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SMALL MAMMALS AT FOREST PLANTATIONS IN THE JESENÍKY MTS. (CZECH REPUBLIC)

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Abstract

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Small mammal community was studied at *Fagus sylvatica* plantations in 2007–2011. The animals were captured in snap traps once a year in autumn in the course of three consecutive nights. The abundance, species composition, dominance and diversity were assessed with the help of the Shannon (H) and Simpson (1/D) indexes. A total of 586 individuals of 11 species were captured, out of this 8 rodent species (Rodentia) and 3 insectivorous species (Soricomorpha). Four species, namely *Apodemus flavicollis* (30.2%), *Myodes glareolus* (27.1%), *Microtus agrestis* (24.6%) and *Sorex araneus* (12.6%), were eudominant, one species was dominant (*Microtus arvalis*, D = 3.7%) and the remaining six species were subrecedent (D < 1%). The structure of the small mammal community was strongly affected by the herb layer composition. Population dynamics of *A. flavicollis* and *M. glareolus* fluctuated strongly in relation to beech nut crops in the surrounding high forests. The overall diversity was H = 1.546 a 1/D = 0.757 with equitability of 0.427, which indicates a highly unbalanced community. Differences in diversity, both at individual plots and in relation to altitude, were inconclusive ($p > 0.05$). The monitored plantations represented important habitats of rodent species significant in terms of forest management, as well as refugia of an abundant population of the common shrew. With respect to the subrecedent species (*Sicista betulina*, *Muscardinus avellanarius*, *Crocidura suaveolens*), the paper extends the knowledge on their habitat preferences. The obtained values on biodiversity give evidence of the key importance of forest plantations for the small mammal biodiversity in our production forests.

small mammals, *Rodentia*, *Soricidae*, Jeseníky Mts., forest plantations

In the recent years, small terrestrial mammals (*Rodentia*, *Eulipotyphla*) in the Jeseníky Mts. have not been subject to intensive studies, particularly of ecological studies and applied research in forest protection. Generally, only one study on the ecosystems influenced by air pollutions (NESVADBOVÁ, GAISLER, 2000) and faunistic data on the occurrence of individual species tend to be available (ANDĚRA, BENEŠ, 2001, 2002; ANDĚRA, 2000, 2011), along with one-off monitoring projects studying the damage to trees caused by browsing, summarised e.g. by KAMLER *et al.* (2010, 2011). Preliminary assessments of habitat preferences of selected small mammal species in non-forest environment (SUCHOMEL *et al.*, 2009) and the impact of voles (Arvicolinae) on forest plantations of the common beech – *Fagus sylvatica* (SUCHOMEL *et al.*, 2011) were conducted in the area only recently. Other available studies are significantly older and tend to be part of more complex studies on mammals (e.g. REMEŠ, 1927; KRATOCHVÍL, GRULICH, 1949, 1950; BENEŠ, 1974, 1986) or focus exclusively on sites attractive from the nature conservation perspective, such as the so-called Velká kotlina (Great Basin) (e.g. KRATOCHVÍL, 1955; ZAPLETAL, 1957), but not on sites subject to forest management. The presented paper focuses on the research of small mammals on forest plantations and as such expands the sum of knowledge in this field. Apart from an assessment of the diversity and dominance of individual species, the paper also discusses the issues of population dynamics

fluctuation and the significance of this type of environment on small mammal species important from the forest management perspective. The data obtained on the occurrence of individual species may be used in faunistic monitoring as well.

MATERIAL AND METHODS

A total of 18 plots at *Fagus sylvatica* plantations were selected in the area of the Jeseníky Mts. at different altitudes and with various exposures (Tab. I), as well as with varying vegetation covers and herb layer characters (Tab. II). The age of saplings was 5–7 years in the first year of monitoring (2007). The size of plots ranged between 0.2 and 0.5 ha. Small mammals were trapped at the plots over the course of five years (2007–2011), once a year in the autumn. The trapping was conducted under a project studying the bark gnawing impact of small mammals on forest regeneration and the annual sampling was therefore sufficient for the purposes of the project. The sampling was conducted with the help of snap traps placed in lines (a line of 34 traps per plot). The traps were baited by a candle wick fried in flour and oil and in the course of each trapping the baits were smeared with peanut butter every day. The traps were exposed for three nights.

