

BREEDING BIRD COMMUNITY OF MONOCULTURAL SPRUCE PLANTATION IN THE SKOLIVSKI BESKIDS (THE UKRAINIAN CARPATHIANS)

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А.-Т.В. Башта. - Гніздове населення птахів монокультурного смерекового насадження у Сколівських Бескидах (Українські Карпати). - Беркут. 8 (1). 1999. - Дослідження проводилися протягом 1994-1996 рр. Всього виявлено 38 видів птахів. Щільність орнітонаселення становить 24,1-24,7 пар/10 га. В усі роки в населенні птахів домінували зяблик, жовтоголовий королик, чорна синиця і вільшанка. Проста структура досліджуваних смерекових насаджень є причиною низьких кількісних показників його орнітоугруповання. Разом з тим, смерекові лісостани є гніздовими біотопами деяких рідкісних видів: волохатого сича, глухаря, довгохвості сови, трипалого дятла.

Key words: the Carpathians, community, count, population density, rare species.

1. Introduction

The territory of the Skolivski Beskids has been poorly investigated in ornithological respect till now. Only single data about some birds of this region are known from previous works (Dzieduszycki, 1880, 1896; Domaniowski, 1915; Strautman, 1954; Pogranichny, 1993; Bashta et al., 1994), materials of Ornithofaunistic Commission of the Ukrainian Ornithological Society (OFC), etc.

2. Study area

Our investigations have been carried out in the territory of Skolivski Beskids, which are situated on the north-eastern slope of the Ukrainian Carpathians in Lviv region.

The Skolivski Beskids are relatively low part of the Ukrainian Carpathians. They are limited by the Misunka river on the east, the Striy river on the west, the Precarpathians on the north-east and line between towns Turka and Slavske on the south-west. Investigated area has a very dismembered relief. The highest mountains are Magura (1362 m), Parashka (1268 m) and Zeimyn (1265 m). The main rivers are Striy and Opir. The period with temperatures below 0°C lasts 3,5-4 months (Andrianov, 1968).

According to a geobotanical distribution of the Ukrainian Carpathians (Holubets, Malynowsky, 1967), main part of Skolivski Beskids belongs to region of spruce-fir-beech

beskids forests. Some part lies in the region of beech-fir upperdnister forests and fir-beech premountain forests.

The main element of the landscape of Skolivski Beskids is forest, which cover above 90 % of all area. During last century it has suffered considerable degradation because of excessive cutting. Among the plant communities the fir-beech woods (*Abieto-Fageta*) have a large area. Clear beech woods (*Fageta silvaticae*), beech-fir woods (*Fageto-Abieta*), spruce-beech-fir woods (*Piceeto-Fageto-Abieta*) are rare. Besides, monocultural spruce (*Picea abies*) plantations are distributed in modern plant cover. They have very simple vertical structure, weak resistance to disease and younger age of nature ripeness than the nature spruce forests.

Present investigations cover the southwestern slope of the Perecop-mountain. The route (about 2,5 km long) was laid on the altitudes 650-800 a. s. l. in monocultural spruce plantation which is about 70-80 years old and belongs to the association *Piceetum myrtillusum*. The route lies mainly in closed stands, almost without distinctive gaps and thinning.

3. Methods

The data were collected in 1994-1996. The literature data and materials of the OFC are used too. They supplement information about bird distribution and number in the region.

Table 1

Breeding bird community of the monocultural spruce plantation in the Skolivski Beskids in 1994-1996 (explanations are in text)
Гніздове населення птахів монокультурного смерекового насадження в Сколівських Бескидах у 1994-1996 рр. (пояснення в тексті)

