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Distribution, skull morphometrics and systematic status of an isolated population of *Apodemus microps* (Mammalia: Rodentia) in NW Bohemia, Czech Republic

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Abstract. An extensive series of owl pellets collected in Bohemia between 1974–1981 revealed an isolated population of the pygmy field mouse, *Apodemus microps* Kratochvíl et Rosický, 1952 near the town of Žatec, NW Bohemia. The population's distribution was confined to 25 localities, all within an area of ca. 25×20 km. The region is nearly without woods and strongly agricultural. Altitude ranges mostly between 220–300 m (375 m exceptionally) and the climate is relatively dry and moderately warm. This represents the westernmost population of *A. microps* known, being 190 km from the nearest known Polish population and 230 km from a neighbouring southern Moravian population. One skull and three molar measurements from this population were compared with those from a sample composed of specimens of the nominotypic subspecies from S. Moravia and S. and E. Slovakia. Univariate as well as PC and DF analyses revealed highly significant differences; these suggest a distinct systematic position for the Bohemian population, described here as *Apodemus microps cimrmani* ssp. n.

Taxonomy, skull morphometry, distribution, new subspecies, Rodentia, Muridae, *Apodemus*, Palearctic region

INTRODUCTION

Barn owl (*Tyto alba*) pellets were collected in NW Bohemia, Czech Republic, between 1974–1981. By inspecting church lofts and towers, castles and other buildings suitable for the presence of the Barn owl, we obtained more than 130 pellet samples from 123 localities spread over an area of ca. 2,200 km^2. Five geographical units (as defined by Balatka et al. 1973) were covered entirely (i. e. Žatecká pánev, Házmburská tabule, Rakovnická pahorkatina, Žihelská pahorkatina and Džbán) also included were adjacent parts of some neighbouring geographical units (Kralovická tabule, Doupovské hory, Kladenská tabule, Chomutovsko-teplická pánev, Milešovské středohoří and Řípská tabule).

Owl pellet analysis revealed the presence of the skull remains of a very small *Apodemus* species which was, according to its molar size and the specific shape of the infraorbital foramen (cf. Cais 1978) identified as the pygmy field mouse, *Apodemus microps* Kratochvíl et Rosický, 1952. In 1979, identification was confirmed by the trapping of specimens.

During the last ten years various Latin names have been suggested for the pygmy field mouse, e. g. *A. uralensis* (Pallas, 1811), *A. mosquensis* (Ognev, 1913), *A. ciscaucasicus* (Ognev, 1924) and *A. volhynensis* (Migulin, 1938). Because there is still no agreement over the validity of these (cf. Voroncov et al. 1992, Orlov et al. 1996, Meždžerin 1997) I prefer to use the traditional name *A. microps* for central European populations, before the thorough taxonomic revision will be available.

The aims of the present paper are: (1) to describe in detail the area of distribution of the westernmost isolate of the pygmy field mouse, (2) to make morphometric comparisons of this

Tab. 1. Number of all mammals, all *Apodemus* (*A.* sp.), all identified *Apodemus microps*, all identified *A. sylvaticus* + *A. flavicollis*, and percentage of *A. microps* among identified *Apodemus* spp. in individual samples

	locality	number of				%
		mammals	*A.* sp.	*A. m.*	*A. s.* + *A. f.*	*A. m.*
1	Kadaň	62	9	1	2	33
2	Soběsuky	1543	85	1	56	2
3	Břežany	393	24	2	9	18
4	Libědice	152	10	2	6	33
5	Žabokliky	645	51	7	24	23
6	Žatec	718	51	11	24	31
7	Radonice	1030	39	11	15	42
8	Zahořany	26	3	1	1	(50)
9	Vilémov	26	2	2	–	(100)
10	Mašťov (a)	112	15	2	10	17
	Mašťov (b)	621	45	3	21	13
	Mašťov (c)	598	69	13	33	28
11	Podlesice	920	67	20	28	42
12	Veliká Ves	286	5	1	1	(50)
13	Zlovědice	536	10	3	3	50
14	Vysoké Třebušice	592	33	18	5	78
15	Buškovice	1047	71	30	31	49
16	Podbořany	379	36	4	14	22
17	Letov	955	117	44	32	58
18	Pšov	638	21	2	9	18
19	Radičeves	858	66	26	6	81
20	Milčeves	843	39	5	18	22
21	Blšany	749	33	7	21	25
22	Soběchleby	1543	85	1	56	2
23	Želeč	324	42	2	22	8
24	Vroutek	720	60	1	32	3
25	Bílenec	335	68	2	46	4
	Σ	15553	1106	222	496	30.9

population with conspecifics from south Moravia and south and east Slovakia, and (3) to check its systematic position.

MATERIAL AND METHODS

Barn owl pellets were analysed by hand. All mammal skulls and lower jaws were identified and counted; the number of individuals of a species being taken as the highest value from the number of skulls and left and right lower jaws in a sample. In *Apodemus* skulls, discrimination between *A. microps* and the two other species present in the area (*A. sylvaticus* (Linnaeus, 1758) and *A. flavicollis* (Melchior, 1834)) is easy according to the shape of the infraorbital foramen as described by Cais (1978). This character is usually well preserved – even in heavy damaged skulls. Identification of lower jaws that have been separated from skulls is difficult and often impossible when the molars are missing. Unfortunately, in barn owl pellets, and especially in older and partly decomposed ones, the number of *Apodemus* lower jaws practically always predominates over the number of skulls. Therefore, representation of *A. microps* in the sample was given as the relation between the number of identified skulls of *A. microps* and other two *Apodemus* spp. The number of all *Apodemus* specimens counted according to the number of lower jaws present is denoted as *Apodemus* sp. (cf. Tab. 1).

