

Occurrence of *Crocidura leucodon* in plantings of forest trees in southern Moravia, Czech Republic (Soricomorpha: Soricidae)

Výskyt bělozubky bělobřiché (*Crocidura leucodon*) ve výsadbách lesních dřevin jižní Moravy (Soricomorpha: Soricidae)

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Abstract. In 2007, within the study of small mammals in plantings of forest trees in floodplain forests of southern Moravia, a rather considerable number of individuals of the bicolored shrew (*Crocidura leucodon*) was caught. The population made up a dominant or even eudominant component within the local community of small mammals. Considering the regularly low subprecedent occurrence of the species in small mammal communities, it is an unusual phenomenon. Thus, its occurrence in forest tree plantings extends information on the spectrum of habitats colonized by this species.

Key words. *Crocidura leucodon*, forest tree planting, floodplain forest, southern Moravia

The bicolored shrew *Crocidura leucodon* (Hermann, 1780), is a rather non-abundant species of insectivore, which has been spreading to new areas in the Czech Republic only in the last decades (ANDĚRA 2000, 2003, ANDĚRA & HORÁČEK 2005). It mostly inhabits open sites of a steppe character, such as shrubby slopes, field balks and vineyards (PELIKÁN et al. 1979, ANDĚRA & HORÁČEK 2005) but also forest edges, open groves and pheasantries (SUCHOMEL & HEROLDOVÁ 2004, 2007). Sometimes it also appears in agricultural crops, e.g. cereals (HEROLDOVÁ et al. 2007). In addition, it occurs (particularly in the western part of the country) in moist habitats, especially on banks of streams, ponds and drainage canals (ANDĚRA & HŮRKA 1984, HANÁK et al. 1998, ZBÝTOVSKÝ 1998). Due to the preferences of open sites, findings of bicolored shrews in the forest environment are very rare (HODKOVÁ 1979, ŘEPA 1980, LEŠO et al. 2008). Occasionally, this species occurs also in residential buildings; however, a tendency towards the synanthropic way of life is evidently smaller than in *Crocidura suaveolens* (Pallas, 1811) (NESVADBOVÁ 1979, ANDĚRA 2000).

Information on the occurrence and population dynamics of *Crocidura leucodon* is mostly obtained in an untargeted way within the catch of other small mammals and it nearly always refers to individual animals (often a subprecedent species with the dominance of less than 1%), while a higher number of caught individuals is relatively rare (ANDĚRA & HŮRKA 1984, HANÁK et al. 1998, SUCHOMEL & HEROLDOVÁ 2004, 2007, HEROLDOVÁ et al. 2007 etc.). Therefore, records of the occurrence of more abundant populations of *C. leucodon*, although obtained accidentally, can be rather interesting.

Within the study of small mammals as an important factor in the process of forest stand regeneration, we managed to note a relatively abundant population of *C. leucodon* in plantings of floodplain forests in southern Moravia in 2007. In this year, 26 individuals of bicolored shrews, found among 369 small mammals were captured on five out of nine study plots (D=7.0%). In the following year 2008, only four individuals were found in the double number (in total 18) of monitored plots (one individual in each of

the plots nos. 3, 7, 17, 18, see Table 1) out of the total number of 257 small mammals ($D=1.6\%$). In 2009, no bicolored shrews were recorded. The low number of monitored plots in 2007 was caused by the early beginning of winter associated with a rich snow cover. This situation did not allow to carry out the catches at all originally planned 18 plots but only at a half. Therefore, we suppose that if the catch was carried out at all plots, the number of *Crocidura leucodon* would be even substantially higher. The bicolored shrew was caught using the classical method of sampling small mammals by means of snap traps (34 traps in a line/plot, three nights), which could even amplify the amount of catch because this method is not too suitable for catching Soricidae (ŘEHÁK et al. 1998). The trapping occurred in the autumn period. The experimental plots were situated at Vranovice ($48^{\circ} 58' N$, $16^{\circ} 36' E$), about 36 km south of Brno. Detailed characteristics of the plots are given in Table 1.

