ACTA UNIVERSITATIS AGRICULTURAE ET SILVICULTURAE MENDELIANAE BRUNENSIS

Volume 63 92 Number 3, 2015
http://dx.doi.org/10.11118/actaun201563030825

DOMINANCE AND DIVERSITY OF BIRD COMMUNITY IN FLOODPLAIN FOREST ECOSYSTEM

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Abstract

POPRACH KAREL, VRBKOVÁ JANA. 2015. Dominance and Diversity of Bird Community in Floodplain Forest Ecosystem. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis,* 63(3): 825–833.

The paper is aimed to assessment of diversity and structure of bird community in floodplain forest ecosystem. Authors present results of analyses data on bird communities obtained at two transects in the Litovelské Pomoraví Protected Landscape Area (Czech Republic) in the period 1998–2012. Research of bird communities was carried out using the point-count method. The article deals with qualitative and quantitative representation of breeding bird species, including their relation to habitat type (closed floodplain forest, ecotone). Altogether 63 breeding species were recorded at the Vrapač transect and 67 at the Litovelské luhy transect, respectively. To be able to detect all recorded species, 11 out of 14 years of monitoring were needed at the Vrapač transect and all 8 years of monitoring at the Litovelské luhy transect, respectively. Authors show that the values in dominant bird species change significantly among the particular census dates within one season, mainly with respect to their activity and detectability. Results are discussed in the frame of sustainable forest management in floodplain forest ecosystems. The presented article can promote to discussion aimed to management strategy for floodplain forest ecosystems, which ranks among natural habitat types of Community interest protected under the Natura 2000 European network.

Keywords: Chao2 estimation, dominance, hardwood floodplain forest, forest management, species richness, Litovelské Pomoraví, Natura 2000 European network

INTRODUCTION

Monitoring of birds is an important tool to enhance the knowledge of population status and population trends of rare, declining as well as common species (Hora *et al.*, 2010). Monitoring of birds carried out on a long time scale gives basic information on species composition and development of a bird community in space and time (Bibby *et al.*, 2007). Results of monitoring can be used to understand long-term changes in numbers of birds at a particular site with respect to possible habitat changes, to plan suitable management of the sites and more effective conservation of birds.

The aim of this paper is to assess diversity and structure of a bird community in floodplain forest ecosystem, which ranks among natural habitat types of Community interest protected under the Natura 2000 network. In the paper we assess qualitative and quantitative representation of breeding bird species at the two transects, including their relation to habitat type (closed floodplain forest, ecotone). Taking into consideration the results, we discuss the issue of species richness of bird communities in floodplain forests of central Moravia in the frame of forest management strategy.

MATERIAL AND METHODS

Research of birds using the point-count method was carried out in the Litovelské Pomoraví Protected Landscape Area (Poprach, Machar, 2012). Census of birds was carried out at the Vrapač transect (A transect) in the years 1998–2003 and 2005–2010

and at the Litovelské luhy transect (B transect) in the period 2005–2012. At each transect, 20 monitoring points were established (Janda, Řepa, 1986). Habitats belong to the hardwood forest of elm-oak stands of the *Querco-Ulmetum* association (Chytrý *et al*., 2001). The counts were carried out three times during the breeding season at both transects: in mid April – 1st census, in mid May – 2nd census and in mid June – 3rd census (in 2005, both transects were censused only in mid May and mid June). Three census dates per year were chosen because of the fact that some bird species (resident or arriving early in spring) start breeding earlier and their singing activity during territory defense may be rather intensive already during April. During the census in mid April, the determination of species and individuals was 70–80 percent acoustic, while in mid May when most of the trees had already come into leaf, the share of acoustic registrations increased to 90–100%. In mid June, when the trees are already covered by leaves and the canopy is closed, the share of acoustic registrations at the particular points was up to 100 percent.

Species diversity of bird community at the studied transects was compared using the rarefaction curves. The analysis was carried out in the EstimateS software (http://viceroy.eeb.uconn.edu/estimates/), Chao2 estimator, with the standard setting of the number of repetitions (50).