Basic environmental characteristics, such as species dominance (D), were evaluated for the determined community, using the class dominance census by LOSOS *et al.* (1984). To assess diversity and heterogeneity, commonly used indicators were used, such as Shannon's Index based on a natural logarithm (H), Reciprocal Simpson Index (1/D)

I: *Basic geographical characteristics of the experimental plots in the Jeseníky Mts. (FVB – Forest vegetation belt)*

Site	GPS	Altitude	FVB	Exposure	Territory
1	N50°12´41´´ E017°19´34´´	730	5	0	Kobrštejn
2	N50°14´06´´ E017°19´09´´	690	5	SW	Javorná
3	N50°14´00´´ E017°19´22´´	710	5	SW	Javorná
4	N50°09´28´´ E017°15´02´´	1010	7	0	Kříž
5	N50°10´12´´ E017°14´14´´	910	6	W	Kříž
6	N50°08´51´´ E017°14´46´´	1035	7	NE	Kříž
7	N50°12´58´´ E017°19´45´´	755	5	0	Kobrštejn
8	N50°12´52´´ E017°19´51´´	745	5	0	Kobrštejn
9	N50°14´03´´ E017°19´04´´	720	5	NE	Javorná
10	N50°12´11´´ E017°20´29´´	705	6	E-SE	Kobrštejn
11	N50°12´54´´ E017°18´13´´	770	6	NW	Orlík
12	N50°12´53´´ E017°18´25´´	790	6	NW	Orlík
13	N50°12´30´´ E017°18´40´´	785	6	SE	Orlík
14	N50°12´36´´ E017°18´35´´	820	6	SE	Orlík
15	N50°06´50´´ E017°11´21´´	1070	7	NW	Vodopády
16	N50°06´49´´ E017°11´09´´	1065	7-8	0	Vodopády
17	N50°07´09´´ E017°11´04´´	1040	7	SW	Vodopády
18	N50°07´03´´ E017°12´41´´	1085	7	E	Vodopády

II: *Vegetation cover characteristics of the monitored plots in 2007–2011. Figures accompanying the individual components of the herb layer represent cover in %. (E1 cover – total cover of herb layer, E1 height –herb layer height, Grass – total cover of grass, Weed – total cover of weed, Dicotyl. – total cover of dicotyledonous plants, Calam. sp. - total cover of Calamogrostis sp., Avenella sp. – total cover of Avenella sp., Rubus sp. – total cover of Rubus spp., SD – standard deviation)*

	E1 cover		E1 height		Grass		Weed		Dicotyl.		Calam. sp.		Avenella sp.		Rubus spp.	
Site	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
1	96	± 3	70	± 20	76	± 13	0	± 0	20	± 10	61	± 13	23	± 5	1	± 1
2	100	± 0	60	± 0	62	± 14	28	± 14	10	± 0	49	± 8	15	± 0	24	± 13
3	100	± 0	47.5	± 5	48	± 5	48	± 5	5	± 0	43	± 5	5	± 0	44	± 3
4	68	± 15	37.5	± 5	41	± 23	4	± 4	22	± 12	28	± 16	3	± 0	0	± 0
5	100	± 0	62.5	± 15	94	± 1	4	± 2	2	± 1	83	± 5	12	± 5	1	± 0
6	96	± 3	52.5	± 15	85	± 0	7	± 1	5	± 4	65	± 10	20	± 10	1	± 0
7	96	± 3	52.5	± 15	89	± 3	0	± 1	8	± 5	55	± 0	35	± 1	0	± 0
8	96	± 3	55	± 10	63	± 15	0	± 0	38	± 15	49	± 18	14	± 3	0	± 0
9	70	± 20	57.5	± 5	35	± 12	25	± 8	10	± 0	28	± 9	5	± 0	18	± 9
10	96	± 3	60	± 20	72	± 1	3	± 1	24	± 8	33	± 5	41	± 8	2	± 0
11	99	± 3	80	± 0	79	± 13	9	± 2	11	± 13	34	± 3	45	± 10	7	± 0
12	100	± 0	70	± 20	86	± 3	10	± 0	4	± 2	44	± 8	43	± 5	12	± 9
13	100	± 0	70	± 20	83	± 4	8	± 4	9	± 8	33	± 5	51	± 9	7	± 1
14	100	± 0	70	± 20	87	± 4	8	± 4	5	± 0	15	± 10	72	± 6	14	± 11
15	100	± 0	40	± 0	70	± 0	13	± 5	16	± 3	5	± 1	1	± 1	5	± 0
16	95	± 0	32.5	± 5	54	± 2	16	± 8	25	± 10	8	± 5	8	± 4	5	± 0
17	95	± 0	37.5	± 5	61	± 12	35	± 10	1	± 3	10	± 0	0	± 1	1	± 1
18	91	± 3	30	± 0	9	± 3	0	± 0	82	± 4	3	± 2	4	± 2	0	± 0

and Shannon Evenness (E), which differ in their respective focuses on species diversity of samples or on the abundance of the most abundant species in the sample (see MAGURRAN, 2004 for definitions).

