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On some "forgotten" samples of small mammals from the Western Tatra Mts – Roháče Mts (Slovakia) (Insectivora, Rodentia, Carnivora)

O několika "zapomenutých" vzorcích drobných savců ze Západních Tater – Roháčů, Slovensko (Insectivora, Rodentia, Carnivora)

Jiří GAISLER[1] & Jan ZEJDA[2]

[1] Institute of Botany and Zoology, Masaryk University, Kotlářská 2, CZ–611 37 Brno, Czech Republic; gaisler@sci.muni.cz
[2] State Plant Protection Administration, Trnkova 103, CZ–628 00 Brno, Czech Republic; jan.zejda@srs.cz

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Abstract. In 1964 to 1974, 511 specimens of 14 mammal species were collected in the Roháče Mts, northern Slovakia, mostly at elevations of 1,000–2,000 m. The following mammalian families and species are represented in the samples, *viz*, Soricidae: *Sorex araneus*, *S. alpinus*, *S. minutus*, *Neomys fodiens*; Talpidae: *Talpa europaea*; Arvicolidae: *Clethrionomys glareolus*, *Chionomys nivalis*, *Microtus subterraneus*, *M. tatricus*, *M. agrestis*; Muridae: *Apodemus flavicollis*; Gliridae: *Muscardinus avellanarius*, *Dryomys nitedula*; Mustelidae: *Mustela nivalis*. In addition, *Eliomys quercinus* was observed on 22 May 1964 in the valley Spálená dolina, 1,520 m a. s. l. Besides its description, an exact drawing of the animal supports the record. Details are given on the sample of 170 specimens obtained in September 1964 by 4,730 trap-nights at elevations of 1,500–2,100 m. Mammals were trapped at the forest upper edge (ecotone) and at higher situated habitats up to the mountain ridge. Alpine vole species, *M. tatricus* and *C. nivalis*, clearly dominate this sample (Table 1). Additional eight samples were obtained mostly within the forest zone and their species diversity and numbers of records per species corroborate previous data on the development of small mammal communities with respect to the ecosystem succession (Kratochvíl & Gaisler 1967). Cranial measurements were recorded of all adult and grown-up individuals of *M. tatricus* and *C. nivalis* trapped in 1964–1974 in the Roháče Mts and available as museum specimens with undamaged skulls. The data are given in Tabs. 2 and 3, together with external measurements and body weights of the same animals as recorded in the field. Although certain biometrics of the specimens may have been included in earlier statistical evaluations (Kratochvíl 1970, 1981), individual measurements of particular specimens have never been published. The purpose of their presentation in this paper is to submit data on rare and not readily obtainable material for future examination.

INTRODUCTION

In the 1960's, Professor J. Kratochvíl, director of the then Institute of Vertebrate Research, CSAS, Brno, built a team to study small terrestrial mammals on the territory of the valley Roháčská dolina in the Western Tatra Mts. In addition to problems of sampling methods dealt with in two short papers (Kratochvíl & Gaisler 1964, Gaisler & Kratochvíl 1966), the main goal of the study was to follow natural succession of small mammal communities. Kratochvíl was inspired by the paper of Grodziński (1959), who investigated the succession by comparing mammal communities on an overgrown clearing and subsequent stages of a mountain forest

existing simultaneously and close to each other. Accordingly, six plots of a *Sorbeto-Piceetum* forest were selected in the Roháče Mts, representing stands of various ages from a clearing grown with trees one to 10 years old up to a forest 100–110 years of age, considered a climax stage. In 1963, small mammal communities inhabiting the plots were sampled by a standardized method and the results were published by Kratochvíl & Gaisler (1967). In addition to the material obtained in 1963, results of a preliminary sampling in 1959–1962 and a sample obtained in 1964 were included as well. The latter sample, however, was only used to complete the knowledge of the spectrum of small mammal species living on the territory in question.

