

## ANTHROPOGENIC IMPACT ON *BOMBINA BOMBINA* (L.) POPULATED HABITATS IN THE SOUTH PART OF THE EGLAINE PARISH (ILUKSTE DISTRICT, LATVIA)

Zanda Lisovska<sup>1</sup>, Aija Pupiņa<sup>2</sup>, Mihails Pupiņš<sup>3</sup>

<sup>1</sup>Daugavpils University, Daugavpils, Latvia, zandulis15@inbox.lv

<sup>2,3</sup>Latgales Zoo, Daugavpils, Latvia, <sup>3</sup>Institute of Ecology, Daugavpils University, Daugavpils Latvia

### ABSTRACT

The study was carried out in 2011-2012 in Eglaine parish (Ilukste district), Latvia. Water biotopes, inhabited by *Bombina bombina*, were detected by auditive calculation of vocalizing males. Distance to human settlements, other water biotopes, other *Bombina bombina* vocalizing males' biotopes and roads was determined with the help of ArcGIS program. The data of the study might be used at planning of development of Eglaine parish and other regions of Latvia, in which *Bombina bombina* is distributed.

Key words: *Bombina bombina*, Latvia, anthropogenic impact

### INTRODUCTION

*Bombina bombina* is very rare amphibian in Latvia and in European Union. Bern Convention (Bern Convention, 1979), the EU Council Directive 92/43/EEC (EU Habitats Directive, 1992) and the Latvian law «Protection of species and habitats» (Likums „Sugu un biotopu...”, 2000) are the basis to *Bombina bombina* (L.) protection in Latvia. *Bombina bombina* is found only on the very south of the country, so it is recorded in the Latvian Red Data Book in 1<sup>st</sup> category as a very rare species.

It is very important to save a natural biotopes for *Bombina bombina* and the Plan on conservation of *Bombina bombina* in Latvia (Pupiņš & Pupiņa, 2006) recommends conservation and restoration of these biotopes. Anthropogenic influence on water and terrestrial habitats of *Bombina bombina* (amelioration, use of water, breeding of

fish, etc.) might influence negatively on the quantity of populations of *Bombina bombina*. Roads might be dangerous for *Bombina bombina* during their migration and settling. Therefore the research of anthropogenic impact on *Bombina bombina* populated habitats in the south part of Latvia is actual.

### MATERIALS AND METHODS

The study was carried out in 2011-2012 in Eglaine parish (Ilukste district), Latvia. Water biotopes, inhabited by *Bombina bombina*, were detected by auditive calculation of vocalizing males (Zimmerman, 1994) and marked with the help of GPS Trimble Juno. Distance to human settlements, other water biotopes, other *Bombina bombina* vocalizing males' biotopes and roads was determined with the help of ArcGIS program. *Bombina bombina* habitats were mapped with ArcGIS program. Use of reservoir by people was defined by interviewing (Pupiņa, 2011).

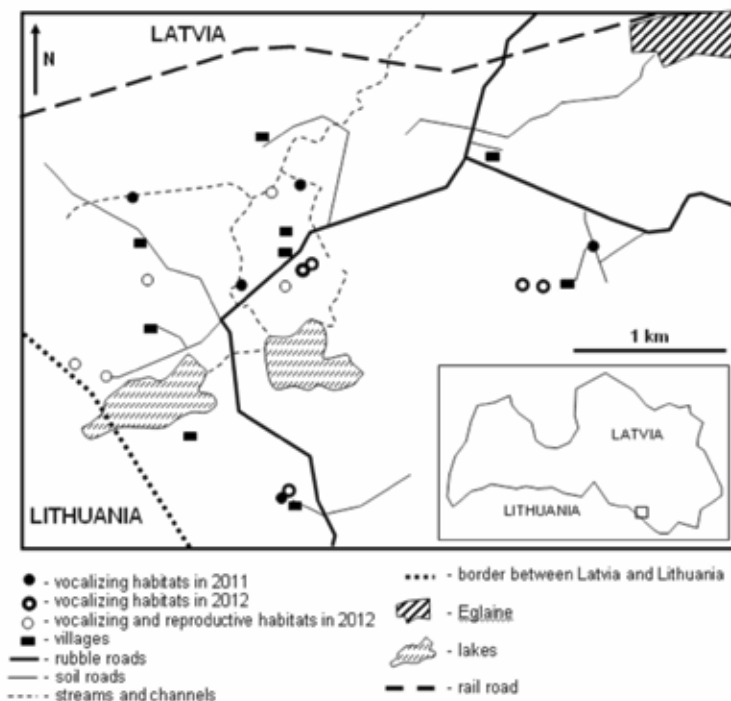


Figure 1. Location of habitats of *Bombina bombina* in agricultural zone in Eglaine parish, south Latvia.

