporaria</i>
4	45°21'0.69" N 24°30'44.0" E	Mixed deciduous forest, small ponds	<i>Lissotriton vulgaris</i> , <i>Rana temporaria</i>
5	45°19'57.1" N 24°30'8.55" E	Pond at village edge	<i>Bufo bufo</i>
6	45°21'9.89" N 24°30'26.4" E	Mixed deciduous forest, small ponds	<i>Triturus cristatus</i> , <i>Ichthyosaura alpestris</i> , <i>Bombina variegata</i> , <i>Hyla arborea</i> , <i>Podarcis muralis</i>
7	45°21'38.06" N 24°30'5.75" E	Limestone rocks	<i>Podarcis muralis</i>
8	45°23'11.4" N 24°30'16.7" E	Beech forest with clearings and small ponds	<i>Bombina variegata</i> , <i>Rana temporaria</i> , <i>Lacerta agilis</i> (including <i>erythronotus</i> morph)
9	45°26'37.07" N 24°28'48.1" E	Beech forest	<i>Rana temporaria</i>
10	45°27'26.49" N 24°28'58.9" E	Mixed beech-spruce forest	<i>Zootoca vivipara</i>
11	45°33'34.34" N 24°32'10.68" E	Semi-open area with deciduous shrubs, rocks and logs	<i>Bombina variegata</i> , <i>Bufo bufo</i> , <i>Rana temporaria</i> , <i>Podarcis muralis</i> , <i>Zootoca vivipara</i> , <i>Vipera berus</i>
12	45°27'44.82" N 24°28'47.28" E	Temporary ponds in concrete remains – open area	<i>Ichthyosaura alpestris</i> , <i>Bombina variegata</i>
13	45°27'36.40" N 24°29'4.20" E	Temporary ponds and ditches with water	<i>Bombina variegata</i>
14	45°27'53.46" N 24°30'29.95" E	Temporary ponds and ditches with water	<i>Salamandra salamandra</i> , <i>Bombina variegata</i>
15	45°28'31.73" N 24°31'28.42" E	Semi-open, swampy area with temporary ponds, scattered rocks and logs	<i>Bombina variegata</i> , <i>Bufo bufo</i> , <i>Rana temporaria</i> , <i>Zootoca vivipara</i>