The original goal of the present paper was to publish both qualitative and quantitative data on a sample of small terrestrial mammals obtained in September 1964 in the Roháče Mts by trapping above the upper edge of a continuous forest, at the elevation of ca. 1,500–2,100 m. Kratochvíl himself did not participate in this trapping campaign but delegated the first author of this paper (J. Gaisler) to form a team and organize the field work. Six persons, including the second author (J. Zejda), participated in the work. The results obtained were entered into a field notebook which is still deposited with the collection of the present Institute of Vertebra-

Fig. 1. Professor Kratochvíl and his team in front of a log cabin near Zverovka, Roháče, September 1963. From left to right: Z. Machař (technician), F. Tenora (helminthologist), M. Lichard (microbiologist), M. Klíma (zoologist), J. Kratochvíl (zoologist), J. Šmarda (botanist), I. Toušková (zoologist), and M. Hejnolová (technician).
Obr. 1. Profesor Kratochvíl a jeho tým před srubem nedaleko turistické chaty Zverovka v Roháčích, září 1963. Zleva doprava (bez titulů): Z. Machař (preparátor), F. Tenora (helmintolog), M. Lichard (mikrobiolog), M. Klíma (zoolog), J. Kratochvíl (zoolog), J. Šmarda (botanik), I. Toušková (zoložka) a M. Hejnolová (technička).

te Biology, AS CR, Brno. After having analysed this material, we realized that further samples of small mammals collected in the Roháče Mts in 1964–1974 were also worth considering, although their documentation in field notebooks was less complete. This was probably due to other than faunistical or ecological aims of the field works, such as obtaining material for anatomical, embryological, or caryological studies. In this paper, we describe those samples briefly. Identification of the respective notebooks and names of the organizers of research are given in the next chapter (Material etc.). All persons who took part in the fieldwork, as far as recorded in the notebooks and excepting ourselves, are mentioned in Acknowledgments.

In addition to the basic data of the 1964–1974 samples, we aimed at the biometrics of alpine species *Chionomys nivalis* and *Microtus tatricus*, which can still be regarded as relatively little known. Kratochvíl published three monographs focussed on these vole species, yet the first one could not concern that material because of the publication date (Kratochvíl 1956). The material collected in 1964–1974, or a portion of it, could have been included in further two monographs (Kratochvíl 1970, 1981) but only within the statistical evaluation of samples, not as measurements of particular individuals. In contrast, we give biometrical data of each complete specimen to enable their future use in both ecological and taxonomical studies. Numerous papers by Slovak mammalogists (Kocian et al. 1985, Kocian & Kocianová 2002, Kocianová et al. 2002, Martínková et al. 2004, Žiak et al. 2004, Adamcová 2004, Žiak 2005) are based on recent research of *C. nivalis*, *M. tatricus* and other small mammals in the Western Tatra Mts. Our Slovak colleagues suggested that historical data be presented on small mammal populations comparable with the recent data (Kocian in litt.).

MATERIAL, LOCALITIES, METHODS

The samples comprise 15 mammal species the full generic names of which are given when mentioned for the first time, henceforward by their first letter only. All taxa follow the present nomenclature, regardless of how they were entered into the respective field notebook, e.g. *Microtus tatricus*, not *Pitymys tatricus*. The notebook KR contains data on specimens collected in 1964–1966, other notebooks are specified below.

The first sampling on 16 to 24 June 1964 was done by J. Kratochvíl and his collaborators in spruce forest and dwarf pine habitats in the valley Roháčská dolina at elevations ca. 1,000–1,700 m. Both standard (small) and large snap traps were used, 6,400 trap nights in total, and an unspecified number of live traps. The traps were baited alternatively with a piece of wick soaked in fat and root vegetables, and this method was applied in the second sampling as well. The total number of snap-trapped mammals was 123 (1.8% of trap nights), that of live-trapped 10, with the following distribution among the species: *Microtus subterraneus* 39, *Microtus tatricus* 31, *Clethrionomys glareolus* 21, *Sorex araneus* 18, *Chionomys nivalis* 11, *Microtus agrestis* 8, *Dryomys nitedula* 2, *Muscardinus avellanarius* 1, *Apodemus flavicollis* 1 and *Neomys fodiens* 1. Two species, *D. nitedula* and *N. fodiens*, were recorded by only this sampling. One *D. nitedula* was trapped in a building, probably in the log cabin near Zverovka where the researchers were accommodated, the other in a forest 1,000 m a. s. l. *N. fodiens* was trapped at a brook in the valley Salatínská dolina, 1,400 m a. s. l.

