Bio-Ecological Data on Amphibians of Thermal Water of Permeti Area (South Albania)

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ABSTRACT

Thermal waters in the region of Permeti are located near Bënja village, along the low watercourse of Lengarica River, about 4.5 kilometers from its joint with Vjosa River.

In this study we have taken into consideration four thermal sources due to their chemical, physical and variety peculiarities. All bio-ecological data gathered from these habitats is compared to other similar data gathered from different check points along the river situated before and after these thermal sources.

The Bënja thermal waters are used for curative purposes (esp. medical ones), so changing the eco – hydrology of these sources; transforming them from sources into ponds, which has a great impact over the thermal water regimes and all living organisms including here and amphibians.

All the data collected from these sources and check points show that these changes are more visible when they are under the influence of temperature changes and sulfur quantity of the water. In three different sources, the water temperature is higher than the river temperature, whereas in the last one, the temperature is lower.

The most distributed genus is Rana genus. We have recorded as the most common species of the thermal waters (Rana balcanica), as a species of high ecological valence.

Keywords: thermal waters, amphibians, Rana balcanica, water eco-hydrology.

Introduction

In the south of Albania, in the Mediterranean hilly area, the valley of Lengarica extends as far as its river with a length of 20 km. The river flows at the village of Kamnik where the two streams of Shalës and Barmash widen into a river, snaking its way along different lithological areas. At its first stretch, the river is narrow and shallow because of the calcareous formation, but further on it widens out along the terogenous rocks. At the very place, where the right stretch of Gostivishti River flows into Lengarica, it snakes towards the south-west, where the calcareous formation is found again. Along the 3 km, the river flows through canyons 100m in depth and 1, 5-2 m in width. Both sides of Lengarica canyon are famous for their great number of caves which are run through by tunnels. Traces of prehistoric habitations are found at one of the left side caves of the canyon. On the way out of this canyon, very close to Bënja village, 4, 5 km far from the flow of Lengarica river into Vjosa, some spa waters burst out of the ground. These springs are closely linked with tectonic faults of palaeogene rocks at both river sides (Kabo, 1990-1991). The springs change according to their water temperature, their flow, conductivity, Ph, saltiness, and chemical elements (Miho *et al.,* 2005). Some physical-chemical analyses are carried out at such components. The use for medical purposes of spa waters has changed ecohydrology and different species of flora and fauna (2006/60/EC, NEA/AKM ed., 1999). Besides, the climate changes, the global warming and the geo morphological changes might cause unpredictable results. Our aim is to analyze the current situation, especially the future evolution of amphibians (Annonimous, 2006, Bego, 2001).
The following figure illustrates the location of Langarica River and Bënja springs (Fig.1).

Materials and Methods

Collection of amphibians in the Permeti area was done according to the classical methods, using a neiln net, whereas their determination was done based on literature of Haxhhiu, (1982) and Anonimous, (2006). The river of Lengarica is easily found in Përmeti, in the south of Albania, along its 8 km, north-east of Përmeti, close to Bënja village. Samples are taken at thermal springs to undergo physical-chemical analyses. These samples are taken at 4 springs, where three out of four, burst out on the left of the river edge, while the fourth, on its right one. The springs are given names according to their therapeutic effects and these names are accompanied with numbers. Such numbers are used during the analysis of the results. 1. The spring of priest. 2. The spring of stomach. 3. The spring of skin. 4. The spring of

rheumatism. The above mentioned samples are analyzed for determining the conductivity, Ph (in various temperatures as illustrated in table 1), and saltiness (Cardoso *et al.,* 2005). The temperature of water is taken at the four analyzed springs.