For morphometric evaluation I used skulls (mostly heavy damaged) obtained from barn owl pellets from NW Bohemia and also the skulls of specimens trapped in east and south Slovakia and south Moravia.

The Bohemian sample consisted of 173 skulls from 20 localities, i. e. from all those given in Tab. 1 with exceptions of localities 8, 12, 15, 21 and 25. From eastern Slovakia I measured skulls from Šaca near Košice (4 spec.), Haniska (7), Královský Chľmec (1), Viničky (near Slov. Nové Mesto) (1), Veröske (Slovak Karst) (1),

Domica (3), Turňa n. Bodvou (2), Rimavská Sobota (2), Lúčky (near Michalovce) (1) (n = 22). From south Slovakia, I had skulls from Čalovo (3), Nové Zámky (l) and Dunajská Streda (1) (n = 5). From south Moravia, measured skulls from Lužice and Josefov (near Hodonín) (17), Čejkovice (12), Lednice (26) and Vlasatice (7) (n = 62). Mice from Slovakia were collected between 1953 and 1962, those from south Moravia in 1961 and 1977. Material from Bohemia is deposited in the pellet collection of the Department of Zoology, Charles University, Praha, under sample Nos 130–308. Skulls from Slovakia and Moravia are housed in the Institute of Vertebrate Biology, CAS, Brno, under Nos 373–772.

As the skulls obtained from owl pellets were heavy damaged, only four measurements were used for morphometric evaluation:

1. Length of the maxillary molar row (M^1–M^3)
2. First upper molar length (M^1L)
3. First upper molar width (M^1W)
4. Foramina incisiva length (FI)

Measurements were taken under a stereomicroscope with use of the calliper to a precision of 0.1 mm in FI and 0.05 mm in all other measurements. Molar measurements were taken on the crowns of the molars as the maximum distance on the longitudinal (M^1–M^3, M^1L) or perpendicular (M^1W) tooth axes. Only molars from the left side of the skull were used, in FI only the left foramen was measured. Age groups were assessed according to molar abrasion as suggested by Steiner (1968).

In the description of the type series (Tab. 3) further measurements and body weights were noted: body weight (W); head and body length (L) – taken from the snout to the anal orifice; tail length (T) – taken from the anal orifice to the tail tip; hind foot length (HF) – taken without the claws; ear length (E), condylobasal length (CBL); zygomatic width (ZG); rostral length (I^1–M^3) – taken as the distance between the prosthion and the most aboral point on the crown of the left upper M^3, as suggested by Tvrtković (1976).

Morphometric data were subjected to Discriminant Function Analysis (DFA) and to Principal Components Analysis (PCA) using Statgraphics (release 5.0) and Statistica Analysis System (release 6.0).

RESULTS AND DISCUSSION

1. Distribution of *Apodemus microps* in NW Bohemia

In central Europe the pygmy field mouse inhabits two major areas, i. e. the lowland part of southern Poland and the Pannonian Basin (Mitchell-Jones et al. 1999). These regions are separated by the Carpathians and the north Moravian mountains (Fig. 1). From the north individual populations penetrated southwards into the northern Moravian lowlands (Zejda et al. 1962) and, from the south, northwards into the river valleys of Slovakia (Kratochvíl 1962, Dudich & Štollmann 1979) and to the south- and central Moravian lowlands (Holišová et al. 1962). Isolated populations of unclear origin were also found along the upper forest border in the Tatra Mts (Mošanský 1962, Zima et al. 1984, Haitlinger 1990).

The occurrence of *A. microps* near the town Žatec in NW Bohemia was mentioned already by Kratochvíl (1962). Analysis of barn owl pellets collected in the period 1977–1980 in this region revealed the presence of this rodent in samples from 25 localities (Fig. 2). However, other samples collected between 1974 and 1981 at 98 localities spread over an extensive area of NW Bohemia did not contain *A. microps*. Similarly, *A. microps* was not found in numerous barn owl pellet samples collected between 1978 and 1980 in the valley of the Ohře river, further to the west (Vohralík & Lazarová 1998).

A list of localities and sampling sites where owl pellets containing *A. microps* skulls were found (Fig. 2) includes: (1) Kadaň, monastery, square 5645 of the faunistic grid mapping system (see Buchar 1982, for details), altitude 300 m, date of collection 14. 2. 1980. (2) Soběsuky, church and rectory building, 5646, 265 m, 9. 3. 1978. (3) Břežany, church, 5646, 225 m, 13. 7. 1978. (4) Libědice, church, 5646, 255 m, 13. 7. 1978. (5) Žabokliky, church, 5647, 247 m, 13. 7. 1978. (6) Žatec, evangelical church, 5647, 260 m, 8. 3. 1978. (7) Radonice, church, 5745, 320 m, 16. 8. 1979. (8) Zahořany, church, 5645, 290 m, 16. 8.1979. (9) Vilémov, church, 5645, 295 m, 13. 7. 1978. (10) Mašťov, 5745, (a) small church, (b) large church near the rectory, (c) castle, 350–375 m, 2. 3. 1978. (11) Podlesice, church,