The next sample, most important from the point of view of this study (see Introduction), was obtained by J. Gaisler and J. Zejda plus four researchers on 14 to 23 September 1964. Line trapping with standard snap traps (4,736 trap nights in total) yielded the species *Sorex minutus*, *Sorex alpinus*, *S. araneus*, *C. nivalis*, *M. tatricus*, *M. subterraneus*, *M. agrestis*, *C. glareolus*, *A. flavicollis* and *M. avellanarius* (see Table 1 for details). Except inside a hunting lodge just beneath the forest upper edge, probably in the valley Spálený žlab (Kocian in litt.), all trappings were carried out in various habitats above the tree line in the valleys Spálená dolina and Zadná Spálená dolina, around the tarn Štvrté Roháčské pleso and on the slopes and ridges of Mts Salatín, Rákoň, Zelené and Tri Kopy. The highest situated trap line (75 traps) was set at an elevation of ca. 2050–2100 m but there was a heavy snow-fall the next night. Owing

to that, most traps were lost, yet a female *C. nivalis* was excavated from under the snow close to the first summit of Mt Tri Kopy.

The third sample was obtained on 30 August to 3 September 1966 by J. Kratochvíl and his collaborators, incl. J. Gaisler. Unspecified numbers of live traps were set in the valleys Roháčská and Spálená dolina ca. 1000–1500 m a. s. l. Only specimens that died in traps were entered into the field notebook: *S. araneus* 16, *S. minutus* 1, *C. glareolus* 8, *C. nivalis* 3, *M. tatricus* 2, *M. subterraneus* 1, *A. flavicollis* 2, and *M. avellanarius* 2.

The next sampling was focussed on the beginning of the growing season and was done by J. Kratochvíl, O. Štěrba and V. Hrabě (assisted by technicians?). Trapping, probably using snap traps, was carried out on 24 to 27 April 1968. The results concerning reproduction of small mammals were published by Kratochvíl (1968), other data were either not utilized or incorporated in the data sets for the monographs on *Pitymys* species (Kratochvíl 1970) and *C. nivalis* (Kratochvíl 1981). The bag was obtained in the valley Roháčská dolina in plots II and IV (see Results), ca. 1200–1300 m a. s. l., and consisted of *S. araneus* 9, *S. alpinus* 1, *Talpa europaea* l, *C. glareolus* 21, *C. nivalis* 2, *M. tatricus* 16, *M. subterraneus* 11 and *M. agrestis* 1 (field notebook R).

The following sampling was done by B. Král and V. Králová in October 1968, the exact date not specified. According to the field notebook RO, *S. araneus* 21, *C. glareolus* 20, *C. nivalis* 1, *M. subterraneus* 1, and *A. flavicollis* 4 were snap or live trapped in plot VI in the valley Roháčská dolina and on the bank of the river Orava near Podbiel. Only the name of B. Král is connected with the next three samples from the Roháče Mts (notebook CH). The first trapping was done on 28 April to 5 May 1969, the bag consisted of *C. nivalis* 2, *M. subterraneus* 2 and *M. agrestis* 2, and neither traps nor localities were specified. The second trapping, 9 to 16 June1969, concerned plot VI and a locality on the river Orava near Podbiel. The bag of 24 specimens included *M. subterraneus* 19, *M. agrestis* 3 and *M . avellanarius* 2. The third sampling by B. Král, with both snap and live traps (numbers unspecified), was done in the valley Roháčská dolina and near Oravský Podzámok on 9 to 15 June 1971. In the field notebook, the following localities are specified: environs of the chalet Ťatliakova chata, plots II, III and VI, at a brook (probably Studený potok) and above a waterfall. The bag of 30 specimens consisted of *C. glareolus* 5, *C. nivalis* 2, *M. subterraneus* 8, *M. tatricus* 7, *M. agrestis* 3, *A. flavicollis* 4. A weasel, *Mustela nivalis*, was live trapped. The last sampling in the Roháče Mts was carried out by O. Štěrba, R. Obrtel and V. Hrabě in September 1974. We found neither an exact date nor information about the localities in the respective notebook (CH). The bag consisted of *C. glareolus* 3, *M. tatricus* 1, *M. agrestis* l and *Microtus arvalis* 1. Since the latter species was not recorded in any other sample and the respective specimen was not preserved, we consider the record of *M. arvalis* questionable and exclude it from the evaluation.