Species Вид	Occurrence Численність	Frequency Частота
<i>Accipiter gentilis</i>	B	r
<i>A. nisus</i>	A	r
<i>Buteo buteo</i>	C	+
<i>Tetrao urogallus</i>	C	r
<i>Tetrastes bonasia</i>	C	r
<i>Strix aluco</i>	B	r
<i>S. uralensis</i>	B	r
<i>Aegolius funereus</i>	B	r
<i>Cuculus canorus</i>	B	r
<i>Picoides tridactylus</i>	D	+
<i>Dryocopus martius</i>	B	r
<i>Dendrocopos major</i>	B	+
<i>Anthus trivialis</i>	C	r
<i>Troglodytes troglodytes</i>	D	++
<i>Prunella modularis</i>	D	++
<i>Erithacus rubecula</i>	D	++
<i>Turdus merula</i>	D	+
<i>T. torquatus</i>	D	+
<i>T. philomelos</i>	D	+
<i>Sylvia atricapilla</i>	C	+
<i>S. curruca</i>	A	r
<i>Phylloscopus trochilus</i>	C	+
<i>Ph. collybita</i>	D	++
<i>Ph. sibilatrix</i>	A	r
<i>Regulus regulus</i>	D	++
<i>Parus montanus</i>	D	+
<i>P. ater</i>	D	++
<i>P. cristatus</i>	D	+
<i>P. major</i>	B	r
<i>Sitta europaea</i>	A	r
<i>Certhia familiaris</i>	D	++
<i>Fringilla coelebs</i>	D	++
<i>Spinus spinus</i>	C	+
<i>Loxia curvirostra</i>	B	+
<i>Pyrrhula pyrrhula</i>	D	+
<i>Garrulus glandarius</i>	A	r
<i>Nucifraga caryocatactes</i>	B	+
<i>Corvus corax</i>	C	r
Total:	38	38

The itinerary route method with the width of stripe at the average distance of detection of birds was used in quantitative studies (Kusiakin, 1962). The data get from the field should be passed into the formula:

$$D = V / 2WAL,$$

where: D – population density (pairs/10 ha), V – the number of registered pairs on the 1 km of route, W – distance of audibility of bird voice (in km), A – activity of the singing birds; L – length of the route, km.

Besides, the sites of singing males, nests observed and other evidences of bird nesting were plotted on a map. Each count was carried out about 3 hours in early morning, when the vocal activity of birds is most intensive. For some birds evening counts were made in order to obtain a more exact estimation of their abundance. Every year 5-6 counts were carried out on the route.

Days of counts of birds on the sample route:

	May	June	July
1994	8, 16	7, 16	2
1995	12, 13, 29	9, 19	8
1996	10, 19	11, 12, 16	10

According to Palmgren (1930), criterion of species dominance is minimum 5 % proportion of total.

The category of occurrence was established for each species observed, they are as follows:

A – no findings permitting conclusions about breeding,
B – nesting supposed,
C – nesting very probable,
D – nesting observed.

Besides, the occurrence of birds was characterised on the basis of the frequency of records



Table 2

Results of bird counts in monocultural spruce plantation in Skolivski Beskids in 1994-1996 (pairs/10 ha)

Результати обліків птахів у монокультурному смерековому насадженні у Сколівських Бескидах у 1994-1996 рр. (пар/10 га)

Species	Вид	1994		1995		1996		M n
		n	%	n	%	n	%	
<i>Fringilla coelebs</i>		9,1	37,8	8,7	35,5	9,2	37,2	9,0
<i>Regulus regulus</i>		4,3	17,9	4,8	19,6	4,5	18,2	4,5
<i>Parus ater</i>		2,4	10,0	2,0	8,2	2,3	9,3	2,2
<i>Erithacus rubecula</i>		1,7	7,1	1,4	5,7	1,5	6,1	1,5
<i>Prunella modularis</i>		1,2	5,0	1,3	5,3	1,2	4,9	1,2
<i>Phylloscopus collybita</i>		1,2	5,0	0,6	2,4	0,9	3,6	0,9
<i>Certhia familiaris</i>		0,9	3,7	1,2	4,9	0,7	2,8	0,9
<i>Turdus merula</i>		0,6	2,5	0,4	1,6	0,9	3,6	0,6
<i>T. torquatus</i>		0,6	2,5	0,7	2,9	0,4	1,6	0,6
<i>Pyrrhula pyrrhula</i>		0,4	1,7	0,6	2,4	0,4	1,6	0,5
<i>Troglodytes troglodytes</i>		0,4	1,7	0,7	2,9	0,5	2,0	0,5
<i>Turdus philomelos</i>		0,5	2,1	0,6	2,4	0,4	1,6	0,5
<i>Parus cristatus</i>		0,2	0,8	0,3	1,2	0,4	1,6	0,3
<i>P. montanus</i>		0,2	0,8	0,2	0,8	0,5	2,0	0,3
<i>Loxia curvirostra</i>		0,2	0,8	0,2	0,8	0,3	1,2	0,2
<i>Spinus spinus</i>		–	–	0,2	0,8	0,2	0,8	0,1
<i>Sylvia atricapilla</i>		0,1	0,4	0,2	0,8	0,1	0,4	0,1
<i>Picoides tridactylus</i>		–	–	0,1	0,4	0,1	0,4	0,1
<i>Phylloscopus trochilus</i>		0,1	0,4	–	–	0,1	0,4	0,1
<i>Nucifraga caryocatactes</i>		–	–	0,1	0,4	0,1	0,4	0,1
Total 20 species		24,1	100,0	24,3	100,0	24,7	100,0	24,4