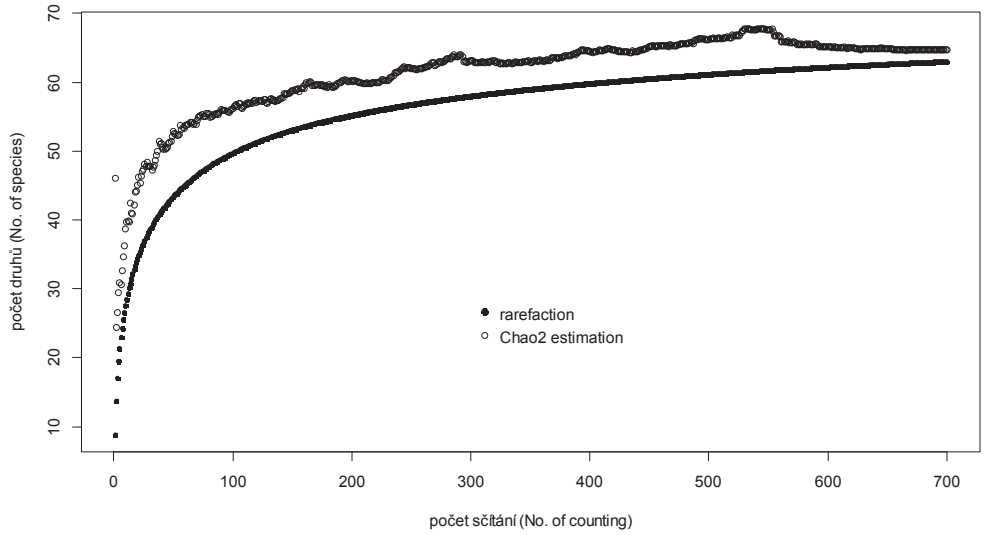
RESULTS

At the Vrapač transect, altogether 63 breeding bird species were recorded. In the first year of monitoring in 1998, we registered 43 species. To be able to detect all 63 recorded species, 11 out of 14 years of monitoring were needed. At the Litovelské luhy transect, 67 breeding birds species were recorded. In the first year (2005) we registered 39 species. To be able to detect all 67 recorded species, all 8 years of monitoring were needed (Tab. I). Differences in the number of recorded species between the two transects in the statistical regression model, where the effect of transect, environment and date of census in the given year, as well as meteorological factors were assessed, were not statistically significant (Wald test for regression coefficient corresponding to the factor „transect", $P = 0.477$). However, the number of individual registrations (with constant values of the other parameters) was significantly affected by transect ($P < 0.001$). The chance of registration is 0.890x lower at the Litovelské luhy transect compared to the Vrapač transect (Fig. 1 and Fig. 2). Curves of total species richness (estimated by the rarefaction method) are shown with closed circles, curves of the estimated species richness (Chao2 extrapolation) with open circles.