The particular experimental plots represent a specific habitat of early succession stages of a forest ecosystem, which appeared to be very suitable for the occurrence of *C. leucodon*. Concerning its frequency in the community of small mammals, the bicolored shrew ranked among dominant species ($D=5-10\%$; cf. LOSOS et al 1985) at three localities (nos. 10, 13 and 14). At two localities (nos. 11 and 17) it even was a eudominant species ($D>10\%$; LOSOS et al 1985). This is not usual because in the majority of studied communities of small mammals, the bicolored shrew represents only a marginal species with subprecedent ($D<1\%$) proportion (e.g. SUCHOMEL & HEROLDOVÁ 2004, 2007, HEROLDOVÁ et al. 2007 etc.). Our finding is obviously related to the reported population growth of the species in the country. Trends towards dominance or eudominance at the monitored plots can be also traced from several basic characteristics of the evaluated sites. Regardless of the planted tree species, the age of planting as well as the herb layer cover were found to be an important factor. At plots with a one-year old planting (no. 13; $n=1$; $D=6.7\%$; and no. 14; $n=4$; $D=7.0\%$) and with the herb layer cover lower than 100% (here up to 60%), *Crocidura leucodon* was a dominant species. At sites with a several-year old planting (here 5–6 years) and with the herb layer cover reaching 100%, the shrew was a eudominant species (no. 11; $n=4$; $D=11.8\%$; and no. 17; $n=11$; $D=16.2\%$). The age of planting and the cover and height of the herb layer are connected with each other, being the result of the site succession development. Older plantings are characterized by a more closed and developed herb layer, which represents a more suitable environment concerning the availability of hiding places and food. A trend towards eudominance was recorded at one, in this case marginal locality (No. 10; $n=6$) with the plantation age of 8 years and the herb layer cover of 95%, where the *C. leucodon* population reached 9.4% dominance. Management of the herb layer had no effect on the species abundance and dominance on the monitored plots. On the contrary, the highest dominance was shown by the *C. leucodon* population in a poplar planting (plot no. 17; 16.2%), where the herb layer was regularly mowed.

The dominant position of *Crocidura leucodon* in the community of small mammals is unambiguously an unusual phenomenon. Information on its occurrence in forest plantings and plantations can increase our knowledge on the spectrum of habitats colonized by this species.

SOUHRN

Na podzim r. 2007 byl v průběhu studia drobných savců výsadeb lesních dřevin v lužních lesích jižní Moravy odchylen poměrně vysoký počet jedinců bělozubky bělobřiché (*Crocidura leucodon*). Populace tvořila v rámci místního společenstva drobných savců dominantní až eudominantní složku. Z hlediska obecně nízkého (subprecedentního) výskytu ve společenstvech jde o neobvyklý jev. Výskyt ve výsadbách lesních dřevin pak rozšiřuje informace o škále obývaných biotopů tímto druhem. Vyšší eudominantní zastoupení na některých plochách mohlo souviset se stářím porostu a vývinem a pokryvností bylinného patra, negativně neovlivnilo početný výskyt ani pravidelné vyžínání některých výsadeb.

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Table 1. Characteristics of the monitored plots of forest tree plantations