Species, included only in fauna: *Anthus trivialis*, *Phylloscopus sibilatrix*, *Sitta europaea*, *Parus major*, *Garrulus glandarius*, *Corvus corax*, *Cuculus canorus*, *Dryocopus martius*, *Dendrocopos major*, *Tetrastes bonasia*, *Strix aluco*, *Strix uralensis*, *Buteo buteo*.

in the breeding season. Species met several times were regarded as rare (r), fairly frequent (+) and frequent (++).

In order to determine the similarity of the bird communities being compared for specific composition Soresnson's quotient (QS) was applied (Magurran, 1988). The value of QS exceeding 60 % indicates a big similarity of the communities.

4. Results

During the investigated periods 38 bird species were registered in monocultural spruce

plantation in Skolivski Beskids. They are listed in Table 1. It also gives categories of their occurrence and the frequency of meeting. The bird number was relatively stable and varied within the limits of 24,1-24,7 pairs/10 ha.

Some species demanding more comment.

Buteo buteo. It is the most numerous bird of prey in the Skolivski Beskids. Pairs or single individuals were observed during each count. Two families with 2 (in 1995) and 3 (in 1996) flying young have been found in the area of sample route. In 1996 a bird, which

Table 3

Population density of birds in the community relative to nesting site (pairs/10 ha)
Густота населення птахів по місцях гніздування (пар/10 га)

Nest sites	1994		1995		1996		M	
	n	%	n	%	n	%	n	%
On ground	3,4	14,1	2,7	11,1	3,0	12,2	3,0	12,3
Low above ground	2,5	10,4	2,6	10,7	2,6	10,3	2,5	10,3
On tree branches	14,5	60,2	15,2	62,6	15,1	61,4	15,1	61,9
In tree-holes	3,7	15,3	3,8	15,6	4,0	16,1	3,8	15,5
Total:	24,1	100,0	24,3	100,0	24,7	100,0	24,4	100,0

was hunting inside of forest massive under the canopy, was observed. Mikusek (1996) in Stolowe and Bystrzyckie Mts has also noted the similar behaviour.

Tetrao urogallus. There are about 30 breeding pairs in Beskids. They were fixed mainly in spruce forests.

Tetrastes bonasia. The hatch of 7 birds (17.07.1996) has been observed near the sample route. Separate birds have been noted during the counts also in winter.

Dryocopus martius. The population density is 0,19 pairs/10 ha in monocultural spruce plantation.

Picoides tridactylus. This species have been observed almost in the every count. 19.06.1995 was found the nest with nestlings.

Turdus torquatus. It is a common species above 1200 m a. s. l. 12.06.1996 the nest with 4 eggs was found and 16.06 nestlings were already in this nest.

T. merula. On the sample route it is less numerous, than previous species. In 1996 have been found 2 nests in spruce plantations 15 years old.

Corvus corax. During last decades significant changes in Raven's ecology in our investigated area were occurred (Bashta, 1998).

Table 4

A comparison of the quantitative parameters of bird communities in coniferous forests of study areas in Central Europe. **Bk** – Skolivski Beskids, **Tb** – Reserve “Turbacz”, **Ta** – Tatra NP, **Pl** – Polica, **Bs** – Bystrzyckie Mts

Порівняння кількісних показників населення птахів у хвойних лісах на пробних територіях у Центральній Європі

Parameter	Bk	Tb	Ta	Pl	Bs
Number of species	20	15	18	12	17
Total density, pairs/10 ha	24,4	23,7	36,3	49,5	40,5
Number of dominant species	4	4	5	5	7
Part of dominant species, %	70,1	81,1	60,9	93,0	80,1
Density of Chaffinch, pairs/10 ha	9,0	7,5	11,1	22,5	14,3
Part of Chaffinch, %	36,9	31,4	30,6	44,5	35,1
Number of tree-holenesters	5	4	3	2	5
Density of tree-holenesters, pairs/10 ha	3,8	4,0	4,7	3,5	11,8
Part of tree-holenesters, %	15,5	17,2	13	7,1	28,1



Since 1970th their number here had been increased. According to Gusiya (1995), the density of Raven in the Ukrainian Carpathians is 0,4-0,6 pairs/km². This species both alone and in pairs was noted regularly by us.