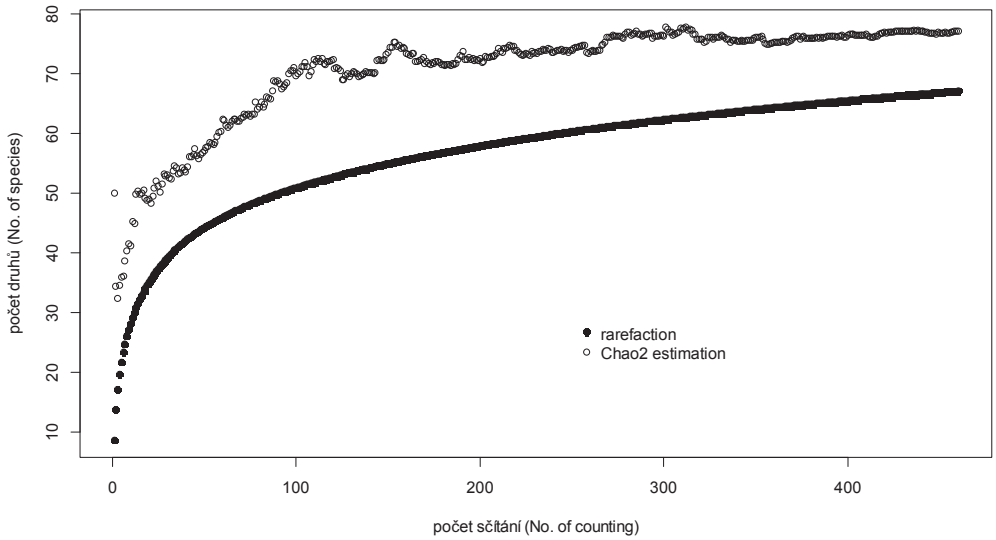
Using the available data, rough values of dominance were obtained for the two transects. At the Vrapač transect, 10 dominant species were recorded – *Fringilla coelebs, Sylvia atricapilla, Parus major, Sitta europaea, Sturnus vulgaris, Cyanistes caeruleus, Ficedula albicollis, Phylloscopus collybita, Dendrocopos major, Turdus merula*. The number of dominant species and their representation in dominance varied between particular census dates (Tab. I). Altogether 9 dominant species were recorded on the 1st census date – *Sturnus vulgaris, Parus major, Cyanistes caeruleus, Sitta europaea, Fringilla coelebs, Phylloscopus collybita, Sylvia atricapilla, Coccothraustes coccothraustes, Dendrocopos major*, 7 dominant species on the 2nd date – *Sylvia atricapilla, Fringilla coelebs, Ficedula albicollis, Sturnus vulgaris, Parus major, Turdus merula, Cyanistes caeruleus* and 7 dominant species on the 3rd date – *Fringilla coelebs, Sitta europaea, Sylvia atricapilla,*

I: *Number of bird species recorded at the Vrapač and Litovelské luhy transects in particular research years*

Year	Vrapač transect		Litovelské luhy transect	
	number of species (n)	%	number of species (n)	%
1998	43	68.3		
1999	43	68.3		
2000	48	76.2		
2001	57	90.5		
2002	58	92.1		
2003	59	93.7		
2004				
2005	59	93.7	39	58.2
2006	59	93.7	51	76.1
2007	60	95.2	53	79.1
2008	62	98.4	54	80.6
2009	63	100	57	85.1
2010	63	100	60	89.6
2011	63	100	62	92.5
2012	63	100	67	100



1: *Relationship between census effort and the number of recorded species at the Vrapač transect*



2: *Relationship between census effort and the number of recorded species at the Litovelské luhy transect*

Turdus merula, Parus major, Dendrocopos major, Cyanistes caeruleus.

At the Litovelské Luhy, 9 dominant species were recorded – *Sylvia atricapilla, Fringilla coelebs, Phylloscopus collybita, Cyanistes caeruleus, Parus major, Sitta europaea, Ficedula albicollis, Dendrocopos major, Sturnus vulgaris*. Altogether 8 dominant species were recorded on the 1st census date – *Cyanistes caeruleus, Parus major, Sylvia atricapilla, Phylloscopus collybita, Sturnus vulgaris, Fringilla coelebs, Sitta europaea, Ficedula albicollis*, 7 dominant species on the 2nd date – *Sylvia atricapilla, Fringilla coelebs, Ficedula albicollis, Phylloscopus collybita, Parus major, Sturnus vulgaris, Cyanistes caeruleus* and 7 dominant species on the 3rd date – *Sylvia atricapilla, Fringilla coelebs, Sitta europaea, Dendrocopos major, Phylloscopus collybita, Cyanistes caeruleus, Turdus merula*.

Tab. II shows in detail number of bird species recorded at the Vrapač and Litovelské luhy transects in particular research years. For each analysed year (covering all censuses in the given year), number of all bird species recorded since the beginning of the monitoring is provided. It shows the number of years needed to be able to detect all recorded species at the particular point-count transects.