Tab. 1. Charakteristika monitorovaných ploch

Legend / vysvětlivky: WS – wood species / druh stromu; OCS – shrub layer cover – total / celkový pokryv keřového patra (%); AL – altitude / nadmořská výška; HS – shrub height / výška keřů (m); SP – plot size / velikost plochy (ha); CP – spruce (*Picea abies*) cover / pokryv smrkem (*Picea abies*) (%); EX – slope orientation / orientace svahu; CQ – oak (*Quercus* sp.) cover / pokryv dubem (*Quercus* sp.) (%); AC – plantation age / stáří kultury; CT – lime (*Tilia* sp.) cover / pokryv lípou (*Tilia* sp.) (%); V – mowing / těžba: 1 – in strips / v pruzích, 0 – no / ne; CS – willow (*Salix* sp.) cover / pokryv vrbou (*Salix* sp.) (%); OL – herb layer cover – total / celkový pokryv bylinného patra; CF – ash (*Fraxinus* sp.) cover / pokryv jasanem (*Fraxinus* sp.) (%); HH – herb layer height / výška bylinného patra (cm); CA – alder (*Alnus* sp.) cover / pokryv olší (*Alnus* sp.) (%); OG – grass layer cover / pokryv travního patra (%); CPO – poplar (*Populus* sp.) cover / pokryv topolem (*Populus* sp.) (%); BC – forest weed cover / pokryv lesním plevelem (%); CU – hornbeam (*Carpinus* sp.) cover / pokryv habrem (*Carpinus* sp.) (%); OD – dicotyledonous plant cover – total / celkový pokryv dvouděložnými rostlinami; FD – other broadleaves cover / pokryv ostatními listnatými rostlinami (%); OG – old grass / stará tráva: 1 – moderately developed / mírně rozvinutá, 0 – no / ne; GC – grasses of *Calamagrostis* type cover / pokryv travami typu *Calamagrostis* (%); GA – grasses of *Avenella* type cover / pokryv travami typu *Avenella* (%); OR – blackberry (*Rubus* sp.) cover / pokryv ostružiníkem (*Rubus* sp.) (%); o – oak / dub; p – poplar / topol

plot	GPS	WS	AL	SP	EX	AC	V	OL	HH	OG	BC	OD	OG	GC	GA	OR	OS	HS	CP	CQ	CT	CS	CF	CACPo	CU	FD	
3	48° 49' N, 16° 47' E	o	165	0.6	0	6	1	100	140	65	25	10	1	20	1	5	24	2	16	1	16	1	1	1	1	4	2
7	48° 48' N, 16° 48' E	o	150	0.3	0	7	1	100	70	60	30	10	1	20	5	5	23	1	13	1	13	1	5	1	1	1	2
10	48° 57' N, 16° 35' E	o	210	0.8	0	8	0	95	100	80	10	5	1	70	0	5	25	1	5	16	2	2				2	2
11	48° 58' N, 16° 36' E	o	210	0.5	SE	6	0	100	130	15	45	40	1	10	0	10	26	1	2	16		2				3	3
13	48° 57' N, 16° 36' E	o	180	1	0	1	0	60	30	1	40	19	0	0	0	0	13	1	10		10					3	3
14	48° 57' N, 16° 37' E	o	180	0.5	0	1	0	45	30	1	29	15	0	0	0	0	9	0	9		9						
17	48° 57' N, 16° 37' E	p	185	1	0	5	1	100	30	5	30	65	0	0	0	0	25	3								25	25
18	48° 57' N, 16° 37' E	p	185	1	0	5	1	100	60	15	80	5	0	0	0	0	20	3								20	20