One-way ANOVA was used to test the significance of differences in the obtained values. If the tested differences were statistically significant, a post-hoc test (Tukey's honest significant method) for multiple comparison was used (STATSOFT, Inc. 1999).

The impact of environmental variables (herb layer character, altitude) on the species structure and distribution of small terrestrial mammal communities and the relation of individual species to these variables were tested by the redundancy analysis (RDA), using Monte Carlo permutation procedure in CANOCO (TER BRAAK & ŠMILAUER, 2002; LEPŠ & ŠMILAUER, 2003) and Spearman's rank correlation coefficient (STATSOFT, Inc. 1999).

RESULTS AND DISCUSSION

A total of 586 individuals of small mammals (*Rodentia, Soricomorpha*) in 11 species (8 rodent species and 3 insectivorous species) were captured in the course of the monitored period. The yellow-necked mouse (*Apodemus flavicollis*) was the most abundant – (n = 177; D = 30.2%), followed by the bank vole (*Myodes glareolus*) – (n = 159; 27.1%) and the field vole (*Microtus agrestis*) – (n = 144; 24.6%), all of them highly eudominant (D > 10%). The remaining rodent species held a minority position in relation to the above mentioned species and included the subdominant (D = 2–5%) common vole (*M. arvalis*) – (n = 21; 3.7%) and the sub-recedent (D < 1%) wood mouse (*A. sylvaticus*) – (n = 4; 0.7%), European pine vole (*M. subterraneus*) – (n = 2; 0.4%), the northern birch mouse (*Sicista betulina*) – (n = 1; 0.2%) and the hazel dormouse (*Muscardinus avellanarius*) – (n = 1; 0.2%). The only abundant and eudominant insectivorous species included the common shrew (*Sorex araneus*) – (n = 74; 12.6%), while the remaining two species of the Eurasian pygmy shrew (*S. minutus*) – (n = 1; 0.2%) and the lesser white-toothed shrew (*Crocidura suaveolens*) – (n = 2; 0.4%) were subrecedent. The number of individuals captured and their dominance at individual plots are shown in Tab. III and IV.

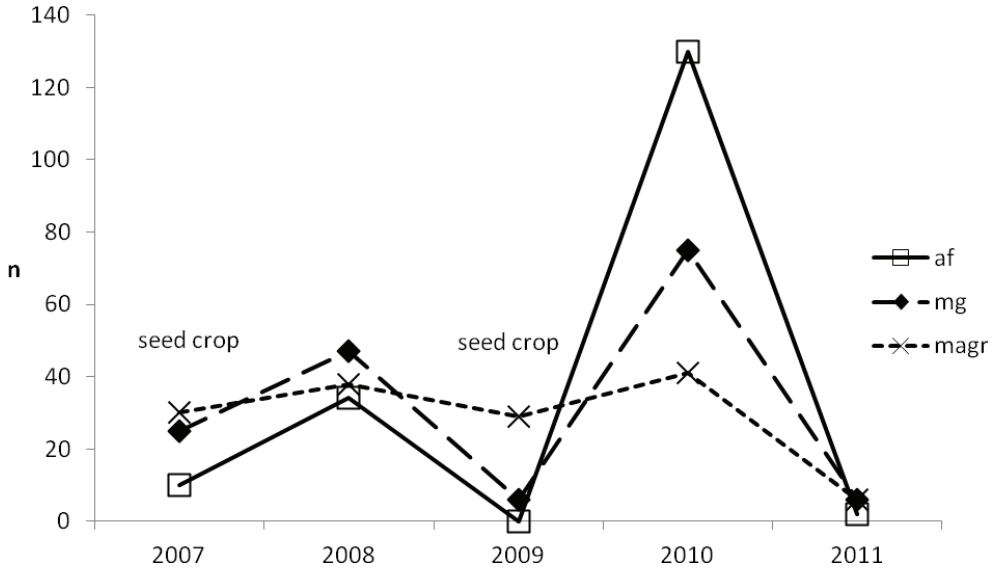
With respect to the number of occupied plots, the most frequently monitored species included the field vole and the bank vole, which occurred at 15 out of the 18 monitored plantations. The occurrence intensity corresponds to their habitat preferences. Both species prefer habitats with a well-developed