5745, 295 m, 16. 8. 1979. (12) Veliká Ves, church, 5746, 275 m, 16. 8. 1979. (13) Zlovědice, church, 5746, 290 m, 15. 8. 1979. (14) Vysoké Třebušice, church, 5746, 290 m, 15. 8. 1979. (15) Buškovice, church, 5746, 340 m, 15. 8. 1979. (16) Podbořany, church of the Czech Brethren, 5746, 320 m, 1. 2. 1978. (17) Letov, church, 5746, 345 m, 13. 7. 1978. (18) Pšov, church, 5746, 320 m, 15. 2. 1980. (19) Radičeves, church, 5747, 275 m, 9. 3. 1978. (20) Milčeves, bell-tower, 5747, 285 m, 12. 11. 1979. (21) Blšany, church, 5746, 280 m, 15. 2. 1980. (22) Soběchleby, church, 5747, 290 m, 4. 6. 1979. (23) Želeč, church, 5747, 340 m, 31. 1. 1978. (24) Vroutek, the southernmost of two churches, 5846, 330 m, 15. 12. 1977. (25) Bílenec, church, 5846, 350 m, 15. 12. 1977.

The survey of localities where pellet samples did not contain *A. microps* skulls (Fig. 2): 5546 Údlice, Přečaply; 5645 Kadaň (church near rectory building); 5646 Nové Sedlo; 5647 Bitozeves, Hořetice, Libočany, Minice, Nehasice, Vysočany, Žiželice; 5745 Nepomyšl; 5746 Mory; 5747 Deštnice, Holodeček, Siřem; 5845 Libyně, Lubenec, Skytaly; 5847 Běsno, Děkov, Hořovičky, Kněževes, Kolešovice, Vrbice.

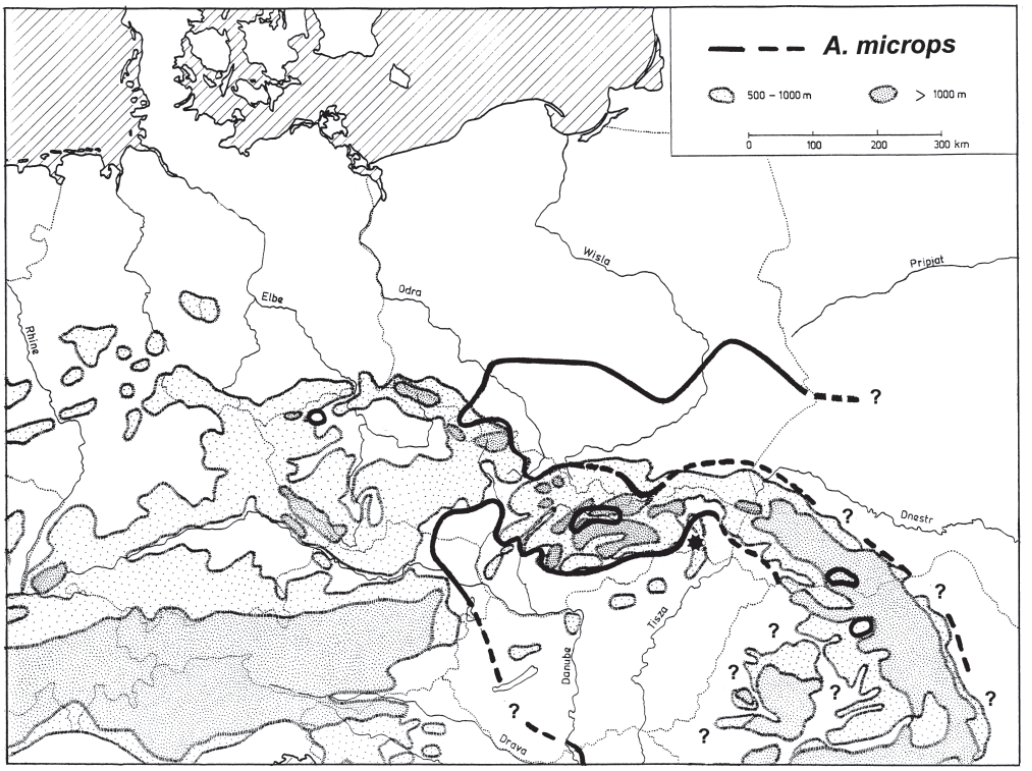

Fig. 1. Distribution of *Apodemus microps* in central Europe, compiled from data of Kratochvíl (1962), Holišová et al. (1962), Mošanský (1962), Zejda et al. (1962), Hamar et al. (1966), Steiner (1978), Dudich & Štolmann (1979), Ruprecht (1983), Zima et al. (1984), Haitlinger (1990), Petrov (1992), Kiseljuk (1993), Reiter et al. (1997), and Heroldová et al. (1998). Location of isolated Bohemian population is based on own data. Distributions in Ukraine and Romania should be considered as tentative. The type locality of the species is indicated by an asterisk.