DISCUSSION

Polášek (1991) mentions altogether 7 dominant species at the locality Vrapač in 1989–1990: the Common Starling, Common Chaffinch, Eurasian Blackcap, Collared Flycatcher, Great Tit, Eurasian Nuthatch and Hawfinch. Bureš, Maton (1984/1985) found 7 dominant species near the locality Litovelské luhy between the municipalities of Hynkov and Střeň in 1982–1984: Eurasian Blackcap, Common Starling, Common Chiffchaff, Common Chaffinch, Eurasian Blue Tit, Great Tit

II: *Number of species and species composition recorded at the Vrapač and Litovelské luhy transects*

Species	Vrapač transect								Litovelské luhy transect							
	abundance (n)				dominance (%)				abundance (n)				dominance (%)			
	A1	A2	A3	AΣ	D1	D2	D3	DΣ	A1	A2	A3	AΣ	D1	D2	D3	DΣ
Ciconia nigra	2	0	2	4	0.06	0.00	0.08	0.05	0	1	0	1	0.00	0.06	0.00	0.02
Anas platyrhynchos	23	11	0	34	0.71	0.39	0.00	0.40	10	0	0	10	0.56	0.00	0.00	0.20
Pernis apivorus	0	0	0	0	0.00	0.00	0.00	0.00	0	2	0	2	0.00	0.11	0.00	0.04
Buteo buteo	36	31	45	112	1.11	1.09	1.79	1.31	17	16	8	41	0.95	0.89	0.53	0.81
Phasianus colchicus	12	15	0	27	0.37	0.53	0.00	0.31	7	3	4	14	0.39	0.17	0.26	0.28
Actitis hypoleucos	4	0	0	4	0.12	0.00	0.00	0.05	0	0	0	0	0.00	0.00	0.00	0.00
Columba oenas	0	0	0	0	0.00	0.00	0.00	0.00	1	0	0	1	0.06	0.00	0.00	0.02
Columba palumbus	38	53	36	127	1.17	1.87	1.44	1.48	45	41	27	113	2.53	2.29	1.78	2.22
Streptopelia decaocto	0	1	1	2	0.00	0.04	0.04	0.02	4	0	2	6	0.22	0.00	0.13	0.12
Streptopelia turtur	1	2	3	6	0.03	0.07	0.12	0.07	1	25	33	59	0.06	1.40	2.17	1.16
Cuculus canorus	2	30	7	39	0.06	1.06	0.28	0.45	1	22	20	43	0.06	1.23	1.32	0.84
Strix aluco	0	0	0	0	0.00	0.00	0.00	0.00	2	0	0	2	0.11	0.00	0.00	0.04
Alcedo atthis	4	1	6	11	0.12	0.04	0.24	0.13	0	2	1	3	0.00	0.11	0.07	0.06
Jynx torquilla	3	1	0	4	0.09	0.04	0.00	0.05	0	0	0	0	0.00	0.00	0.00	0.00
Picus canus	8	3	3	14	0.25	0.11	0.12	0.16	15	4	3	22	0.84	0.22	0.20	0.43
Picus viridis	13	5	5	23	0.40	0.18	0.20	0.27	9	8	7	24	0.51	0.45	0.46	0.47
Dryocopus martius	5	3	7	15	0.15	0.11	0.28	0.17	4	4	3	11	0.22	0.22	0.20	0.22
Dendrocopos major	168	121	157	446	5.19	4.27	6.26	5.20	69	88	115	272	3.87	4.92	7.57	5.34
Dendrocopos medius	48	26	12	86	1.48	0.92	0.48	1.00	52	19	11	82	2.92	1.06	0.72	1.61
Dendrocopos minor	22	3	10	35	0.68	0.11	0.40	0.41	8	0	1	9	0.45	0.00	0.07	0.18
Anthus trivialis	5	0	1	6	0.15	0.00	0.04	0.07	1	3	0	4	0.06	0.17	0.00	0.08
Motacilla cinerea	5	16	5	26	0.15	0.56	0.20	0.30	1	1	0	2	0.06	0.06	0.00	0.04
Motacilla alba	6	1	2	9	0.19	0.04	0.08	0.10	2	0	0	2	0.11	0.00	0.00	0.04
Cinclus cinclus	0	1	0	1	0.00	0.04	0.00	0.01	0	0	0	0	0.00	0.00	0.00	0.00
Troglodytes troglodytes	98	78	109	285	3.02	2.75	4.35	3.32	21	32	32	85	1.18	1.79	2.11	1.67
Prunella modularis	34	19	17	70	1.05	0.67	0.68	0.82	14	8	7	29	0.79	0.45	0.46	0.57
Erithacus rubecula	132	47	84	263	4.07	1.66	3.35	3.06	89	45	50	184	5.00	2.52	3.29	3.61
Luscinia megarhynchos	0	2	0	2	0.00	0.07	0.00	0.02	0	1	0	1	0.00	0.06	0.00	0.02
Phoenicurus phoenicurus	0	0	0	0	0.00	0.00	0.00	0.00	0	2	0	2	0.00	0.11	0.00	0.04