III: *Number of small mammals (n) trapped at the monitored plots in 2007–2011. A. f. – Apodemus flavicollis, A. s. – Apodemus sylvaticus, M. g. – Myodes glareolus, M. agr. – Microtus agrestis, M. a. – Microtus arvalis, M. s. – Microtus subterraneus, Mus. av. – Muscardinus avellanarius, Sic. b. – Sicista betulina, S. a. – Sorex araneus, S. m. – Sorex minutus, Cr. s. – Crocidura suaveolens*

Species/Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A. f.	6	18	10	-	-	-	8	13	21	14	12	8	22	19	6	-	9	11
A. s.	-	-	1	-	-	-	1	1	-	-	-	-	-	-	-	-	-	1
M. g.	-	7	30	2	4	3	-	-	23	3	7	1	4	12	14	7	11	31
M. agr.	1	6	10	-	1	-	1	-	3	6	21	24	18	17	15	10	6	5
M. a.	-	-	-	-	-	-	-	-	-	12	1	-	6	2	-	-	-	-
M. s.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Mus. av.	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Sic. b.	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
S. a.	-	-	2	-	-	1	1	-	-	9	12	9	10	7	6	10	2	5
S. m.	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Cr. s.	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-
Total (n)	7	31	53	2	5	5	12	15	47	45	53	43	60	57	41	27	30	53

IV: *Small mammal dominance (%) and diversity at individual monitored plots in 2007–2011*

	Dominance																	
Species/Site	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
A. f.	85.7	58.1	18.9	-	-	-	66.7	86.7	44.7	31.1	22.6	18.6	36.7	33.3	14.6	-	30	20.8
A. s.	-	-	1.9	-	-	-	8.3	6.7	-	-	-	-	-	-	-	-	-	1.9
M. g.	-	22.6	56.6	100	80	60	-	-	48.9	6.7	13.2	2.3	6.7	21.1	34.1	25.9	36.7	58.5
M. agr.	14.3	19.4	18.9	-	20	-	8.3	-	6.4	13.3	39.6	55.8	30	29.8	36.6	37.3	20	9.4
M. a.	-	-	-	-	-	-	-	-	-	26.7	1.9	-	10	3.5	-	-	-	-
M. s.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	-
Mus. av.	-	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-
Sic. b.	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-	-
S. a.	-	-	3.8	-	-	20	8.3	-	-	20	22.6	20.9	16.7	12.3	14.6	37.3	6.7	9.4
S. m.	-	-	-	-	-	-	-	-	-	2.2	-	-	-	-	-	-	-	-
Cr. s.	-	-	-	-	-	-	8.3	6.7	-	-	-	-	-	-	-	-	-	-
Number of species	2	3	5	1	2	3	5	3	3	6	5	5	5	5	4	3	5	5
Shannon	0.41	0.97	1.15	0	0.50	0.95	1.10	0.49	0.89	1.57	1.38	1.14	1.44	1.43	1.30	1.09	1.41	1.16
Reciprocal Simpson	0.25	0.57	0.61	0	0.32	0.56	0.53	0.24	0.56	0.77	0.72	0.61	0.73	0.74	0.71	0.66	0.73	0.60
Evenness	0.75	0.88	0.63	1	0.83	0.86	0.60	0.54	0.81	0.80	0.80	0.63	0.84	0.84	0.92	0.99	0.82	0.64



1: *Oscillation of population dynamics of selected small terrestrial mammal species in 2007–2011 at the monitored plantations in relation to beech mast crops in 2007 and 2009 (af – Apodemus flavicollis, mg – Myodes glareolus, magr – Microtus agrestis, n – number of individuals)*

herb layer which provides them with the necessary cover and food supply (HEROLDOVÁ, 1992; SUCHOMEL *et al*., 2009). The monitored plantations meet this condition, as the herb layer cover at monitored plots exceeded 90% (Tab. II). The yellow-necked mouse displayed a frequent occurrence as well, being monitored at 14 out of the 18 monitored plots. However, despite its high abundance the plantations represent only a temporary habitat for this species, particularly due to the limited supply of tree seeds (OBRTEL, HOLIŠOVÁ, 1974) which are largely lacking at tree plantations. It may therefore be assumed that yellow-necked mice take advantage of tree plantations particularly in the course of migration when looking for food and suitable habitats with a sufficient supply of fruiting trees, as, unlike voles, they are highly mobile and can cover large distances (FLOWERDEW *et al*., 1985).