Museum specimens of *M. tatricus* and *C. nivalis* collected in 1963–1974 in the Roháče Mts and deposited in the collection of the Institute of Vertebrate Biology were examined. Only adult and fully grown-up individuals were selected and their skulls checked for completeness. Undamaged or nearly undamaged skulls were then measured under a stereo microscope with a vernier calliper (J. Zejda). Data on external measurements and weights of the same specimens were assumed from field notebooks. All measurements are specified in Table 2. To determine male maturity and sexual activity, a testovesicular index (TVI) was calculated as a multiple of testicle and vesicular gland lengths (Hrabě 1972).

RESULTS AND DISCUSSION

During eleven years 1964 to 1974, 87 insectivores, 423 rodents and 1 carnivore, totalling 511 small mammals, were trapped in the Roháče Mts by Brno zoologists. The species are represented by the following number of individuals: *S. araneus* 81, *S. alpinus* 3, *S. minutus* 2, *N. fodiens* 1, *T. europaea* 1, *C. glareolus* 107, *C. nivalis* 58, *M. subterraneus* 114, *M. tatricus* 102, *M. agrestis* 20, *A. flavicollis* 14, *M. avellanarius* 6, *D. nitedula* 2, and *M. nivalis* 1.

The results of the September 1964 sampling are summarized in Table 1. The total number of trapped individuals represents 3.6% of the number of trap nights. Relatively highest (18.8%)

Tab. 1. The main sample according to species and habitats, TN = trap nights, n = individuals, % = individuals in percent of trap nights. Habitats: A – hunting lodge; B – upper forest edge; C – dwarf pine stands; D – brook; E – tarns; F – meadows up to 2,000 m a. s. l.; G – block fields up to 2,000 m; H – ridge above 2,000 m

Tab. 1. Hlavní vzorek podle druhů a prostředí, TN = počet pastí krát nocí, n = počet jedinců, % = n jako % TN. Prostředí: A – lovecká chata; B – horní hranice lesa; C – kosodřevina; D – potok; E – plesa; F – louky do 2000 m n. m.; G – balvanitá pole do 2000 m; H – hřeben nad 2000 m

habitat / prostředí		A	B	C	D	E	F	G	H
TN		16	1200	925	620	300	680	920	75
S. araneus	n	0	11	1	2	1	1	1	0
	%	0	0.9	0.1	0.3	0.3	0.2	0.1	0
S. minutus	n	0	1	0	0	0	0	0	0
	%	0	0.1	0	0	0	0	0	0
S. alpinus	n	0	1	0	1	0	0	0	0
	%	0	0.1	0	0.2	0	0	0	0
C. nivalis	n	0	8	8	2	4	0	14	1
	%	0	0.7	0.9	0.3	1.3	0	1.5	1.3
M. tatricus	n	0	14	10	7	8	2	4	0
	%	0	1.2	1.1	1.1	2.7	0.3	0.4	0
M. subterraneus	n	0	4	1	11	0	16	1	0
	%	0	0.3	0.1	1.8	0	2.4	0.1	0
M. agrestis	n	0	1	0	1	0	0	0	0
	%	0	0.1	0	0.2	0	0	0	0
C. glareolus	n	2	9	6	6	3	0	3	0
	%	12.5	0.8	0.7	1.0	1.0	0	0.3	0
A. flavicollis	n	1	0	0	2	0	0	0	0
	%	6.3	0	0	0.3	0	0	0	0
M. avellanarius	n	0	1	0	0	0	0	0	0
	%	0	0.1	0	0	0	0	0	0
total / celkem	n	3	50	26	32	16	19	23	1
	%	18.8	4.2	2.8	5.1	5.3	2.8	2.5	1.3