Species	Vrapač transect								Litovelské luhy transect							
	abundance (n)				dominance (%)				abundance (n)				dominance (%)			
	A1	A2	A3	AΣ	D1	D2	D3	DΣ	A1	A2	A3	AΣ	D1	D2	D3	DΣ
Turdus merula	81	187	176	444	2.50	6.60	7.02	5.17	45	87	91	223	2.53	4.86	5.99	4.38
Turdus pilaris	17	16	3	36	0.52	0.56	0.12	0.42	3	1	0	4	0.17	0.06	0.00	0.08
Turdus philomelos	67	72	91	230	2.07	2.54	3.63	2.68	23	53	42	118	1.29	2.96	2.76	2.32
Turdus viscivorus	4	1	2	7	0.12	0.04	0.08	0.08	1	6	2	9	0.06	0.34	0.13	0.18
Locustella naevia	0	1	0	1	0.00	0.04	0.00	0.01	0	0	0	0	0.00	0.00	0.00	0.00
Locustella fluviatilis	0	61	11	72	0.00	2.15	0.44	0.84	0	22	4	26	0.00	1.23	0.26	0.51
Acrocephalus palustris	0	10	4	14	0.00	0.35	0.16	0.16	0	0	0	0	0.00	0.00	0.00	0.00
Hippolais icterina	0	5	2	7	0.00	0.18	0.08	0.08	0	1	0	1	0.00	0.06	0.00	0.02
Sylvia curruca	1	0	0	1	0.03	0.00	0.00	0.01	0	0	0	0	0.00	0.00	0.00	0.00
Sylvia communis	0	5	1	6	0.00	0.18	0.04	0.07	2	12	7	21	0.11	0.67	0.46	0.41
Sylvia borin	1	39	22	62	0.03	1.38	0.88	0.72	3	21	11	35	0.17	1.17	0.72	0.69
Sylvia atricapilla	177	294	245	716	5.46	10.37	9.77	8.34	152	209	185	546	8.53	11.68	12.17	10.73
Phylloscopus sibilatrix	12	4	2	18	0.37	0.14	0.08	0.21	15	5	3	23	0.84	0.28	0.20	0.45
Phylloscopus collybita	210	115	122	447	6.48	4.06	4.87	5.21	145	138	102	385	8.14	7.71	6.71	7.56
Phylloscopus trochilus	8	2	0	10	0.25	0.07	0.00	0.12	13	3	2	18	0.73	0.17	0.13	0.35
Regulus regulus	0	0	0	0	0.00	0.00	0.00	0.00	8	2	5	15	0.45	0.11	0.33	0.29
Regulus ignicapilla	0	0	0	0	0.00	0.00	0.00	0.00	1	0	0	1	0.06	0.00	0.00	0.02
Muscicapa striata	1	53	58	112	0.03	1.87	2.31	1.31	0	21	31	52	0.00	1.17	2.04	1.02
Ficedula albicollis	112	262	106	480	3.46	9.24	4.23	5.59	91	143	50	284	5.11	7.99	3.29	5.58
Aegithalos caudatus	5	8	6	19	0.15	0.28	0.24	0.22	6	8	6	20	0.34	0.45	0.39	0.39
Poecile palustris	10	14	22	46	0.31	0.49	0.88	0.54	9	8	21	38	0.51	0.45	1.38	0.75
Cyanistes caeruleus	294	155	139	588	9.07	5.47	5.54	6.85	172	91	99	362	9.66	5.09	6.51	7.11
Parus major	339	209	157	705	10.46	7.37	6.26	8.22	161	120	61	342	9.04	6.71	4.01	6.72
Lophophanes cristatus	0	0	0	0	0.00	0.00	0.00	0.00	0	1	0	1	0.00	0.06	0.00	0.02
Periparus ater	0	0	0	0	0.00	0.00	0.00	0.00	7	8	5	20	0.39	0.45	0.33	0.39
Poecile montanus	0	0	0	0	0.00	0.00	0.00	0.00	1	0	2	3	0.06	0.00	0.13	0.06
Sitta europaea	259	101	299	659	7.99	3.56	11.93	7.68	99	52	143	294	5.56	2.91	9.41	5.78
Certhia familiaris	67	63	34	164	2.07	2.22	1.36	1.91	15	12	13	40	0.84	0.67	0.86	0.79
Certhia brachydactyla	45	24	15	84	1.39	0.85	0.60	0.98	1	2	1	4	0.06	0.11	0.07	0.08
Oriolus oriolus	5	75	46	126	0.15	2.65	1.83	1.47	20	45	35	100	1.12	2.52	2.30	1.96