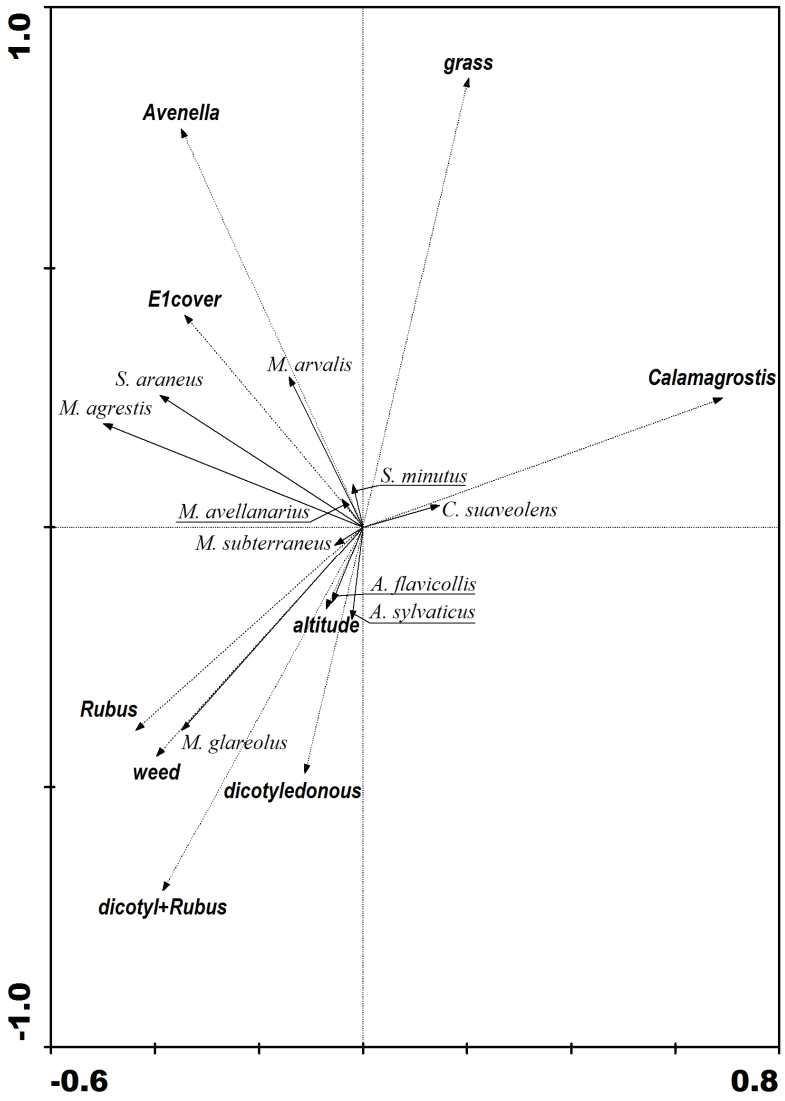
The population abundance of these species fluctuated strongly in the course of the years, which may, among other things, be attributed to changes in availability of food supply in the form of tree seeds. In the course of monitoring, strong beech nut production was monitored in 2007 and 2009, which corresponds to the fluctuations of the said small mammal species (Fig. 1). 2008 and particularly 2010 saw a sharp increase in the yellow-necked mouse as well as the bank vole populations. Both species are significant tree seed consumers and react by population growths to good mast crops (SUCHOMEL, HEROLDOVÁ, 2008). However, such abundance increases occur with a certain delay (one-year delay at times) and shift to the years immediately following the seed years (FLOWERDEW *et al*., 1985), as was the case in our monitoring. Reactions of these species populations outside the forest environment attest to the fact that mast crops affect the said species significantly even in open habitats and that in times of seed excess these species gather around such food sources. On the other hand, the field vole, whose population fluctuated considerably less, reacted completely differently (Fig. 1). This may be attributed to its different food preferences. This species prefers grasses and seeds constitute a minimum part of its diet (HEROLDOVÁ, 1992), which significantly minimizes its dependence on mast crops.