was the bag from inside a hunting lodge where two common forest species, *C. glareolus* and *A. flavicollis*, were captured. In contrast, relatively lowest (1.3%) was the bag from a mountain ridge above 2,000 m where only one *C. nivalis* was found in a trap due to unfavourable weather (see Material). For various reasons the two samples A and H are incomparable with the remaining samples and are excluded from further evaluation. Among the samples B to G, that from the environs of the tarn Štvrté Roháčské pleso (E, 5.3%) and from the bank of an unspecified brook (D, 5.1%) show relatively high percentages of trapped mammals. The sample from the upper border of the forest stand (ecotone) in the valley Zadná Spálená dolina (B, 4.2%) ranks third, comprising nine species and thus showing the highest species diversity. In samples B to G, *M. tatricus* is represented by 45 specimens, thus being the most often trapped species. Its relative abundance ranges from 0.3% (meadows) to 2.7% (tarn environs). The second most common species, *C. nivalis*, is represented by 36 specimens with relative abundance ranging from 0.3% (brook) to 1.5% (rock fields), the species was not recorded in alpine meadows. In contrast, *M. subterraneus*, represented by the total of 33 specimens, was most often trapped in meadows

(2.4%). Next comes *C. glareolus* with 27 specimens evenly distributed among various habitats (0.3–1.0%), missing in the habitat meadows only. *S. araneus* was the most common shrew species. The 17 specimens of this shrew are evenly distributed over all habitats though in low numbers (0.1–0.9%). The remaining species are only represented by 1–2 specimens each.

The qualitative (species) and quantitative composition of further eight samples has already been specified under Material etc. We are unable to evaluate this material according to habitats

Fig. 2. Habitat of the snow vole (*Chionomys nivalis*) in the Spálená dolina Valley, with Mt. Tri Kopy in the background, September 1966. Both photos by J. Gaisler.
Obr. 2. Stanoviště hraboše sněžného (*Chionomys nivalis*) na konci Spálené doliny, v pozadí v mracích vrcholky Trech kop, září 1966. Oba snímky J. Gaislera.

Tab. 2. External and cranial measurements of *Microtus tatricus*. Explanations: No. – logo of the notebook and excursion number; G – weight; H+B – head and body length; T – tail length; HF – hind foot length; E – ear length; M – male; TVI – testovesicular index (Hrabě 1972); F – female; gr – pregnant; MC – placental scars; Cb – condylobasal length; LSp – length of splanchnocranium (measured from prosthion to the aboral edge of M^3); DMx – length of the maxillar diastema; Zyg – zygomatic breadth; LMd – maximum length of mandible (measured to the aboral edge of processus angularis); DMd – length of the mandibular diastema. Weight in g, measurements in mm, cranial ones to the nearest 0.1 mm

Tab. 2. Tělesné a lebeční rozměry *Microtus tatricus*. Vysvětlivky: No. – označení protokolu a exkursní číslo; G – hmotnost; H+B – délka těla; T – délka ocasu; HF – délka zadní tlapky; E – výška ušního boltce; M – samec; TVI – testo-vesikulární index (Hrabě 1972); F – samice; gr – březí; MC – děložní skvrny; Cb – kondylobazální délka lebky; LSp – délka splanchnokrania (měřená od prosthionu k zadnímu okraji M^3), DMx – délka horní diastemy; Zyg – zygomatická šířka; LMd – největší délka mandibuly (měřená po zadní okraj processus angularis); DMd – délka dolní diastemy. Hmotnost v gramech, rozměry v mm, u lebečních s přesností 0,1 mm