REFERENCES

- ANDĚRA M., 2000: *Atlas rozšíření savců v České republice. Předběžná verze. III. Hmyzožravci (Insectivora)* [Atlas of the Mammals of the Czech Republic. A Provisional Version. Insectivores (Insectivora)]. Národní muzeum, Praha, 108 pp (in Czech, with a summary in English).
- ANDĚRA M., 2003: Vývoj areálu bělozubky bělobřiché (*Crocidura leucodon*) v ČR [Development of the natural range of the bicolored shrew in the Czech Republic]. P.: 166. In: BRYJA J. & ZUKAL J. (eds.): *Zoologické dny. Brno 2003. Sborník abstraktů z konference 13.–14. února 2003* [Zoological Days. Brno 2003. Book of Abstract of Conference 13–14 February 2003]. ÚBO, Brno, 244 pp (in Czech).
- ANDĚRA M. & HORÁČEK I., 2005: *Poznáváme naše savce. 2. přepracované vydání* [We Recognize our Mammals. 2nd Revised Edition]. Sobotáles, Praha, 327 pp (in Czech).
- ANDĚRA M. & HŮRKA L., 1984: Zur Verbreitung der *Crocidura*-Arten in der Tschechoslowakei (Mammalia: Soricidae). *Folia Musei Rerum Naturalium Bohemiae Occidentalis, Zoologica*, **18**: 1–38.
- HANÁK V., ZBYTOVSKÝ P., BENDA P. & REITER A., 1998: Distribution of *Crocidura leucodon* in the southern borderland of the Czech Republic (Mammalia, Insectivora). *Časopis Národního Muzea, Řada Přírodovědná*, **167**: 55–60.
- HEROLDOVÁ M., BRYJA J., ZEJDA J. & TKADLEC E., 2007: Structure and diversity of small mammal communities in agriculture landscape. *Agriculture, Ecosystems and Environment*, **120**: 206–210.
- HODKOVÁ Z., 1979: Drobní savci z území ČSSR ve sběrech pracovníků Parazitologického ústavu ČSAV v letech [Small mammals from the territory of Czechoslovakia in collections of workers of the Parasitological Institute of the CS Academy of Science in 1953–1976]. *Lynx, n. s.*, **20**: 45–74 (in Czech).
- LEŠO P., LEŠOVÁ A. & KROPIL R., 2008: Unusual occurrence of the bicoloured white-toothed shrew (*Crocidura leucodon*) in a fir-beech forest in central Slovakia (Soricomorpha: Soricidae). *Lynx, n. s.*, **39**: 191–194.
- LOSOS B., GULIČKA J., LELLÁK J. & PELIKÁN J., 1985: *Ekologie živočichů* [Ecology of Animals]. SPN, Praha, 320 pp (in Czech).
- NESVADBOVÁ J., 1979: K poznání drobných savců v zemědělských objektech [Towards the knowledge of small mammals in agricultural facilities]. *Acta Universitatis Agriculturae, A*, **27**: 203–213 (in Czech).
- PELIKÁN J., GAISLER J. & RÖDL P., 1979: *Naši savci* [Our Mammals]. Academia, Praha, 164 pp (in Czech).
- ŘEHÁK Z., ZUKAL J., GAISLER J. & BRYJA J., 1998: Comparison of some modifications of a Y sampling of small mammal communities in the Czech Republic. Pp.: 237–238. In: REIG S. (ed.): *Abstracts. Euro-American Mammal Congress. Santiago de Compostela, 19–24 July, 1998. Abstracts*. Universidade de Santiago de Compostela, Santiago de Compostela, 424 pp.
- ŘEPA P., 1980: Živočišní obyvatelé květnaté bučiny v státní přírodní rezervaci Diana [Animal inhabitants of a flower beech forest in State Nature Reserve Diana]. *Sborník Okresního Muzea v Tachově*, **13**: 55–61 (in Czech).
- SUCHOMEL J. & HEROLDOVÁ M., 2004: Small terrestrial mammals in two types of forest complexes in intensively managed landscape of South Moravia (The Czech Republic). *Ekológia, Bratislava*, **23**: 377–384.
- SUCHOMEL J. & HEROLDOVÁ M., 2007: A pheasantry as the site of small terrestrial mammals (Rodentia, Insectivora) in southern Moravia (Czech Republic). *Journal of Forest Science*, **53**: 185–191.
- ZBYTOVSKÝ P., 1998: Poznámky k bionomii rozmnožování drobných savců na Táborsku [Notes on the bionomics of reproduction of small mammals in the region of Tábor]. *Sborník Jihočeského Muzea v Českých Budějovicích, Přírodní Vědy*, **29**: 91–101 (in Czech).