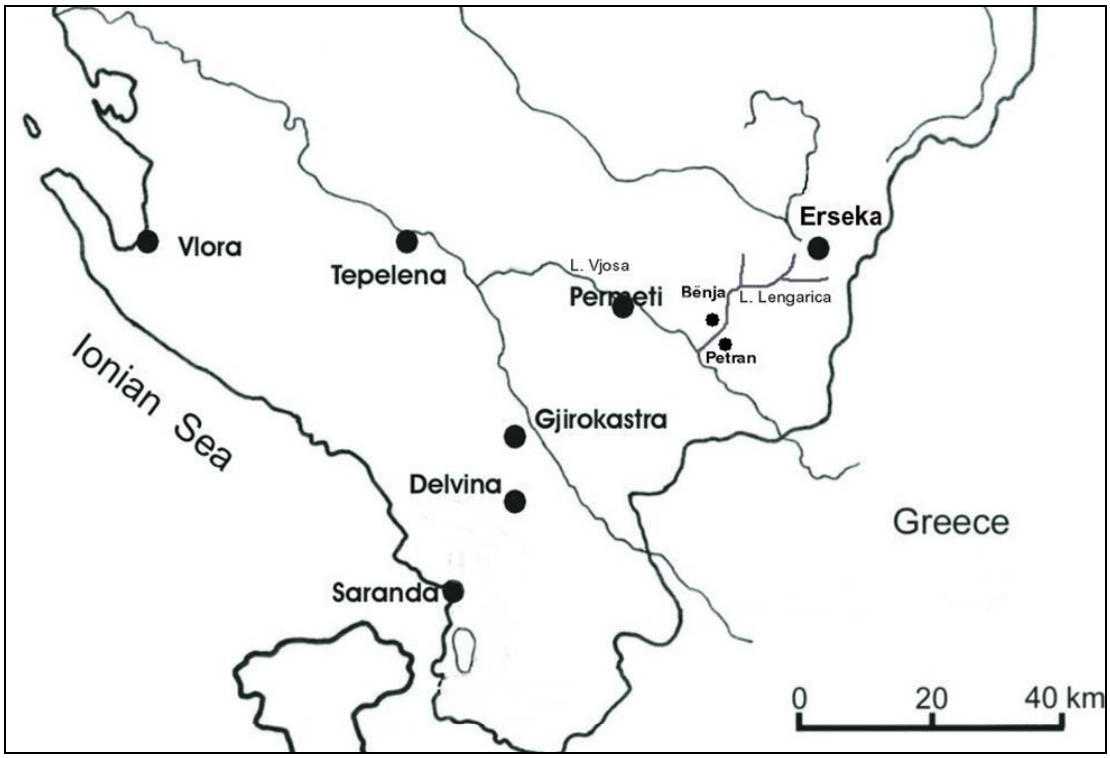

Figure 1. Distribution map of the amphibians in the thermal waters of Permeti area

Results and Discussions

The thermal waters of Langarica contain up to 1700 mg/l mineral substance, mainly NaCl, scarce Ca and a lot of H_2S (Kabo, 1990-1991). The river of Lengarica flows into the Vjosa River at the village of Petran. The water conductivity at the Vjosa River is 405 µS/cm (Paparisto *et al.*, 2008).

The physico-chemical parameters of water, taken in the Langarica tributaries are given in the table 1.

Based on the analyses of collected material, results that two are the inhabit specie of different waters of these areas. According to Haxhiu and Oruci (2004) *Rana graeca* that occurred in this area is a species that grouing in the mountain tributaries, so it can not be found in the lowland tributaries. Two amphibian species of the family (*Ranidae*) particularly (*Rana balcanica* and *Rana graeca*) are common before reaching the thermal springs of Lengarica. Only (*Rana balcanica*) is commonly found only at the thermal waters of springs 1-4. This specie (*Rana balcanica*) is found even after leaving the thermal springs, as well as in the Vjosa River (Haxhiu, 1982).

Differences that exist in different part of the water flow, the clean water before mixer with thermal ones, make and the differences on the specie number. So 2-amphibian specie are living in the upper part of the water flow (clean water), in the contrary with one species in the thermal waters and the down part of the water flow.

Conclusions

The data taken from the physical-chemical analyses of the thermal springs and the presence of (*Rana balcanica*) prove that this specie has got a higher plasticity and ecological valence compared with other frogs of the family (*Ranidae*).

More detailed analyses and studies, including the chromosomal researches should be launched to analyze the links of (*Rana balcanica*) with the biotype.

Table 1: The physico-chemical water parameters of Langarica River.

Sample no. / Parameter	1	2	3	4
conductivitety (µS/cm)	2970	2740	2750	1894
pH	7.3 (21 /^{0}C)	7.4 (19.9/^{0}C)	7.64 (18.8/^{0}C)	7.35 (19.3/^{0}C)
Temperature (spring)	29^{0}C	29^{0}C	29^{0}C	24^{0}C
Salinity (mg/L)	1.4	1.3	1.4	0.8

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