Results of RDA clearly indicate a significant impact (with the exception of stand age) of the habitat character (altitude, herb layer composition) on the structure and distribution of the small terrestrial mammal community (Tab. V, Fig. 2). *Microtus arvalis* and *M. agrestis* gave particular preference to habitats with prevailing grasses which condition the occurrence of these vole species with respect to their habitat and food preferences (HEROLDOVÁ, 1992; HEROLDOVÁ *et al*., 2007; SUCHOMEL *et al*., 2009). *Myodes glareolus*, on the other hand, preferred habitats with dicotyledonous plants, particularly in combination with *Rubus* spp., it feeds on (HOLIŠOVÁ, 1971; HANSSON, 1985).

Out of the determined insectivorous species, only the common shrew showed a relatively high abundance and dominance. When its basic habitat requirements, such as relatively humid sites with a well-developed humus or plant litter layer or with a thick herb layer, are met (Tab. V) it may be abundant both in the forest and non-forest environments (ANDĚRA, 2000). For example, in the Beskydy Mts. it is an eudominant species both in virgin forest reserves (D = 12%) and on forest plantations (D = 14–20%), while in production forests it is significantly less common (D < 7%) (ČEPELKA *et al*., 2011). This may be related both to the respective management

V: *Results of statistical analyses: RDA – tested the impact of a given factor on the structure and distribution of small terrestrial mammal communities; Spearman's correlation – tested dependence of individual species on given environmental factors. Abbreviations: ns – non-significant, nent – not entered, *– p < 0.05; **– p < 0.01; ***– p < 0.001.*

			Spearman´s correlation									
Environmental	RDA		*Apodemus*	*Apodemus*	*Myodes*	*Crocidura*	*Microtus*	*Microtus*	*Microtus*	*Muscardinus*	*Sorex*	*Sorex*
factors	F	*p*	*flavicollis*	*sylvaticus*	*glareolus*	*sulvaeolens*	*arvalis*	*agrestis*	*subterraneus*	*avelanarius*	*araneus*	*minutus*
Age of plantation	-	ns	nent	nent	nent	nent	nent	nent	nent	nent	nent	nent
Altitude	3.40	0.140	-*	ns	ns	ns	ns	ns	ns	ns	ns	ns
E1 cover	3.12	0.021	ns	ns	ns	ns	ns	+**	ns	ns	ns	ns
Grass	7.07	0.001	ns	ns	-***	ns	ns	ns	ns	ns	ns	ns
Weed	3.94	0.006	ns	ns	ns	-*	ns	+**	ns	ns	ns	ns
Dicotyledonous	2.36	0.052	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
Calamagrostis	7.47	0.001	ns	ns	-***	ns	ns	-**	ns	ns	-*	ns
Avenella	7.36	0.001	ns	ns	-*	ns	+***	+**	ns	ns	+*	ns
Rubus	4.09	0.004	ns	ns	ns	ns	ns	+***	ns	ns	+*	ns
Dicotyl. + *Rubus*	6.59	0.001	+*	ns	+**	ns	ns	ns	ns	ns	ns	ns



2: *RDA results: diagram showing the relation between environmental variables and small terrestrial mammal communities at beech plantations in the Jeseníky Mts. in 2007–2011. Differences between individual years were statistically significant (F = 6.193; p = 0.039) and as such were included in the analysis as co-variables. This model was highly significant (F = 4.171, p < 0.001) and explained 14.9% (axis 1), respectively 24.1% (axis 2) of species data variability. (E1 cover – total cover of herb layer; grass – cover of grass; Avenella – cover of Avenella sp.; Calamagrostis – cover of Calamgrostis sp.; dicotyledonous – cover of dicotyledonous plants; Rubus – cover of Rubus spp.; dicotyl+Rubus – combined cover of Rubus spp. and dicotyledonous plants; weed – cover of forest weed).*

of individual production forests and to changes in landscape management as such, as it is known e.g. from South Moravia (SUCHOMEL, HEROLDOVÁ, 2004). Tree plantations therefore represent an important refugium for this species.