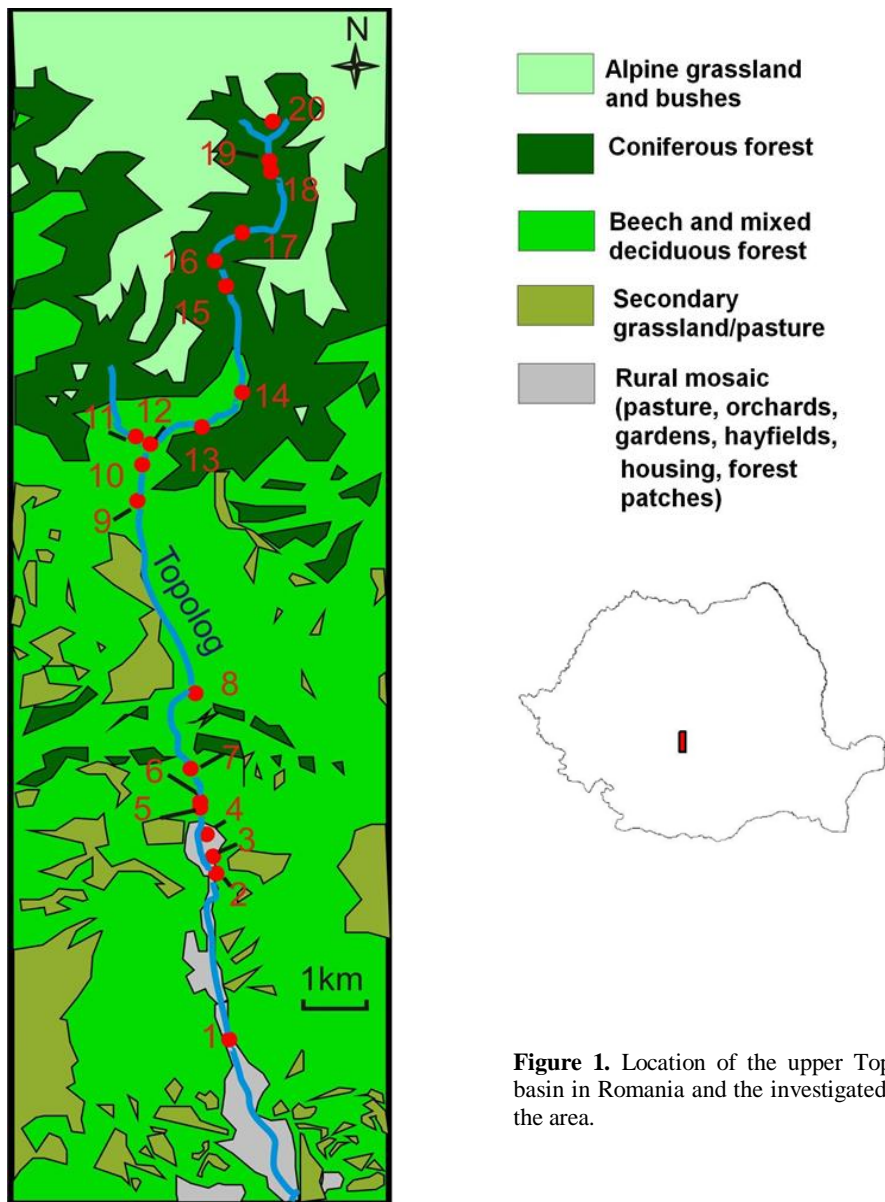
Investigated site no.	Coordinates	Habitat type	Species found
16	45°30'29.52" N 24°31'3.61" E	Temporary ponds and ditches with water	<i>Bombina variegata</i> , <i>Zootoca vivipara</i>
17	45°30'52.85" N 24°30'42.66" E	Temporary ponds and ditches with water	<i>Bombina variegata</i>
18	45°31'32.52" N 24°31'24.60" E	Semi-open area with permanent ponds and scattered logs	<i>Rana temporaria</i> , <i>Zootoca vivipara</i>
19	45°32'33.90" N 24°32'15.18" E	Temporary ponds and ditches with water	<i>Bombina variegata</i> , <i>Rana temporaria</i> , <i>Zootoca vivipara</i>
20	45°32'45.49" N 24°32'8.12" E	Open rocky area with shrubs	<i>Vipera berus</i>

The faunistical list resulting from our data closely mirrors the herpetofauna of the next valley to the east, the Argeş valley, matching the old record of *Hyla arborea* from the Argeş and adding those of two ranid species, *Rana dalmatina* and *Pelophylax ridibundus*, but lacking the Slow-worm (*Anguis (fragilis) colchica*) and the Grass Snake (*Natrix natrix*), which are found on the Argeş. The habitat is, however, favourable for these two species, and we consider that they may be present in the Topolog valley as well, being missed by our survey because of the short time available for detection. Also, comparing the herpetofauna of the Topolog valley to that of its western neighbour, the Cozia massif (for which see Iftime & Iftime, 2006; 2007), we may notice that some thermophilic species (e.g. *Darevskia praticola*, *Vipera ammodytes*) present in Cozia were not found on the Topolog. However, *Rana dalmatina*, which is frequent in Cozia, was also found here; we express the opinion that the colubrid species *Zamenis longissimus*, *Coronella austriaca*, and *Natrix tessellata*, which are found in Cozia, may also occur in the Topolog valley.