Species	Vrapač transect								Litovelské luhy transect							
	abundance (n)				dominance (%)				abundance (n)				dominance (%)			
	A1	A2	A3	AΣ	D1	D2	D3	DΣ	A1	A2	A3	AΣ	D1	D2	D3	DΣ
Lanius collurio	0	0	0	0	0.00	0.00	0.00	0.00	0	1	0	1	0.00	0.06	0.00	0.02
Lanius excubitor	0	0	2	2	0.00	0.00	0.08	0.02	0	0	0	0	0.00	0.00	0.00	0.00
Garrulus glandarius	44	17	14	75	1.36	0.60	0.56	0.87	32	17	14	63	1.80	0.95	0.92	1.24
Corvus cornix	17	14	12	43	0.52	0.49	0.48	0.50	7	2	0	9	0.39	0.11	0.00	0.18
Corvus corax	4	0	1	5	0.12	0.00	0.04	0.06	0	1	0	1	0.00	0.06	0.00	0.02
Sturnus vulgaris	351	225	21	597	10.83	7.94	0.84	6.96	123	118	22	263	6.91	6.60	1.45	5.17
Passer montanus	9	2	4	15	0.28	0.07	0.16	0.17	2	1	2	5	0.11	0.06	0.13	0.10
Fringilla coelebs	222	277	323	822	6.85	9.77	12.88	9.58	113	158	152	423	6.34	8.83	10.00	8.31
Serinus serinus	2	0	0	2	0.06	0.00	0.00	0.02	1	0	0	1	0.06	0.00	0.00	0.02
Carduelis chloris	0	1	1	2	0.00	0.04	0.04	0.02	3	0	4	7	0.17	0.00	0.26	0.14
Carduelis carduelis	15	1	3	19	0.46	0.04	0.12	0.22	1	1	1	3	0.06	0.06	0.07	0.06
Carduelis cannabina	1	0	0	1	0.03	0.00	0.00	0.01	0	0	0	0	0.00	0.00	0.00	0.00
Loxia curvirostra	0	0	0	0	0.00	0.00	0.00	0.00	0	0	2	2	0.00	0.00	0.13	0.04
Coccothraustes coccothraustes	177	30	28	235	5.46	1.06	1.12	2.74	84	39	28	151	4.72	2.18	1.84	2.97
Emberiza citrinella	14	21	23	58	0.43	0.74	0.92	0.68	49	53	48	150	2.75	2.96	3.16	2.95
Emberiza schoeniclus	0	0	0	0	0.00	0.00	0.00	0.00	0	0	2	2	0.00	0.00	0.13	0.04
Σ	3240	2834	2507	8581	100.00	100.00	100.00	100.00	1781	1789	1520	5090	100.00	100.00	100.00	100.00
Σ No. of individuals/transect	295	236	209	245					356	298	253	299				