No.	G	H+B	T	HF	E	M TVI	F	Cb	LSp	DMx	Zyg	LMd	DMd
KR 13	31.5	113	40	17.5	11.5	168			15.3	7.7	14.5	14.5	4.2
KR 38	25.5	114	41	17.0	12.0	80		24.6	15.1	7.7	14.4	14.4	4.1
KR 46	31.5	111	44	18.0	11.0		grMC	25.1	15.3	7.8	14.8	14.3	4.2
KR 47	28.0	109	41	18.0	10.5	121		24.8	14.9	7.7	14.6	14.3	3.6
KR 48	48.0	104	43	17.5	10.5		MC	24.1	14.7	7.5	14.3	14.2	4.1
KR 63	29.5	116	48	18.0	12.0	121		25.3	15.4	8.1	14.7	15.2	4.7
KR 92	26.0	106		17.0	12.0	110		24.7	14.8	7.5	14.4	14.2	3.8
KR 97	24.0	103	37	17.0	13.0		grMC	24.1	14.8	7.2	13.8	14.1	4.1
KR 98	30.5	101		17.5	11.5		gr	23.8	14.9	7.8	13.7	14.6	4.3
KR 100	29.5	112	41	18.0	11.5	108		24.6	15.5	7.5	14.5	14.2	4.1
KR 130	26.0	103	43	18.0	12.0		gr	24.2	15.2	7.4	14.1	14.5	4.1
KR 134	29.5	107	43	17.0	11.0	72 R		24.6	14.9	7.9		14.5	3.9
KR 162	26.0	112	40	18.0	11.0		gr	24.1	15.3	7.5	14.5	14.2	3.8
KR 214	23.5	109	39	17.0	11.0		MC	24.2	14.8	7.4	14.2	13.9	3.8
KR 234	25.0	102	42	17.0	11.0		MC	24.3	15.1	7.5		14.5	4.0
KR 258	24.0	100	40	17.0	11.2	70		24.3	15.1	7.8	14.2	13.8	4.1
RY 31	31.0	111	44	18.5	11.5	120		25.1	15.4	8.1	15.2	14.7	4.3
RY 33	25.0	104	40	18.0	11.5	110			14.3	7.5	14.3	14.1	4.2

due to the lack of pertaining data contained in the respective field notebooks. In these notebooks, trapping localities are often denoted by Roman numbers of study plots. They correspond to the plot labelling in Kratochvíl & Gaisler (1967) where plots I to VI are described in detail and entered in a map. Most often, plot VI was mentioned as the locality trapped in 1964 and later. It was situated at the elevation of 1,150–1,250 m and grown with a stand resembling an old growth forest. The large number of species and the relatively large number of trapped animals correspond to the data in Kratochvíl & Gaisler (l. c.) who recorded the largest number of species and the second largest number of individuals on plot VI. The same number of species (nine) and a still larger number of individuals was recorded on plot I, but that plot was not trapped in 1964 and later. Instead, two other plots were selected. Plot II was grown by patches of *P. abies* 10–20 years old at the elevation of 1,950–1,130 m and there was a permanent brook. Plot III was grown by a dense spruce forest 20–30 years old at the same elevation as plot II. Again, the samples taken in 1964 and later on correspond to the earlier data on the large number of species

(13 on plot II and 11 on plot III) and on the average or low number of individuals (the lowest on plot III from all plots studied) (Kratochvíl & Gaisler l. c.).

Considering all samples obtained in 1964 and later on in the Roháče Mts, the high representation of alpine vole species *M. tatricus* a *C. nivalis* is obvious. This can be due to the frequent trappings at high elevations. In the total material, only *C. glareolus* and *M. subterraneus* were still more numerous. The former species was recorded in a variety of forest or forest-like habitats, which corresponds to its nature as a forest generalist. The latter was most often recorded in habitats corresponding to early stages of forest succession, as far as it can be deduced from the data in the field notebooks. In general, the data underlying this paper correspond to the earlier ones presented by Kratochvíl & Gaisler (1967) and Kratochvíl (1956, 1970, 1981) and to the recent ones obtained by Slovak authors (Kocian et al. 1985, Kocianová et al. 2002, Martínková et al. 2004, Žiak et al. 2004, Adamcová 2004, Žiak 2005). The only major difference seems to be in the extremely low representation of *A. flavicollis* in the 1964–1974 material, compared to both earlier and later samples from the Roháče Mts, the causes of which are unclear.

