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REPORTS

Short review on ecology and distribution of *Microtus tatricus* (Kratochvíl, 1952) in Slovakia

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Microtus tatricus (Tatra vole) is an endemic and pleistocene relict of the Western Carpathians. It was described in 1952 by Kratochvíl from Veľká Studená dolina Valley in the Vysoké Tatry Mountains (Kratochvíl 1952). At first it was classified as a species of genus *Pitymys* McMurtrie, 1831, but currently it is classified as a species of genus *Microtus* Schrank, 1798 and belongs to subgenus *Terricola* Fatio, 1867. Historically, the very first record is from the Early Holocene from the Veľká Fatra Mts. in Slovakia (Dudich *et al.* 1981).

M. tatricus is currently evaluated as Least Concern in the IUCN Red List. It is also listed in the Red List of plants and animals of Slovakia as Vulnerable (Žiak and Urban 2001).

The Tatra vole occupies two distant regions – the western in Slovakia and Poland and the eastern in Ukraine and Romania. *M. tatricus* distribution range is insular and fragmented within each mountain range inhabited (Martínková and Dudich 2003). According to Martínková and Dudich (2003) there are three hypotheses about the species irregular and insular distribution which may be explained in evolutionary history of the species. The first hypothesis is about habitat fragmentation after the glaciation when probably new ecosystems, taiga and boreal conifer forests (Jankovská 1991, Adams and Faure 1997), did not allow interpopulation dispersal. Secondly, *M. tatricus* disappeared from some Carpathian mountains relatively recently and distribution range reduction still continues. In the last one is assumed that *M. tatricus* may occur in mountain ranges where zoological research was not extensively carried out (Martínková and Dudich 2003). The lowest known occurrence is at 600 – 650 m a.s.l. and the highest is at 2,343 m a.s.l. (Martínková and Dudich 2003), with the largest number of collecting sites situated between 1,100 – 1,700 m a.s.l.

In Slovakia the Tatra vole was documented in 10 mountain ranges: High, West and Belianske Tatras, Low Tatras, Oravské Beskydy, Great and Small Fatras, Kremnické hills, Choč hills and Muránska planina (Dudich *et al.* 1981, Martínková and Dudich 2003).

Population density of this species is very low. It ranges from 0,2 to 28,6 individuals/ha (Juchiewicz *et al.* 1986, Kratochvíl and Gaisler 1967, Jurdíková *et al.* 2000). If only the optimal habitat is taken into account, the average population density is 5.7 individuals/ha (Jurdíková *et al.* 2000). No population size fluctuations or population outbreaks are known for the Tatra vole, so it is true K-selected inhabitant of mountains (Happold 1998).

The number of individuals nor species population density did not increase with elevation. But the relative abundance of *M. tatricus* in the assemblage of other small mammals increased significantly with increasing elevation (Jurdíková *et al.* 2000, Martínková and Dudich 2003). According to Jurdíková *et al.* (2000), environmental conditions associated with high altitude such as low temperature, massive and long lasting snow cover, few days of sunshine and short vegetation period suppress the occurrence of other competitors and lead to the increased relative abundance of the Tatra vole.

Optimal habitat is characterized as a habitat where breeding and overwintering of the species occurs (Gliwicz 1989). *M. tatricus* lives in the zone of natural montane spruce forests (Dudich *et al.* 1981), mountain dwarf pine zone (Zima *et al.* 1984) and in the alpine zone (Haitlinger 1981), but it never descends to deciduous forests. According to Jurdíková *et al.* (2000), Tatra vole preferres habitat partially overgrown by talus debris with well developed soil that is capable to hold moisture, but does not support development of *Pinus mugo*. It is characterized by low proportion of stones that usually do not extend 100 cm in diameter. If the dwarf pine and talus debris are reduced, then highland meadow is preferred habitat. In lower altitudes, the species occurs in spruce forests with dense fern undergrowth and numerous fallen logs near streams (Dudich *et al.* 1981, Haitlinger 1981, Štollmann and Dudich 1985). Moisture is a repetitive characteristic of the preferred habitat (Kratochvíl and Gaisler 1967, Dudich *et al.* 1981, Haitlinger 1981, Holišová 1965).

Tatra vole's diet consists almost exclusively of plants and the most frequent compound of its diet are *Homogyne alpina, Chaerophyllum hirsutum*, *Oxalis acetosella* and *Poaceae* (Holišová 1965).

Breeding season lasts from April to August/ September. It starts even under the snow cover (Kratochvíl 1968, 1969). The Tatra vole produces only one filial generation throughout the breeding season. Females become sexually mature usually at weight of 23 g, body length of 100 mm and after overwintering (Kratochvíl 1969). Males also do not attain sexual maturity during the first year of their life. The development of their testes and glandulae vesiculares stagnates until the end of the growing season. The winter is entered by young males which are physically developed and not weakened by reproduction (Kratochvíl 1970). Males and females of

parental generation are eliminated from the population in the second part of the growing season (Kratochvíl 1969, 1970). Sex ratio approaches the theoretical ratio of 1:1 (Kratochvíl 1969, Jurdíková *et al.* 2000). Pregnancy lasts about three weeks (Kratochvíl 1968). Average litter size found by Kratochvíl (1969) is 3 ± 0,08 youngs. Its life-span varies between 15 – 18 months (Kratochvíl 1970).

M. tatricus is morphologically very similar to *Microtus arvalis* (Pallas, 1778) and *Microtus subterraneus* (de Sélys-Longchamps, 1835). The only reliable physical feature for distinguishing *M. tatricus* and *M. arvalis* is the measure of eye, which in *M. tatricus* never exceed 2,5 mm. From *M. subterraneus* it is well distinguished by bigger body measures and by 6 calluses on hind feet instead of 5 (as in *M. subterraneus*) (Anděra and Horáček 2005).

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