

First case of severe bloatedness in adult common brown frogs *Rana temporaria*

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Bloatedness is an externally visible non-skeletal anomaly describing inflation of the body by gas. This condition is often called 'oedema' (also spelt 'edema') however some authors differentiate between the two, using oedema only for intercellular accumulation of fluids. In a review of the literature, Henle et al. (2017) found 158 cases of bloatedness in over 51 amphibian species although only six of these were definitely caused by gas accumulation. In populations living in healthy environments the prevalence of bloatedness is very low – 0.01 % in 7,175 individuals of *Pseudacris regilla* (Johnson et al., 2001) and 0.09 % in 99,992 individuals of *Bufo bufo* (Wolf, 1994). In 228 *Rana arvalis* adults examined in forest city parks of Yekaterinburg (Russia) the prevalence of bloatedness was higher - 0.44 % - probably due to anthropopressure (Vershinin, 2005). The symptoms are not confined to adult amphibians, as gas accumulation has been reported in the tadpoles of *Lithobates sylvaticus* (Guderyahn, 2006), *Lithobates sphenoccephalus* and *Rana aurora* (Reeves et al., 2013). An interesting and rare instance of bloatedness occurred when a pulmonary nematode *Rhabdias tokyoensis* managed to pierce the lung of the Japanese newts *Cynops pyrrhogaster* allowing air to fill the peritoneal cavity when inhaling. Such newts are severely distended and float at the surface of water (Pfeiffer & Asashima, 1997).

Here we report the first case of severe bloatedness (subcutaneous accumulation of gas) in European common brown frog (*Rana temporaria*). On the 12th May 2016, three bloated *R. temporaria* adult males and five healthy conspecifics were found during 2-3 hours of fieldwork in the polluted outskirts of Bielsko-Biała city, Poland (49° 48'38.1" N, 19° 05'20.6" E). The frogs were encountered near a stream and were syntopic with *Ichthyosaura alpestris*, *Bombina variegata*, *Bufo bufo* and *Salamandra salamandra*. Visible bloatedness in *R. temporaria* covered the whole body (Fig. 1) and the skin on dorsum was unnaturally stretched, cracked and with miniscule grey discolorations. The affected frogs walked awkwardly instead of jumping and we assume that they were preyed upon shortly thereafter. One individual was held in a box for further observation but the next day deflated and died. These frogs may have been bloated since their larval stage (Blaustein et al., 1997) due to genetic and / or environmental factors, in particular contact with polluted pond water during the breeding season. Further



Figure 1. Severely bloated adult male of *Rana temporaria* (left) and a healthy conspecific (right)

investigation is required to explain the cause and prevalence of bloatedness in this population of frogs.

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