

Occurrence of a remarkably extensive neck collar in *Apodemus flavicollis* from western Bohemia, Czech Republic (Rodentia: Muridae)

Výskyt mimořádně rozsáhlého krčního límce u myšice lesní (*Apodemus flavicollis*) ze západních Čech (Rodentia: Muridae)

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Abstract. A specimen of the yellow-necked wood mouse *Apodemus flavicollis* possessing a remarkably extensive neck collar was trapped in the Slavkovský les Protected Landscape Area in November 2018. Some additional specimens with similar colouration were found in collections of the Karlovy Vary Museum. Detailed examination of a large collection of skins revealed considerable variation in neck colouration ranging from a complete absence of the yellow spot to presence of a very extensive yellow collar.

Key words. Mammals, wood mouse, neck colouration, variation.

The presence and shape of yellowish neck spots in wood mice of the subgenus *Sylvaemus* Ognev, 1924 is considered an important diagnostic character, used in the species identification (e.g., LARINA 1958, NIETHAMMER 1969, VORONCOV et al. 1992, ZAGORODNŮK & FEDORČENKO 1993). In particular, when discriminating between *Apodemus flavicollis* (Melchior, 1834) and *A. sylvaticus* (Linnaeus, 1758), the presence of the so-called complete neck collar is regarded as an unambiguous proof of the former species (STEINER 1968, NIETHAMMER 1978).

The complete neck collar is defined as a wide yellowish spot passing through the neck just in front of the forelegs and connecting the rusty-brown fur on both sides of the mouse body. In some cases, the collar possesses a longitudinal stripe in its centre extending several millimetres forward as well as back. In Scandinavia and England this collar is present in almost 100% of individuals of *A. flavicollis*, towards south its percentage decreases (BARRETT-HAMILTON 1900, NIETHAMMER 1978). In central Europe, in most individuals of *A. flavicollis* the collar is present, a small number of individuals have only an oval chest spot not forming the collar, and only exceptionally the spot is missing entirely (NIETHAMMER 1969, own unpubl. data).

The size and shape of the collars vary within a population as well as geographically (URSIN 1956, NIETHAMMER 1969). Most extensive collars were reported from some Norwegian (BARTH 1955, URSIN 1956)



Fig. 1. *Apodemus flavicollis* LN214 (A), LN204 (B), LN215 (C). All specimens were trapped in the studied locality Hloubek near Karlovy Vary on 18–19 November 2018.

Obr. 1. Myšice lesní (*Apodemus flavicollis*) LN214 (A), LN204 (B), LN215 (C). Všechny exempláře byly odchyteny u potoka Hloubek nedaleko Karlových Varů 18.–19. listopadu 2018.

and Swedish (REINVALD 1958) populations; their very broad lateral parts were especially remarkable. In the Bohemian populations of *A. flavicollis*, the collar is usually 8–12 mm long (taken from its cranial to caudal border in the medial axis), lateral parts of the collar are usually much narrower, ca. 4–7 mm (Fig. 1B, C).

During a small mammal trapping session on 18–20 November 2018 we captured five individuals of the yellow-necked wood mouse *Apodemus flavicollis*. One of them possessed a remarkable collar resembling the Norwegian specimen as depicted by BARTH (1955), see Fig. 1A. The place of capture is situated in western Bohemia, between Karlovy Vary and Sedlečko, at the northeastern border of the Slavkovský les Protected Landscape Area in the narrow valley formed by a small stream called Hloubek (right tributary of the Ohře river) with approximate altitude of 400 m a. s. l. (Karlovy Vary Dist., ca. 50.231° N, 12.933° E). A line of fifty snap-traps baited with bacon skin was placed in close vicinity of the boulder bed of the above mentioned stream in a stand of a full-grown ash-alder alluvial forest. The surroundings consist of a mosaic of an old and well-preserved ravine and beech forest with smaller patches of rocks and boulder screes. The locality lies in an area with mild climatic conditions, characterized by the mean annual temperature of 6–7 °C and the precipitations of 600–650 mm (HRNČIAŘOVÁ et al. 2009).