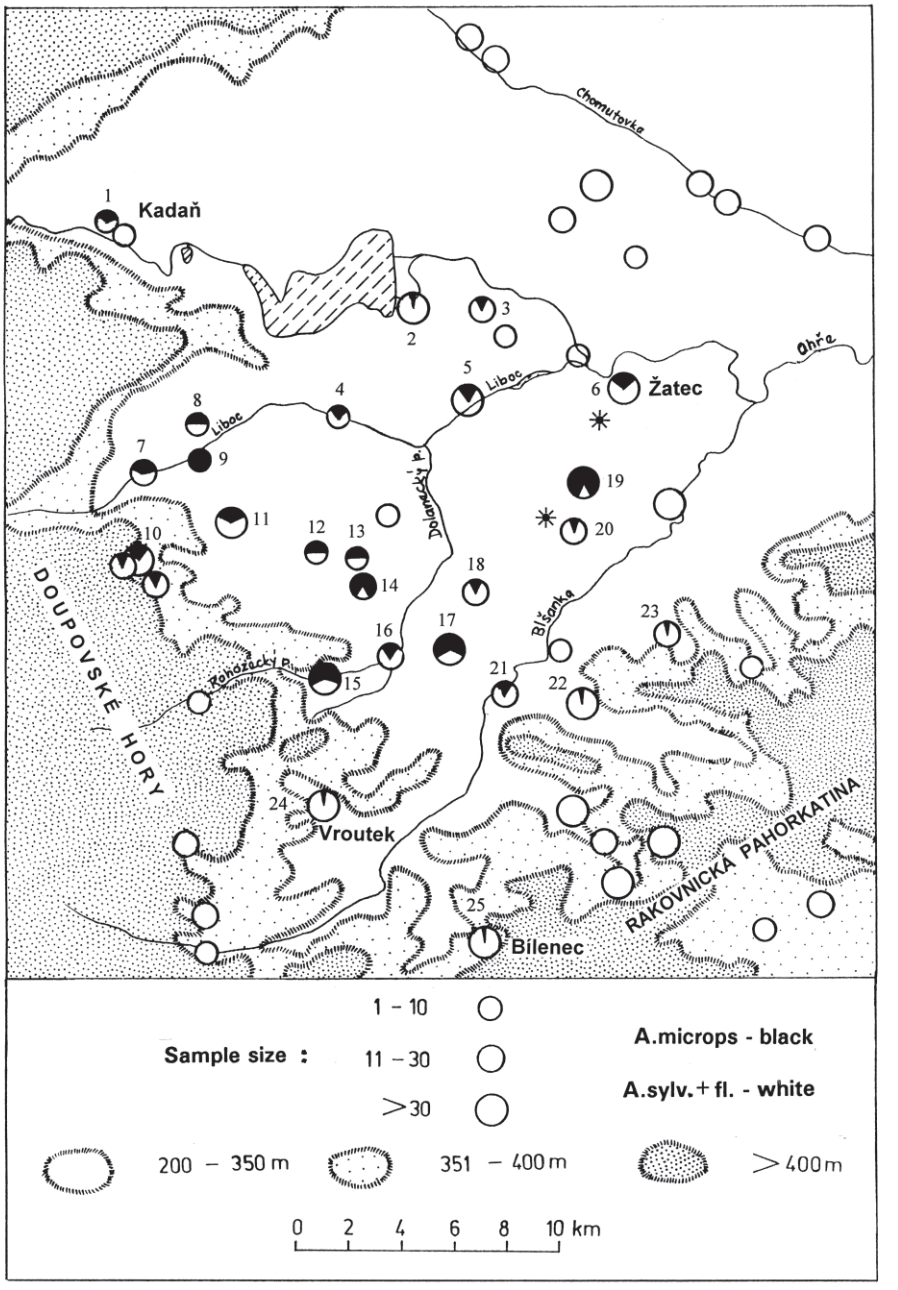

Fig. 2. Distribution area of isolated population of *Apodemus microps* in NW Bohemia. Black and white sectors in a ring depict the ratio between identified skulls of *A. microps* and *A. sylvaticus* + *A. flavicollis* in a pellet sample. For locality names and other information see Results and Tab. 1. Asterisks indicate sites where specimens were trapped.

Tab. 2. Standard descriptive statistics for samples of *Apodemus microps* studied (B = Bohemia, M+S = Moravia and Slovakia) – for measurement abbreviations see text

measurement	FI		M^1–M^3		M^1L		M^1W	
sample	B	M+S	B	M+S	B	M+S	B	M+S
n	125	89	162	89	173	89	173	89
mean	4.79	4.50	3.20	3.36	1.54	1.72	1.01	1.11
minimum	4.4	4.0	2.90	3.10	1.35	1.55	0.90	1.00
maximum	5.4	5.3	3.40	3.65	1.70	1.90	1.10	1.20
median	4.8	4.5	3.20	3.35	1.55	1.70	1.00	1.10
lower quartile	4.6	4.3	3.10	3.30	1.50	1.65	1.00	1.10
upper quartile	4.9	4.6	3.30	3.45	1.60	1.80	1.05	1.15
S. D.	0.20	0.25	0.106	0.113	0.065	0.078	0.039	0.043
S. E.	0.02	0.03	0.008	0.012	0.005	0.008	0.003	0.005

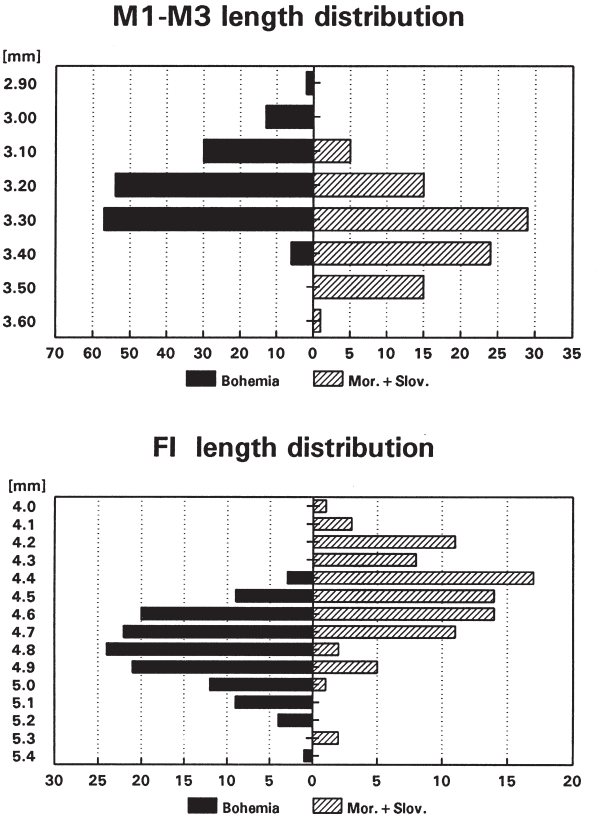

Fig. 3. Distribution of the length of the maxillary molar row (above) and the foramina incisiva length (below) in *Apodemus microps* samples studied.