In addition to specimens collected, the field notebook KR contains an observation and drawing concerning a species not recorded by trapping. On 22 May 1964 at 11:30 a.m., M. Klíma (Brno) and M. C. Saint-Girons (Paris) observed a dormouse, *Eliomys quercinus*, in the valley Spálená dolina near a small tarn at the elevation of 1,520 m, where the yellow and blue marked tourist pathways meet (or did so at that time). That tarn was probably Zelené pleso below Mt Predné Zelené (Kocian in litt.). The dormouse was observed from a distance of two metres as it climbed down a shrub (dwarf pine?), ran slowly across an open space and climbed up another shrub. Its distinct species-specific characters were recorded, namely the grey brownish upper parts, large eye, black stripe from eye to ear, and the enlarged black and white tail tip. Its tail appeared to be longer than head and body. We consider the description and species determination by two experienced zoologists reliable. Furthermore, M. Klíma, now professor emeritus of human anatomy, is a well-known artist and illustrator. To our knowledge, this observation has not been published so far. According to Anděra & Horáček (1982), the species was mentioned "in earlier reports from Orava". The authors do not quote the source of that information. Very likely, however, it had been adopted from Kocyan, a well known naturalist who worked in the region of Orava in the second half of the 19th century. The following is the statement by Kocyan (1888) about the garden dormouse, referred to as *Myoxus quercinus*: "*Sehr selten. Ich habe während 24 Jahren nur zwei Exemplare aus dem Hochgebirge bekommen*". Although no particular locality can be inferred from the term "Hochgebirge" (high mountains), it implies occurrence at high elevations (Kocian in litt. – by the way, Kocian is the grandson of Kocyan). Therefore, the observation by Klíma and Saint-Girons is not as unlikely as it could appear at first sight.

The external and cranial measurements of adult and grown up individuals of *M. tatricus* and *C. nivalis* available as museum specimens are given in Tables 2 and 3. In two *M. tatricus* and three *C. nivalis*, the zygomatic breadth could not be reliably determined and in one *C. nivalis* the maximum length of mandible was undeterminable. The skulls of other specimens were complete. Of the total number of animals trapped, only a small percentage could be used in this respect, viz., 17.6% of *M. tatricus* and 37.9% of *C. nivalis*. On the one hand, this reflects the low representation of fully adult individuals in the sample and, on the other, the unsuitability of commercial snap traps that damage skulls of captured animals. All measurements presented in Tabs. 2 and 3 lie within the minimum-maximum range known in adults of the two species (cf. Kratochvíl 1970, 1981) and they corroborate the species-specific status of the two taxa. The data are designed for future analyses and the specification of each specimen has to assist

Tab. 3. External and cranial measurements of *Chionomys nivalis*. For explanations see Tab. 2
Tab. 3. Tělesné a lebeční rozměry *Chionomys nivalis*. Vysvětlivky u tabulky 2