## RESULTS

In the result of the study were registered 19 water bodies inhabited by *Bombina bombina* in Eglaine parish (Figure 1). An average distance from a water body to a rarely used soil road comprised 195 m (standard deviation  $\pm 234$  m); to a rubble road with rare traffic comprised 306 m (standard deviation  $\pm 299$  m); to an asphalt road with busy traffic – 2 396 m (St.dev. $\pm 662$  m).

Distance from the reservoir of *Bombina bombina* to the nearest house comprised in average 279 m (standard deviation  $\pm 368$  m).

In 61% (11 of 18) of different water biotopes, that has been inhabited by *Bombina bombina*, are in use as a cattle drinking place. For garden watering are in use only 11% of these water bodies, but 28% of *Bombina bombina* habitats are not used for agricultural goals. In 2012

year were found 14 active *Bombina bombina* water habitats. The biggest part of them (57%) is used for giving water to cattle, only two reservoirs are used for watering (14%), 29% are not used by people in economic activities.

## DISCUSSION

The results were received after 2 year study's in south part of Eglaine parish. All found *Bombina bombina* habitats are located about 2 km beyond the Latvian-Lithuanian border. In 2011 there was a one grassland biotope near to stream Lasupite, were was found one *Bombina bombina*, but in 2012 year there were not any one. Namely, in 2012 in 6 places were found juveniles. In the 100 m zone around *Bombina bombina* habitats there are farms, houses, soil roads, rubble roads, asphalt roads, and ameliorative channels. There are the habitats where *Bombina bombina* vocalized in 2011 year, but not in 2012 year.

An economical activity of people, undoubtedly, influences the condition of biotopes and, correspondingly, populations of *Bombina bombina*. Thus, on the results of the study, it was noted that minimal distance from inhabited biotope to the asphalt road with busy traffic comprised 1568 m. The data of the study might be used at planning of development of Eglaine parish and other regions of Latvia, in which *Bombina bombina* is distributed, as well as the data will be used at the inspection of the Plan on protection of *Bombina bombina* in Latvia.

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## REFERENCES

Bern Convention, 1979. Bern Convention on the conservation of European wildlife and natural habitats. Official Journal of the European Communities, No. L 038, vol. 25, 10 February 1982, 1-32 pp.

EU Habitats Directive, 1992. Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Official Journal of the European Communities, No. L 206, vol. 35, 22 July 1992, 102-145 pp.

Likums „Sugu un biotopu aizsardzības likums” [The Law “Protection Law of Species and Habitat”]. 2000. Latvijas Vēstnesis, 05.04.2000, nr.121/122,

Pupiņš, M. & Pupiņa, A. 2006. Sarkanvēdera ugunskrupja *Bombina bombina* (Linnaeus, 1761) sugas aizsardzības plāns Latvijā

[Conservation plan of the European Fire-bellied Toad *Bombina bombina* (Linnaeus, 1761) in Latvia] Dabas aizsardzības pārvalde, Latgales Ekoloģiskā Biedrība, Daugavpils, 82 lpp. (In Latvian)

Pupiņa, A. 2011. Sarkanvēdera ugunskrupju *Bombina bombina* L. ekoloģijas īpatnības uz sugas areāla ziemeļu robežas Latvijā [Features of ecology of fire-bellied toad *Bombina bombina* L. On the northern border of the species' area in Latvia]. Promocijas darbs, Daugavpils, Daugavpils Universitāte, 131. lp. (In Latvian).

Zimmerman, B. 1994. The account of voices on the tape transects. Heyer, W. R., Donnelly, M. A., McDiarmid, R. W., Hayek, L. A. C. & M. S. Foster (eds.). Measuring and Monitoring Biological Diversity Standard Methods for Amphibians. Smithsonian Institution Press, Washington, DC, 70-74.