The distribution of *A. microps* was confined to the low lying and poorly wooded region demarcated in the west by the Doupovské hory Mts. and in the south and south-east by the woody landscapes of the Rakovnická pahorkatina Highland. The area's northern limit is most probably formed by the Ohře river. From the ratio between *A. microps* and the other two *Apodemus* spp. (Tab. 1, Fig. 2) it is clear that the core distribution area lay in the triangle closed by the Ohře and Blšanka rivers and the Doupovské hory Mts. Records from outside of this area (i. e. No. 1 – Kadaň, No. 22 – Soběchleby, No. 23 – Želeč and No. 25 – Bílenec) were based only on one or two specimens, so post-mortem transport by barn owls cannot be excluded. On the whole, the area inhabited by this population did not exceed 25 km in length and 20 km wide.

In 1979, specimens of *A. microps* were trapped several times near Žatec and Milčeves (Fig. 2) in field banks covered by grass and various herbaceous vegetation. In 1999, the population was still present in its core area (P. Nová, pers. comm.).

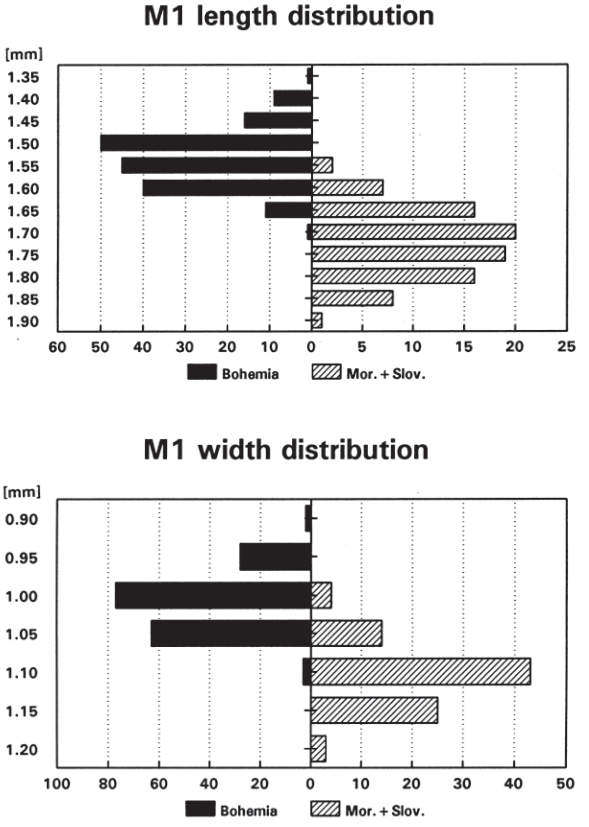

Fig. 4. Distribution of the first upper molar length (above) and first upper molar width (below) in *Apodemus microps* samples studied.

Tab. 3. Body and skull measurements in specimens of the type series (the holotype is indicated by an asterisk). Measurements are given in mm, weights in grams, age group allocation follows Steiner (1968). For further explanation of abbreviations see text.

No.	date	sex	W	L	T	HF	E	CBL	ZG	FI	I^1–M^3	M^1–M^3	M^1L	M^1W	Age
0928	April	F	13.5	83	72	17.3	12.5	20.7	11.7	4.4	11.0	3.15	1.55	1.00	5
0959	Nov.	F	14	81	71	18.0	13	–	11.6	4.3	11.1	3.40	1.55	1.05	2
0960	Nov.	M	13	76	74	18.6	12.5	–	–	–	11.1	3.30	1.60	1.00	2
0961	Nov.	M	13	78	–	18.1	12.5	20.7	–	4.3	11.0	3.40	1.60	1.10	3
0970	Nov.	M	14	82	77	18.1	12	21.5	11.6	4.7	11.1	3.25	1.50	1.00	2
0971	Nov.	M	15	80	79	18.6	11.5	21.8	11.6	4.8	11.4	3.40	1.60	1.05	2
0972	Nov.	M	14	83	77	18.4	13	21.9	12.1	4.5	11.5	3.50	1.60	1.10	2
0973	Nov.	M	12	74	66	17.5	11.5	20.9	10.4	4.8	10.8	3.20	1.45	0.95	2
01017	Sept.	M	10	70	–	17.3	11.5	–	11.0	4.7	10.5	3.20	1.60	1.10	2
01097*	Oct.	F	15.5	87	75	18.0	12.5	21.4	11.4	5.0	11.2	3.20	1.60	1.00	4
01098	Oct.	F	12.5	79	71	17.9	12.5	20.2	11.3	4.8	10.9	3.40	1.70	1.10	2

The climate of this region is dry, with annual precipitation in the *A. microps* core area of less than 450 mm, and between 450 and 500 mm in marginal localities. Summers are moderately warm, winters are mild (Syrový 1958). In Podbořany (locality No 16) average monthly temperatures in January, July and October are –2.5, 17.8 and 7.7 °C, respectively (annual average = 7.8 °C) (Novotný 1971). Soils are black or brown, deep and fertile. During our investigations nearly all the area was covered by large fields; agricultural production was intensive, the main crops being cereals and sugar beet. Altitude varies mostly between 220 and 300 m and, with exception of single locality (No. 10 – Mašťov at 375 m a. s. l.) does not exceed the 350 m contour line (Fig. 2).