A1, A2, A3 – summary abundance from the census in mid April, mid May and mid June; D1, D2, D3 – dominance from the census in mid April, mid May and mid June

and Eurasian Tree Sparrow. Among other authors, e.g. Toman (1984) mentions the Eurasian Blackcap, Common Chaffinch, Common Chiffchaff, Great Tit and Dunnock as dominant species, Chytil (1984) found the Common Starling, Great Tit, Eurasian Blue Tit, Eurasian Blackcap, Eurasian Tree Sparrow and Common Chaffinch to be dominant species. Dominant representation of the Dunnock recorded by Toman (1984) is interesting, as well as a relatively high representation of the Reeves's Pheasant mentioned by Chytil (1984) – 3.8 percent in 1978 and 1.7 percent in 1979, which is certainly related to the number of introduced individuals at the site. In this study, I recorded a marked decline of dominance of the Common Starling during the 3rd census date (less than 2 percent of dominance) – at that time, Starlings already aggregate in flocks and wander the countryside. Chytil (1984) considers the method of nest searching (checking occupancy of potential nest holes) to be the most suitable way to assess the Common Starling numbers, as using the territory mapping method the numbers were underestimated.

Dominant representation of the Eurasian Tree Sparrow mentioned by Bureš, Maton (1984/1985) – 5.6 percent and by Chytil (1984) – 6.4 percent in 1978 and 5.0 percent in 1979 is noteworthy. Svoboda (1991) considers the Eurasian Tree Sparrow to be one of the commonest species in the Žebračka National Nature Reserve. However, in this study, the dominance of the Eurasian Tree Sparrow reached only 0.13 percent at the Vrapač and 0.11 percent at the Litovelské Luhy. Toman (1984) mentions the dominance value of 1.2 percent for the species *„P. montanus"* (Eurasian Tree Sparrow or Willow Tit, authors comment) in 1983. Neither Koleček *et al*. (2011) reported the species from the localities Žebračka and Království from the breeding seasons of 2007–2008. The above findings indicate disappearance of the Eurasian Tree Sparrow from floodplain forests of central Moravia. The question remains whether the presence of the Eurasian Tree Sparrow in floodplain forests was indigenous or whether the species was rather associated with secondary floodplain forest habitats altered by man.

Comparison of the results of the above mentioned studies of bird communities of floodplain forests shows that bird diversity in this habitat changes in time, which is primarily due to changes in structure of the floodplain forest and also due to population trends of the studied species. Bureš, Maton (1984/1985) point to some unsuitable interventions to the forest ecosystem, such as disruption of forest complexity, changes in species composition of woody plants and planting of the non-native spruce, segmentation of forest stands, forest drainage or creation of open areas for the game. Obviously, certain human impacts are not beneficial or are even harmful to floodplain forests (Machar, 2012). In the past, however, floodplain forests went through a complex dynamic development. In central Europe they were intensively managed as coppice with standards (Mezera, 1956), a cattle grazing was also usual. For instance at the end of the 17th century, Vrapač was characterised as a sparse floodplain forest, partly with individual solitary trees as a result of grazing, mainly of pigs. Historical maps from the end of the 18th century already show the Vrapač floodplain forest as compact (Machar, 2008a).