Table 2 shows the results of counts on the sample route. The Chaffinch (*Fringilla coelebs*), the Goldcrest (*Regulus regulus*), the Coal Tit (*Parus ater*), the Robin (*Erithacus rubecula*) and the Tree Creeper (*Certhia familiaris*) were dominant.

Table 3 presents parts and density of birds in the community, relative to the their nesting sites. The most numerous was group of species which build nests on tree branches – 7. It numbered 15,1 pairs/10 ha, that is over the half of bird number on the sample route. The tree-hollers were the least numerous – 6 with density 3,8 pairs/10 ha. Planted monocultures of spruce in inadequate habitats result in weakness and premature death of the trees. Dead or in bed condition trees cause gradation of insects and mites, which attract a number of birds including woodpeckers. Holes left by woodpeckers are then used by the other species of hole-breeding birds. In the groups, which nest on the ground and low above ground compose 4 species.

5. Discussion

Quantitative investigations of bird communities of coniferous forest took place in Ukraine: Carpathians Nature Reserve (Gusiya, 1992), in Poland: Tatra National Park (Głowański, Profus, 1992), Gorce (Kozłowski, 1974), Karkonosze (Dyrcz, 1973), Polica (Ślizowski, 1991), Bystrzyckie Mountains (Mikusek, 1996) and in Slovakia: Babia Hora (Štollman, Kocian, 1965; Karaska, 1989). Various count methods were used during those investigations, therefore we did not compare their results in details.

Table 5

Index of similarity of 5 bird communities, % (see Table 4)

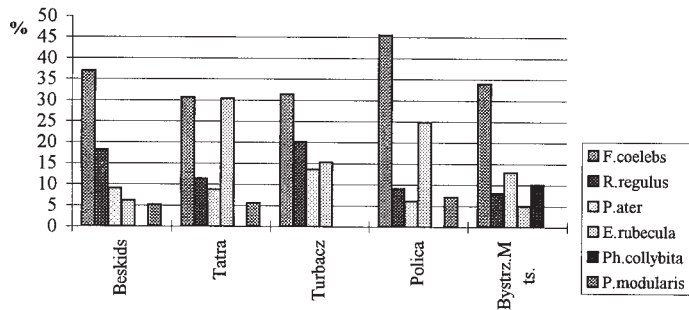
Індекс подібності населення птахів на 5 ділянках, % (див. табл. 4)

	Bk	Ta	Tb	Pl	Bs
Bs	75,7	68,6	68,8	69,0	x
Pl	62,5	60,0	59,3	x	
Tb	74,3	72,7	x		
Ta	78,9	x			

Some differences in size and structure of ornithofauna can be found among spruce forests of various mountain regions. They concerned the numbers of bird species as well as the density (Table 4).

The mean reason of the difference in species composition and quantity, evidently, is the difference of the age and the structure of forest, namely in the riches of shrub layer, percentage of undergrowth and, probable, various count methods. Varying with altitude the action of climatic agents is probably of smaller importance to birds that is the species composition of the forest (Ślizowski, 1991).

Figure shows the comparison of proportion in the most numerous bird species of spruce forests from some regions of the Carpathians. There is a similarity between domi-



Comparison of parts of dominant species in bird communities from different coniferous forests.

Порівняння частки домінуючих видів у населенні птахів різних хвойних лісів.

nant species composition in spruce plantation in Skolivski Beskids and spruce forests in another regions. These species almost always form nearly 80 % of bird communities and they have the decisive influence on their density. The Chaffinch was an absolute dominant in all analysed communities, excepting Carpathian Nature Reserve (Gusiy, 1992), where the Goldcrest was the dominant species. Subdominant species have been changing. The Goldcrest, Coal Tit and Robin were as a rule the second.

In Table 4 there is a comparison between species composition of bird communities in the Skolivski Beskids and other study plots in spruce forests. The bird community of our plot is most similar to the communities of plot in Tatra NP and Bystrzyckie Mts (Table 5).

In general, the monocultural spruce plantation is poor on birds and have more simple structure of community than natural spruce forest. However, they are the breeding habitat of some rare bird species: Tengmal's Owl (*Aegolius funereus*), Capercaillie (*Tetrao urogallus*), Pygmy Owl (*Glaucidium passerinum*), Ural Owl (*Strix uralensis*), Three-toed Woodpecker (*Picoides tridactylus*), etc. (Bashta et al., 1994).

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