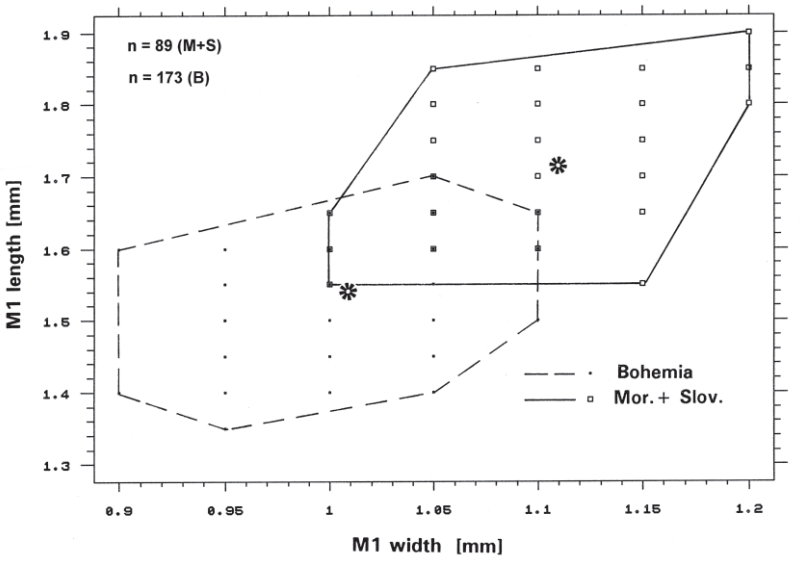

Fig. 5. The scatter diagram for M^1L and M^1W in *Apodemus microps* samples studied. Means are indicated by asterisk.

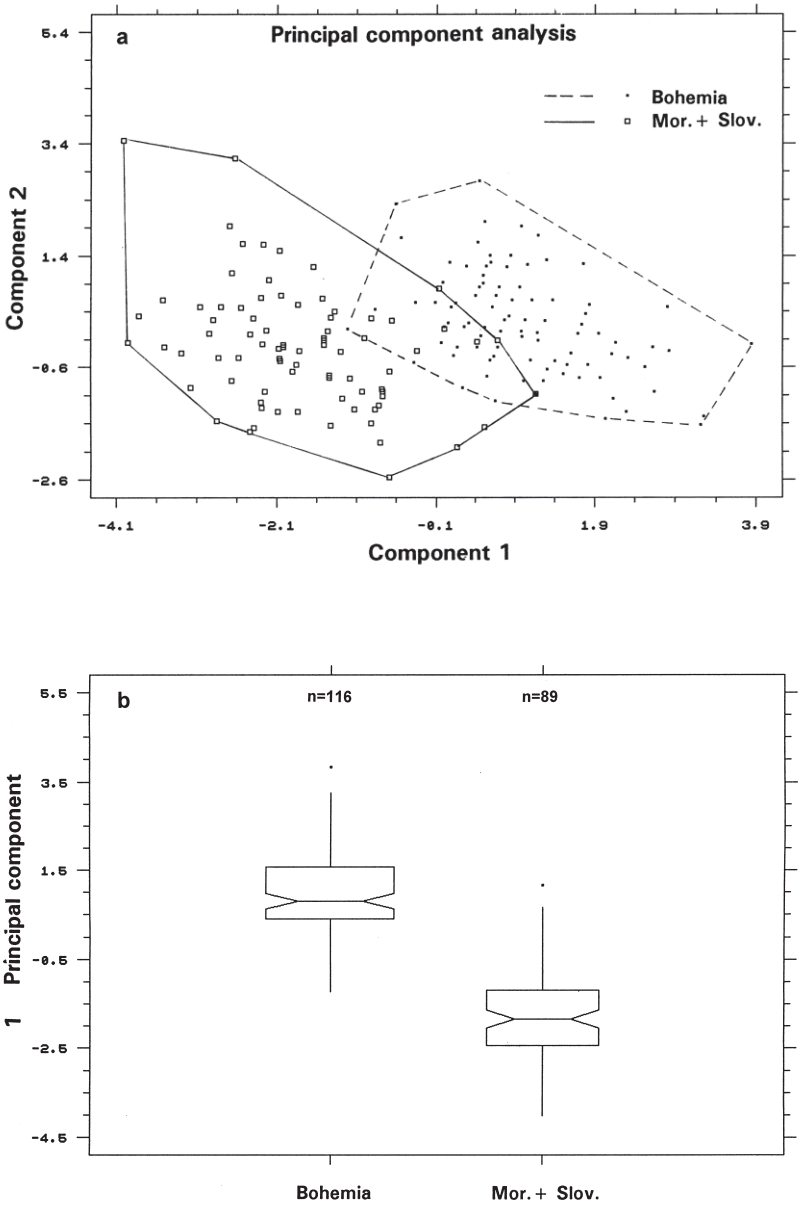

Fig. 6. a – Results of Principal Components Analysis. b – Box plots of factor scores of the First Prinicipal Component computed for all specimens irrespective of their abrasion category.

The distance of the NW Bohemian isolate from the nearest localities of *A. microps* in SW Poland (Haitlinger 1990) is ca. 190 km, whilst the nearest south Moravian localities (near Znojmo, Dukovany, and Brno; Reiter et al. 1997, Heroldová et al. 1998, Holišová et al. 1962) are at distances of 230, 230, and 250 km, respectively.