The occurrence of the northern birch mouse, the hazel dormouse and the lesser white-toothed shrew, all rare subrecedent species, is of particular interest. The northern birch mouse is a strictly submontane to montane species, inhabiting predominantly humid sites with rich herb undergrowth outside closed forests, including forest clearings and clear-cuts. Two thirds of finds come from altitudes of 600–800 m (ANDĚRA, BENEŠ, 2002), which means that the occurrence at 1035 m monitored by us is less common. The hazel dormouse predominantly inhabits the shrub layer of closed deciduous and mixed forests and as such it is rarely captured in the course of terrestrial mammal sampling. However, its occurrence on plantations supports the fact that it favours also habitats of ecotone character (ANDĚRA, BENEŠ, 2001). The lesser white-toothed shrew is generally an uncommon species and in the conditions of the Czech Republic it forms predominantly synanthropic populations (ANDĚRA, 2000). Its occurrence focuses mainly on lower elevations, only rarely reaching to higher altitudes in connection to human settlements. In the Jeseníky Mts. the species was determined as high as Mt. Vysoká Hole, at 1460 m above sea level (BENEŠ, 1974). The lesser white-toothed shrews trapped in the course of our monitoring occurred at an altitude of approximately 750 m, completely outside the reach of human settlements. This supports the hypothesis that the species spreads through natural migration as well, not only through unintentional introduction (ANDĚRA, 2000).

The overall diversity of the small mammal community was H = 1.546 according to Shannon index and 1/D = 0.757 according to Simpson index, with equitability E = 0.4268. Diversity at individual plots fluctuated considerably (e.g. H = 0–1.571; Tab. IV). However, the diversity values at individual plots were not, despite certain distinct trends, statistically conclusive ($p > 0.05$), which gives evidence of only insignificant differences in the habitat character of individual monitored plots (Tab. II). The potential difference in small mammal species diversity was also tested in relation to the respective altitudes and forest altitudinal vegetation zones. At the level of altitudinal vegetation zones (five, six and seven in our case), the monitored plots formed three natural groups of equal sizes (n = 6), with corresponding altitudes (up to 750 m, 750–1000 m, over 1000 m). However, the difference in diversity among the altitudinal zones was not significant as well ($p > 0.05$).

Forest plantations form small-scale open habitats neighbouring with closed forests, which explains the occurrence of both forest and non-forest small mammal species. Owing to this, their diversity is comparable with the diversity of habitats of ecotone character or with richly structured forest stands. The determined value of Shannon index (1.546) corresponds to data obtained from plantations at the Keleč Downs (H = 1.456–1.557; SUCHOMEL, URBAN, 2011) or from the Beskydy Mts. (H = 1.27–1.42; ČEPELKA *et al.*, 2011), from isolated forest units in South Moravia (H = 1.5; SUCHOMEL and HEROLDOVÁ, 2004) or from virgin forests at Kněhyně in the Beskydy Mts. where H oscillated between 1.27–1.67 (BRYJA *et al.*, 2001; ČEPELKA *et al.*, 2011). Forest plantations have key significance for small mammal biodiversity, owing to their ecotone character in the given area and in the given forest stand as well. This fact becomes apparent when compared with closed high forest stands. E.g. the diversity of beech virgin forest stands at a low stage of disintegration is H = 1.0–1.12 (SUCHOMEL, URBAN, 2011), production beech monocultures reach H = 0.68–0.9 (SUCHOMEL, URBAN, 2011), spruce monocultures H = 1.00 (SUCHOMEL *et al.*, 2010) and the floodplain forests in South Moravia reach 0.97–1.04 (ZEJDA, 1976).

SUMMARY

The small mammal community of the monitored forest plantations is characterized by the high dominance of three rodent species, namely the yellow-necked mouse, the bank vole and the field vole (together almost D = 82%). From the forest management perspective, these species significantly affect both the natural and artificial regeneration of forest tree species (by seed consumption and bark gnawing). This is particularly of importance at present, as the area in question is subject to transformation from spruce monocultures to forests close to nature with a high ratio of broadleaved species. Their populations growing in open habitats, similarly to populations in forests, are affected by mast crops in the surrounding stands. Mast crops can therefore be used to predict population increases of selected small mammal species both in high forests and on plantations. Plantations in the area also form an important refugium for the common shrew populations. The rare occurrence of subrecedent species may be related both to their natural population dynamics and to the sampling method used. Data on the occurrence of the northern birch mouse, the hazel dormouse and the lesser white-toothed shrew provide additional information on their habitat preferences. When compared with data from high forests, the obtained values on biodiversity give evidence of the key importance of forest plantations for the small mammal biodiversity in our production forests.

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