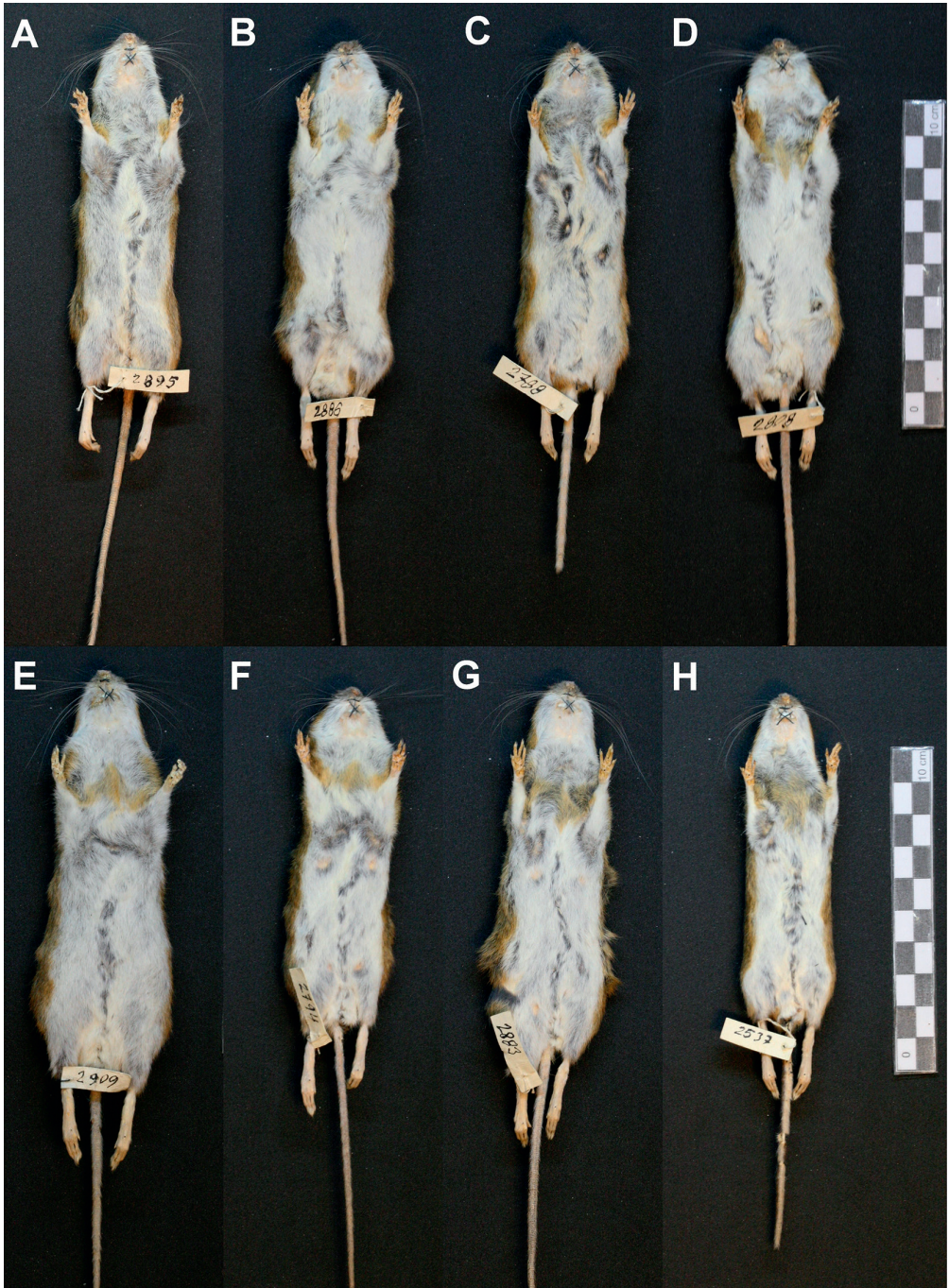
The specimen with a notable collar, No. LN214 was an adult female, its weight was 32 g, head and body length 97 mm, tail length 106 mm, hind foot length 22.5 mm. Length of its collar (taken from its cranial to caudal border in the medial axis) was 20 mm, 9 mm in the narrowest lateral parts.

One of the four other specimens collected in the same place still had a juvenile colouration, the remaining three possessed a complete neck collar. Two of them are depicted in Fig. 1. They are: ♀ adult (LN204), head and body length 92 mm, tail length 100 mm, hind foot length 23.6 mm (Fig. 1B); ♂ adult (LN215), head and body length 96 mm, tail length 105 mm, hind foot length 24.8 mm (Fig. 1C). All these

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Fig. 2. *Apodemus flavicollis* specimens from collections of the Museum Karlovy Vary: Bv2895 (A), Bv2886 (B), Bv2788 (C), Bv2808 (D), Bv2909 (E), Bv2794 (F), Bv2883 (G) and Bv2537 (H). The scale bar = 10 cm (for all individuals).

Obr. 2. Exempláře myšice lesní (*Apodemus flavicollis*) ze sbírek Musea Karlovy Vary: Bv2895 (A), Bv2886 (B), Bv2788 (C), Bv2808 (D), Bv2909 (E), Bv2794 (F), Bv2883 (G) and Bv2537 (H). Měřítko = 10 cm (pro všechny jedince).



five specimens are deposited in collections of the Department of Zoology, Charles University, Prague, Czech Republic.