The origin of the Bohemian population is unclear. Recent, long distance migrations (either natural or man made) cannot be excluded. However, also relictual occurrence and an isolation since time of Boreal (cf. Horáček & Ložek 1988) is possible.These hypotheses should be studied further by palaeontological and genetic methods.

2. Morphometric comparison between Bohemian, south Moravian and Slovak populations of *Apodemus microps*

As populations of *A. microps* from south Moravia, south Slovakia and east Slovakia belong to a continuous distributional area within the Pannonian region, we pooled all Moravian and Slovak skulls into single sample. Distributions of the values of the four measurements are given in Figs 3 & 4. Standard descriptive statistics for the study samples are shown in Tab. 2, the scatter diagram for both M1 measurements is in Fig. 5. It is clear that the molars are much smaller in the Bohemian population and, in contrast, the foramen incisivum is shorter in the Slovak and Moravian sample. According to Mann -Whitney U tests, differences in all measurements were highly significant ($P < 0.0001$). Age composition was not the same in the study samples. While the Bohemian sample contained practically equal numbers of age groups 2, 3, 4 and 5 (only group 6 was less numerous), in the Slovak & Moravian sample younger specimens (group 2) predominated considerably over other age groups. It may be that in the case of the length of the foramen incisivum (which correlates positively with age) unequal age composition may have slightly biased the differences observed, however, the absence of specimens possessing values lower than 4.3 mm in the Bohemian samples (Fig. 3, Tab. 3) suggests that this measurement really is longer in the Bohemian population.

PCA also revealed considerable differences between the two samples and resulted in separation of 84.4% specimens (Fig. 6a). The First Principal Component explained 65.7% and the second one 23.5% of the variation observed. Factor scores of the First Principal Component were further compared between Bohemian and Moravian + Slovak samples. Comparisons computed for all specimens, irrespective of their age (Fig. 6b), revealed similar results to those computed separately either for the lowest abrasion category or for the higher ones (Fig. 7). It is therefore suggested that the differences found between the geographical samples studied were not age biased.

DFA separated the two samples with a high classification success. All but one Bohemian specimen (99.1%, n = 116) and all but five Slovak and Moravian specimens (94.4%, n = 89) were assigned to their appropriate samples (Wilk's lambda =0.207; $F(4,199) = 187.9$; $P < 0.0001$). The classification formula was as follows:

$$S = -42.70 - 14.61 \times M^1 - M^3 - 10.36 \times FI + 44.66 \times M^1L + 62.19 \times M^1W$$

$S > 0$ assignes the specimen to Slovak and Moravian sample, $S < 0$ to the Bohemian one.

Differences found between Bohemian and Slovak + Moravian samples are surprisingly high – comparable with those often observed between different rodent species. Among possible explanations are long-term isolation, character replacement due to strong competition with the larger *A. sylvaticus*, founder effects or genetic drift in the (originally) very small Bohemian population.

3. Taxonomic status of the Bohemian population of *Apodemus microps*

The name *A. microps* was used for the first time by Kratochvíl & Rosický (1952/53) in the first part of their paper (published in 1952) dealing with the ecology and taxonomy of *Apodemus* spp. in the former Czechoslovakia. The description was based on specimens collected in several localities in