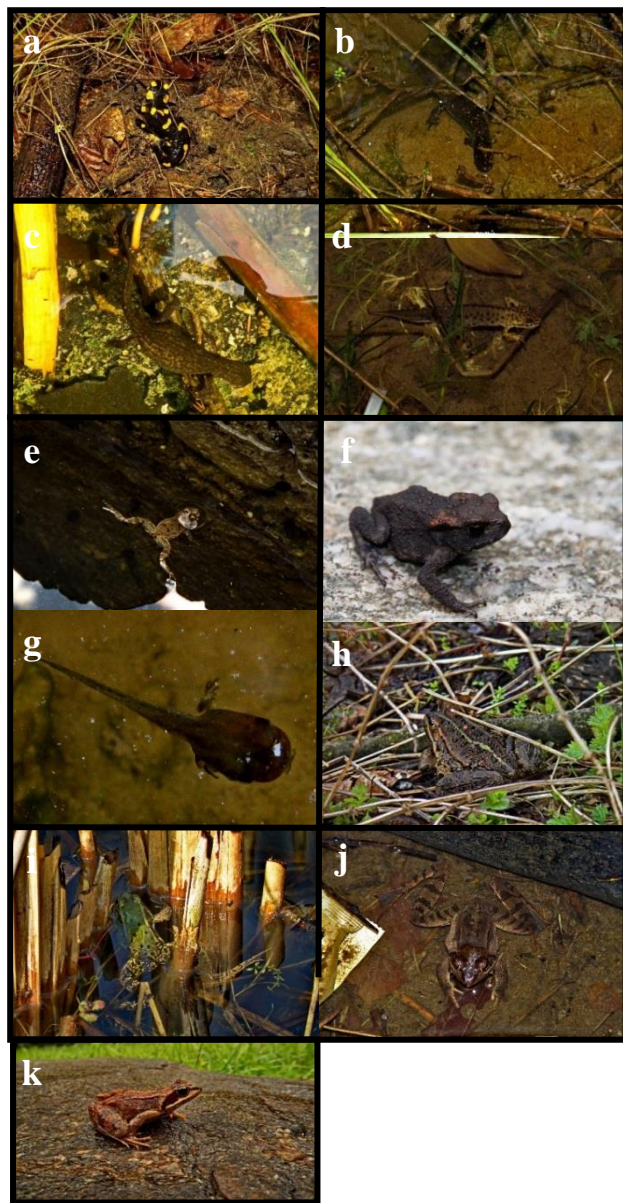
The herpetofaunal assemblage of the Topolog basin is typical for the montane and submontane Carpathian areas. We can also note a clear altitudinal distribution, with less cold-tolerant species such as *Rana dalmatina*, *Pelophylax ridibundus*, and *P. kl. esculentus* concentrated in the lower reaches of our investigated area, while the uppermost stations only harbour typical montane species such as *Bombina variegata*, *Rana temporaria*, *Zootoca vivipara*, and *Vipera berus*.

### Conclusions

Our survey indicates the presence of ten species of amphibians (plus one hybrid form) and four species of reptiles on the Topolog and Topologel valley; however, our observations show the habitats along this river system to be suitable for other reptile species which are found in nearby areas. A more thorough, and long-term, study is needed to construct the full picture of the distribution of the herpetofauna in the area, in order to elaborate measures for their protection.



**Figure 1.** Location of the upper Topolog river basin in Romania and the investigated sites from the area.



**Figure 2.** Specimens of amphibian and reptile species identified on the upper Topolog river basin: a. *Salamandra salamandra* photo P.C. Dincă; b. *Triturus cristatus*, photo Al. Iftime; c. *Ichthyosaura alpestris* photo P.C. Dincă; d. *Lissotriton vulgaris*, photo O. Iftime; e. *Bombina variegata* photo P.C. Dincă; f. *Bufo bufo* photo P.C. Dincă; g. *Hyla arborea*, larva, photo Al. Iftime; h. *Pelophylax ridibundus*, photo Al. Iftime; i. *Pelophylax kl. esculentus*, photo O. Iftime; j. *Rana dalmatina*, photo O. Iftime; k. *Rana temporaria* photo P.C. Dincă



**Figure 3.** Specimens of reptiles species identified on the upper Topolog river basin: a. *Lacerta agilis*, common colour morph, photo Al. Iftime; b. *Lacerta agilis*, *erythronotus* colour morph, photo O. Iftime; c. *Podarcis muralis* photo P.C. Dincă, d. *Zootoca vivipara* photo P.C. Dincă, e. *Vipera berus*, photo P.C. Dincă.

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