Zoological collections of the Museum Karlovy Vary contain a sample set of 569 skins of *A. flavicollis* and *A. sylvaticus* collected between 1969 and 1974 by I. BRDIČKA, mostly in the Slavkovský les Mts. and partly also in the western parts of the Krušné hory Mts. and Doupovské hory Mts., i.e., in the regions not far from the locality of capture of our specimens. Among these, we found several additional *A. flavicollis* individuals whose collar resembles that in our specimen LN214. However, detailed examination of all skins revealed a considerable variation in the neck colouration in *A. flavicollis* ranging from the complete absence of the spot (Fig. 2A) through only a small and isolated yellow spot present (Fig. 2B, C) to the complete collar of a various extent. Majority of the skins showed a narrow collar (Fig. 2D–F) but some possessed a large collar (Fig. 2G, H) similar to that of our specimen LN214 (Fig. 1A) or to that of Scandinavian mice described by BARTH (1955), URSIN (1956), and REINVALD (1958).

List of specimens depicted in Fig. 2 (collection number, locality, date of capture, sex, weight, head and body length, tail length, hind foot length, condylobasal length): **Bv2895** – Podlesí, Slavkovský les Mts., 19 June 1973, ♂ adult, 32 g, 106 mm, 106 mm, 23.3 mm, 26.3 mm (Fig. 2A); **Bv2886** – Podleský potok (stream), Slavkovský les Mts., 14 June 1973, ♂ adult, 38.3 g, 111 mm, 112 mm, 25.5 mm, 28.0 mm (Fig. 2B); **Bv2788** – Těšov, Slavkovský les Mts., 8 May 1973, ♂ adult, 27.5 g, 101 mm, def., 23.0 mm, 25.1 mm (Fig. 2C); **Bv2808** – Novina, Slavkovský les Mts., 21 May 1973, ♂ adult, 32.9 g, 107 mm, 113 mm, 24.6 mm, 27.4 mm (Fig. 2D); **Bv2909** – Horní Hrad, Doupovské hory Mts., 1 June 1977, ♂ adult, 49.4 g, 120 mm, 116 mm, 25.0 mm, 27.1 mm (Fig. 2E); **Bv2794** – Malá Libavá (stream), Slavkovský les Mts., 15 May 1973, ♀ adult, 29.3 g, 97 mm, 96 mm, 23.6 mm, 26.0 mm (Fig. 2F); **Bv2883** – Podlesí, Slavkovský les Mts., 13 June 1973, ♀ adult, 43.5 g, 108 mm, 115 mm, 24.4 mm, 26.6 mm (Fig. 2G); **Bv2537** – Mnichovský potok (stream), Slavkovský les Mts., 9 September 1972, ♀ adult, 22.9 g, 98 mm, 105 mm, 24.4 mm, 26.3 mm (Fig. 2H).

The above mentioned set of 569 skins represents only a part of an extensive sample set available in the museum collection, which contains nearly two thousand specimens of the two *Apodemus* species. Only a small number of the specimens were skinned and the skins preserved (see BRDIČKA 1980). We do not know the criteria used for selection of the skinned specimens, therefore we cannot speculate about the proportion of specimens possessing a remarkable collar in the population.

According to our experience based on extensive trapping of *A. flavicollis* in various regions of Bohemia, the occurrence of the above described collars is unique. Although our specimen LN214 and several other specimens found in collections of the Museum Karlovy Vary exhibited conspicuously extensive collars, examination of the skins in collections of the museum as well as our small sample of five captured specimens suggest a continuum between these and mice possessing the “normally” coloured collar (cf. Fig. 2D–F). However, in the future, it would be useful to check a variation in this character also in the west-Bohemian populations neighbouring to the examined population of the northern part of the Slavkovský les Mts.

SOUHRN

V listopadu 2018 byl na území Slavkovského lesa odchyten exemplář myšice lesní (*Apodemus flavicollis*) s nápadně rozsáhlým krčním límcem, přičemž podobně zbarvení jedinci jsou známi především ze Skandinávie. Několik dalších jedinců s podobným límcem odchytených v Slavkovském lese bylo nalezeno i ve sbírkách Muzea Karlovy Vary. Jedná se však jen o jeden okraj poměrně širokého variačního spektra ve zbarvení *A. flavicollis*, od jedinců bez jakékoliv krční skvrny, přes ty, kteří mají jen malou izolovanou skvrnu až po ty, kteří mají tzv. “uzavřený límec” různého rozsahu.

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