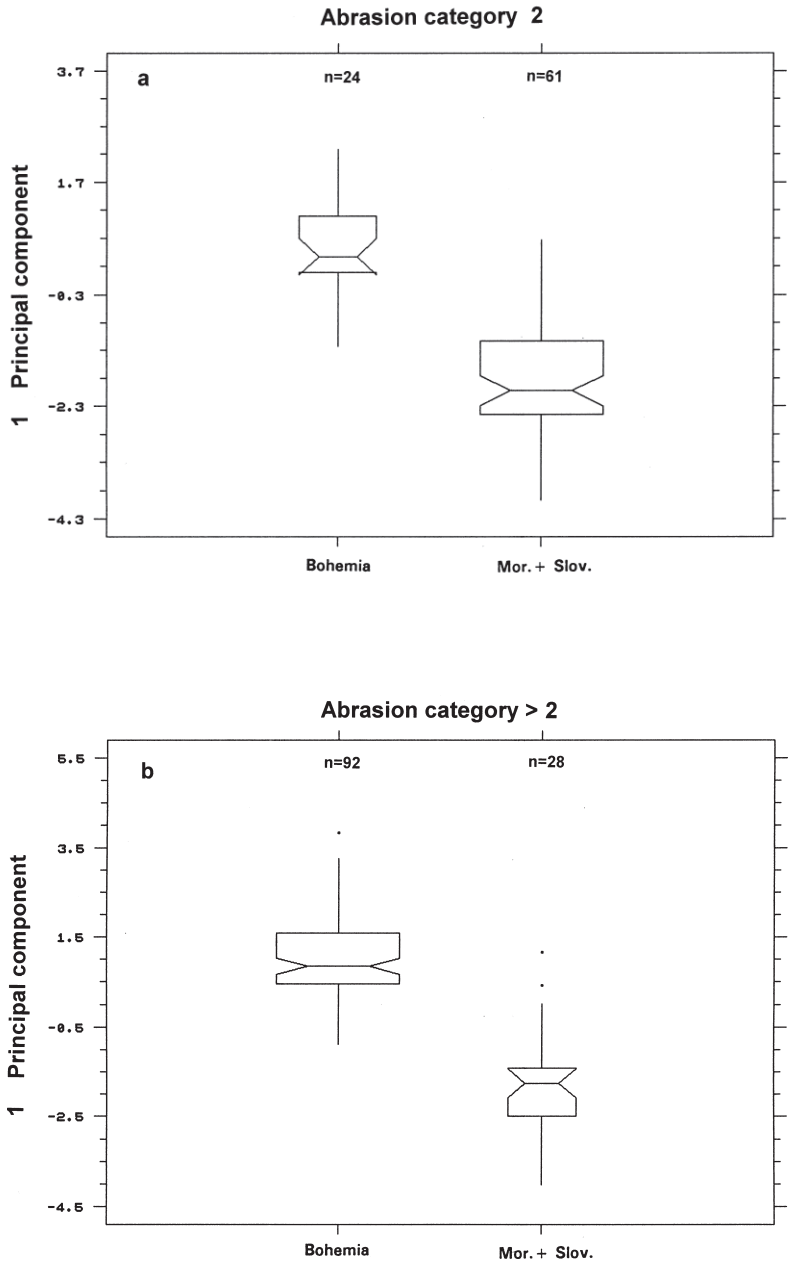

Fig. 7. Box plots of factor scores for the First Principal Component computed for the youngest specimens of abrasion category 2 (upper) and for older specimens of abrasion categories 3, 4, 5 and 6 (below).

the lowlands of SE Slovakia, but neither a type nor type series were designated. The only locality mentioned in first part of the paper, in which the name *A. microps* was introduced, was Šaca, which can therefore be considered as the type locality (Fig. 1). However, from a survey of the materials given in the second part of the same paper it is evident that the authors had at their disposal specimens from the vicinity of three small towns: Šaca and Moldava n. Bodvou (both in the Košice Basin) and Slovenské Nové Mesto (situated about 40–50 km southeast in the east Slovak lowlands). No other name for very small *Apodemus* mice (i.e. those different from *A. flavicollis*, *A. sylvaticus* and *A. alpicola* Henrich, 1952) is available in central Europe. The name *A. parvulus* used by Mošanský (1994) for mountain populations from the Liptovské Tatry Mts., Slovakia, was proposed only conditionally and not accompanied by a proper description; it must therefore be considered as *nomen nudum* (ICZN 1999, Articles 13 and 15).

As the *Apodemus* mice from the NW Bohemian study population differ considerably in skull characters from the nominotypic populations of *A. microps* in the northern part of the Pannonian basin, I am convinced that this merits subspecific ranking.

Apodemus microps cimrmani ssp. n.

Type material. **Holotype**: An adult female (placental scars after at least two litters), No. 01097, skull and skin, collected 17 Oct. 1980 by V. Vohralík ca. 1 km SE of Žatec, Bohemia, 50°19' N, 13° 31' E, altitude 270 m (cf. Figs 1, 2). **Paratypes**: Five males and two females (Nos 0928, 0970–0973, 01017, 01098) collected between 19 April 1979 and 17 Oct. 1980 by V. Vohralík and F. Pojer at the same locality as the holotype; 2 males and 1 female (Nos. 0959–0961) collected 13 Nov. 1979 by V. Vohralík in Milčeves, Bohemia, 50° 17' N, 13° 30' E, altitude 270 m (cf. Fig. 2). With the exception of No. 01017 (skull only) all other paratypes are skulls with accompanying skins.

Deposition. The holotype and eight paratypes are housed in the collections of the Department of Zoology, Charles University, Prague. Paratype Nos. 0960 and 0971 are in the collections of the Department of Zoology, National Museum (Natural History), Prague.

Derivatio nominis. Patronymic, named after Mr. Jára Cimrman, a famous inventor, traveller and the principal of the touring theatre who, in the beginning of 20th century has operated in Bohemia (cf. Svěrák et al. 1999, Smoljak & Svěrák 2000).

Differential diagnosis. A small mouse, distinguished from the nominotypic subspecies by the combination of considerably smaller molars (M^1–M^3 = 2.90–3.50 mm, M^1L = 1.35–1.70 mm, M^1W = 0.90–1.10 mm) and longer foramina incisiva (FI = 4.3–5.4 mm). For the means and the distribution of values of above measurements and a comparison with a sample of *A. m. microps* from Slovakia and Moravia see Tab. 2 and Figs 3, 4. The classification formula (DFA):

$$S = -42.70 - 14.61 \times M^1\text{–}M^3 - 10.36 \times FI + 44.66 \times M^1L + 62.19 \times M^1W$$

enables separation *A. m. cimrmani* ssp. n. ($S < 0$) and *A. m. microps* ($S > 0$) with the high classification success (the correct identification of 99.1% specimens of *A. m. cimrmani* and 94.4% of specimens of *A. m. microps* in our samples).

Description (based on the type series, Tab. 3). Upper side and the flanks are brownish with a visibly dark tinge in the medial part of the head and the body; the belly is lightly grey. Demarcation line between flanks and belly fairly distinct. Yellowish pectoral spot either very small or absent – in our 10 skins it is distinct in only one specimen, rather indistinct in four (including the type) and missing in five. Ears and hind foot very small (length = 11.5–13 mm and 17.3–18.6 mm, respectively). The karyotype of paratype No. 01017 was 2n = 48 (Zima & Macholán 1995).

DISTRIBUTION. Known to be confined to the area of ca. 25 per 20 km, situated near the town Žatec in NW Bohemia, Czech Republic (Fig. 2). This area is isolated from the species' nearest known localities in Poland and Moravia by ca. 190 km and 230 km, respectively (Fig. 1).

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