No.	G	H+B	T	HF	E	M TVI	F	Cb	LSp	DMx	Zyg	LMd	DMd
KR 13	31.5	113	40	17.5	11.5	168			15.3	7.7	14.5	14.5	4.2
KR 119	52.0	123	61	20.5	18.0		grMC		17.7	9.5	17.1	17.9	5.7
KR 120		115	61	21.0			MC	28.8	17.3	9.0	17.1	18.1	5.7
KR 121	53.0	123	56	21.0	16.0		gr	28.6	17.4	9.1	16.7	16.5	4.5
KR 122	58.5	126	54	21.0	16.0		MC	28.7	16.9	9.1		17.1	5.2
KR 124	49.5	125	54	21.5	16.5	255		28.7	17.1	8.3	17.1	17.1	4.7
KR 125	58.5	130	61	21.0	16.0	224		29.1	17.2	9.2	17.2	17.1	4.9
KR 132	49.0	126	64	21.0	16.0	182		29.1	17.2	9.3	16.5	16.7	4.5
KR 145	53.5	125	61	21.0	16.0	75 R		30.2	17.7	9.3	16.9	17.6	4.9
KR 157	43.0	119	53	21.0	16.0		MC	27.9	16.8	9.1	16.1	17.2	4.7
KR 173	42.0	117	55	21.0	17.0		MC	28.2	16.9	9.1	16.6	16.8	4.7
KR 190	46.0	124	62	21.0	16.5		MC	29.1	17.3	9.1	16.7	16.5	4.8
KR 199	48.0	123	60	20.4	15.8		MC	29.1	17.5	9.3		17.1	5.1
KR 217	41.5	119	54	21.0	18.0	6 R		27.9	16.4	8.4	16.1	16.2	4.7
KR 262	46.5	115	62	20.0	16.0		MC	28.1	17.2	8.8	16.2	16.8	4.8
KR 299	56.5	122	57	21.0	19.0		MC	30.5	18.4	9.3	17.5	17.7	4.7
CH 286	42.5	123.5	58	20.5	16.8		MC	29.1	17.1	9.4	16.4	17.8	5.1
CH 293	43.0	128.5	59,5	20.8	16.8		gr	29.2	17.5	9.4	16.8	16.6	5.2
RY 89	54.0	115	54	19.0	18.0	120			17.1	9.1		16.7	4.7
RY 122	58.0	126		19.0	15.0	162		30.1	17.7	9.8	16.7	16.7	5.7
RY 125	54.0	116	57	21.0	15.0	224		28.5	16.8	9.3	16.7	16.7	4.7
RY 167	54.0	117	60	20.0	16.0		MC	28.2	16.9	8.5	16.4		3.5
RY 174	60.0	121	67	20.0	17.5		gr	30.1	17.5	9.4	16.7	17.1	5.1

researchers who wish to use more sophisticated methods (epigenetic, molecular, etc.) to locate the material in the collection.

SOUHRN

V letech 1964 až 1974 bylo v Roháčích na severním Slovensku, většinou v nadmořských výškách 1000–2000 m, uloveno 511 jedinců 14 druhů savců. Ve vzorcích jsou zastoupeny tyto čeledě a druhy: Soricidae: *Sorex araneus*, *S. alpinus*, *S. minutus*, *Neomys fodiens*; Talpidae: *Talpa europaea*; Arvicolidae: *Clethrionomys glareolus*, *Chionomys nivalis*, *Microtus subterraneus*, *M. tatricus*, *M. agrestis*; Muridae: *Apodemus flavicollis*; Gliridae: *Muscardinus avellanarius*, *Dryomys nitedula*; Mustelidae: *Mustela nivalis*. Kromě toho byl 22. 5. 1964 pozorován ve Spálené dolině, 1520 m n. m., živý jedinec *Eliomys quercinus*. Pro věrohodnost pozorování svědčí nejen popis, ale i zdařilá kresba zvířete. Podrobně je zhodnocen vzorek 170 jedinců drobných savců získaný v září 1964 v nadmořských výškách 1500–2100 m odchytem do sklapovacích pastí (4730 pastí × nocí). Pasti byly kladeny při horním okraji smrkového lesa (ekotonu) a ve vyšších polohách až po hřebeny. Ve vzorku zřetelně dominují vysokohorské druhy hrabošů *M. tatricus* a *C. nivalis* (tab. 1). Dále jsou podány základní informace o složení jiných osmi vzorků z Roháčů. Tyto odchyty do sklapovacích nebo živolovných pastí byly většinou provedeny v pásmu lesa *Sorbeto-Piceetum* a jejich složení potvrzuje dřívější poznatky o vývoji populací drobných savců během sukcese tohoto ekosystému (Kratochvíl & Gaisler 1967). Ze sbírkového materiál druhů *M. tatricus* a *C. nivalis* z téže oblasti a období byly vybrány nepoškozené lebky dospělých a plně dorostlých kusů. Zjištěná kraniometrická data spolu s tělesnými rozměry a údaji o váze přejatými z terénních protokolů jsou uvedena v tab. 2

a 3. Tento materiál mohl být částečně či zcela zahrnut v dřívějších publikacích (Kratochvíl 1970, 1981), ale jen v rámci statistického hodnocení souborů, rozměry jednotlivých kusů publikovány nebyly. Cílem jejich zveřejnění je poskytnout data o vzácném a nesnadno získatelném materiálu pro pozdější analýzu.

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