It is well known that the current „primeval forest reserves" of floodplain forests in southern Moravia are not original primeval forests but former grazed forests (Vrška *et al*., 2006). Influencing of water regime of the forest (Maděra, 2001) as well as of fluvial dynamics (Machar, Pechanec, 2011) should be also stressed. The main cause of high diversity of plant and animal communities of floodplain forests in a human-affected landscape of central Europe seems to be the high intensity of forestry (coppicing) practices in the past (Machar, 2009a), which has recently instigated establishment of activities and methodologies aimed at restoration of this type of management in floodplain forests (Kadavý *et al*., 2007; Machar, 2008b). The current effort is focused on the comeback of the optimal form of management – coppice with standards (Kadavý, 2013) with two main levels: the upper layer consisting of individual old reserved trees (oak, ash, elm) of a seed origin left to the age of approx. 150–300 years, and the lower level (coppiced wood) which was logged in short intervals of 7–35 years (Machar, 2009b). The coppice-with-standard forest was thus repeatedly thinned in large areas (Hudec, 2001; Klimo *et al*., 2008; Machar *et al*., 2010). Studies carried out in the last decades in the floodplain forests of Litovelské Pomoraví show that natural regeneration does not take place there due to the impact of the overpopulated cloven-hoofed game (Čermák, Mrkva, 2006). In the floodplain forest reserves of southern Moravia with a non-intervention regime, species composition of woody plants changes significantly: the Field Maple (*Acer campestre*) has prevailed on the studied (fenced) plots, however, natural regeneration of oak (*Quercus sp.*) has not been recorded (Janík *et al*., 2008).

Considering the effect of forestry practices on the structure and diversity of the bird community, differences in preferred breeding habitat should be taken into account, distinguishing interior species and ecotone species of birds (Schlaghamerský, Hudec, 2008). The two groups show different responses to forest management – with increasing fragmentation of a continuous floodplain forest, interior species disappear from the community while ecotone species increase in numbers. For instance Koleček *et al.* (2011) recorded one third more bird species in the Království u Grygova floodplain forest, which is managed more intensively and represents a patchwork of different types of woods and open areas (thickets, clearings, openings, forest roads) than in the Žebračka u Přerova floodplain forest which consists of a full-grown closed wood. The overall diversity due to habitat fragmentation increases depending

on the size of the study area (Reichholf, 1985). Interventions to a continuous floodplain forest are reflected differently by particular breeding bird guilds – as a result of thinning in the understorey, species from the guild of birds breeding in the bush layer may disappear, on the other hand, species from the guild of hollow nesting birds may grow in numbers due to the increased harvesting age (Machar, 2011). Age of the particular forest stand also needs to be taken into account. Most authors focus on old forest stands (in the harvesting age), while only few studies are aimed at younger stands. Younger age categories of the deciduous managed forest can be considered as succession stages where a certain general succession model of changes in diversity and structure of the bird community exists. At the same time, habitat heterogeneity affects the diversity of bird communities in younger woods. For instance LEŠO (2003) showed a significant effect of the number of old reserved trees on the diversity of a bird community in a young oak forest in Slovakia.

CONCLUSION

Bird communities are considered as an important bioindicator of quality of forest ecosystem. Information from analyses of dominance and diversity of bird communities can support sustainable forest management aimed to conservation of biodiversity of forest ecopsystems. The presented paper deals with assessment of dominance and diversity of bird breeding community in floodplain forest ecosystem. Authors present results of analyses data on bird communities obtained at two transects in the Litovelské Pomoraví Protected Landscape Area (Czech Republic) in the period 1998–2012 in study plots of the research grant TARMAG. Research of bird communities was carried out using the point-count method. The article deals with qualitative and quantitative representation of breeding bird species, including their relation to habitat type (closed floodplain forest, ecotone), because the current state of forest habitat is influnced by forest management. Altogether 63 breeding species were recorded at the Vrapač transect and 67 at the Litovelské luhy transect, respectively. To be able to detect all recorded species, 11 out of 14 years of monitoring were needed at the Vrapač transect and all 8 years of monitoring at the Litovelské luhy transect, respectively. Authors show that the values in dominant bird species change significantly among the particular census dates within one season, mainly with respect to their activity and detectability. Results are discussed in the frame of sustainable forest management in floodplain forest ecosystems. The presented article can promote to discussion aimed to management strategy for floodplain forest ecosystems, which ranks among natural habitat types of Community interest protected under the Natura 2000 European network.

Acknowledgement

Research was supported by a grant from the Ministry of the Environment of the Czech Republic TARMAG – Biodiversity and Target Management of Habitats of Coppiced Forests in the Frame of NATURA 2000 System, which was developed at Mendel University in Brno and Palacky University in Olomouc. Authors thank Eva Cepáková for translation into English.

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