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DOI: 10.26565/2075-5457-2024-1
UDC: 574.472+598.2(477)**Breeding bird communities of the pine forests in the forest-steppe zone**
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The avifauna of pine forests in the North-East of Ukraine has been poorly studied. Analysis of bird communities showed that the avifaunal complexes of pine forests are poorer and have minimal similarity to those in deciduous forests. This study aimed to assess the species composition and densities of birds in the pine forest of various ages. Research was conducted on the National Park «Slobozhanskiy», located within the Krasnokutsk United Territorial Community of the Bogodukhiv District in the northwestern part of Kharkiv Region (Ukraine). Most of the park's forests are of artificial origin. Birds communities were studied in May 2023 in six forest types: pine forest less than 25 years old, pine forest 71-90 years old, pine forest 91-110 years old, pine forest over 110 years old, patches of oak stands and patches of birch stands. The point-count technique was used for bird sampling. Overall 60 point-count stations (10 in each forest type) were located using a forest map. The breeding avifauna was classified concerning nest location, according to the sites for searching food, and based upon migration patterns. We registered 39 breeding bird species during point counts; of them 3 were cavity excavators, 13 were secondary cavity users, 13 were tree and 3 were shrub foliage nesters and 6 were ground nesters. There were 7 trunk-foraging species, 15 canopy-foraging species, 3 shrub-foraging species, and 12 ground-foraging species. Eighteen species were long-distance migrants, 6 species were short-distance migrants, and 15 species were residents. The least number of species (16) was recorded in pine forests less than 25 years old. The number of species in other forest types varies slightly (23-25). The lowest total abundance was noted in pine forests less than 25 years old, and the highest in patches of oak stands. Total density differs between all types of forest, except for a couple of pine forests 91-110 years old – patches of birch stands. In pine forest less than 25 years old dominate European Robin (45.1%) and Common Chiffchaff (25.3%); in pine forest 71-90 years old – Wood Warbler (28.3%) and Common Chaffinch (20.4%); in pine forest 91-110 years old – Common Chaffinch (16.4%), Wood Warbler (12.9%), Collared Flycatcher (12.0%), and European Robin (10.9%); in pine forest over 110 years old – Common Chaffinch (18.7%), European Robin (15.0%), Great Tit (12.8%) and Collared Flycatcher (11.9%); in patches of oak stands – Collared Flycatcher (20.1%), Great Tit (19.3%) and Common Chaffinch (14.3%); and in patches of birch stands – Wood Warbler (20.6%), Collared Flycatcher (16.7%), European Robin (14.9%) and Common Chaffinch (13.3%). The most abundant birds in pine forests less than 25 years old were ground nesters (70.5%). In other age groups of the pine forest and the patches of birch stands, secondary cavity users and ground nesters co-dominated. In patches of oak stands secondary cavity users dominated (50.8%). In all types of forests, except for the pine forest less than 25 years old canopy gleaners dominated. Large-distance migrants were the most abundant birds in pine forests, except the pine forest less than 25 years old, and patches of birch stands. In the pine forests less than 25 years old short-distance migrants dominated (56.5%). Residents dominated in patches of oak stands (39.7%). We compared our results with those of other studies conducted in the region's pine forests since the mid-19th century.

Key words: *ornithofauna, breeding bird's community, point counts, pine forests, forest-steppe zone, Kharkiv region.*

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Introduction

The Kharkiv region is located in the north-east of Ukraine, within the watershed separating the Don and Dnieper basins. Zonal types of vegetation in the Kharkiv region are oak forests and meadow steppes in the forest-steppe part and forb-fescue-feather grass steppes in the steppe part. In addition to zonal types

of vegetation, pine and oak-pine forests on sandy terraces in river valleys, floodplain forests, floodplain meadows, vegetation of open sands and chalk outcrops are also common (Alekseenko, 1971; Myakushko, 1978; Gorelova, Alyokhin, 2002).

The avifauna of pine forests in the North-East of Ukraine has been little studied due to the relative poverty of the species composition of this ecosystem. In addition, most of the pine forests in the region are monodominant stands up to 80 years old, which is not typical for this natural zone. Subori (a natural pine forests with an admixture of trees of deciduous species), which are natural coniferous forests, have hardly survived due to the specific nature of forestry.

There are very few studies of the avifauna of pine forests in the Kharkiv region. A fundamental analysis of the fauna of the Izyum steppe forests was made in the 60s of the 20th century (Lisetskiy, 1952). Later, a study was carried out on the avifauna of pine forests in the middle reaches of the Seversky Donets River (Lisetskiy, Fedorov, 1979). In the late 1980s and early 1990s, quantitative surveys and studies of the conditions of existence of birds in the forest ecosystems of the watersheds and river valleys of the Siversky Donets and Dnipro basins within the Kharkiv Region were carried out (Vergeles, 1993). In the beginning of the 21st century data on the structure of the bird population of pine forests in the suburbs of Kharkiv were obtained (Stegniy, Pal'val', 2007).

Analysis of bird communities showed that the avifaunal complexes of pine forests are poorer and have minimal similarity to those in deciduous forests. This is due to the architecture of the crown of the edifying species, the small development of the shrub layer and the well-developed grass layer (Atemasova, 2010).

This study aimed to estimate the species composition and densities of birds in the pine forest of various ages and small patches of deciduous forest in a pine forest.

Methodology

Study area

The research was conducted on the National Park «Slobozhanskiy». The Park has a total area of 5,244 ha. It is located within the Krasnokutsk United Territorial Community of the Bogodukhiv District, in the northwestern part of Kharkiv Region (Ukraine). Most of the park's forests are of artificial origin (64.3%). The existing distribution of stands in the park by age group is uneven, with a significant predominance of middle-aged (77%). The area of young (11%), ripening (6%), and mature and overgrown stands (6%) is much smaller. Pine forests are confined mainly to the pine terrace of the Merla River and form a large continuous forest massif. Pine forests are monodominant, single-tiered from Scots Pine (*Pinus sylvestris*) with little or no undergrowth. Silver Birch (*Betula pendula*), Downy Birch (*B. pubescens*), Common Oak (*Quercus robur*), and Bald Elm (*Ulmus glabra*) grow in the second tier. The greatest floristic diversity is concentrated in the saucer-shaped depressions of the relief. European White Elm (*Ulmus laevis*), Silver Birch and Downy Birch, Black Alder (*Alnus glutinosa*), and Aspen (*Populus tremula*) prevail here.

Bird sampling

Birds communities were studied in May 2023 in the Volodymirivske branch in six forest types: pine forest less than 25 years old, pine forest 71-90 years old, pine forest 91-110 years old, pine forest over 110 years old, patches of oak stands and patches of birch stands. The point-count technique (Sutherland, 2006; Bibby et al., 2012) was used for bird sampling. Overall 60 point-count stations (10 in each forest type) were located using a forest map. They were located at least 200 m from the boundaries between forest types. The exact location of the point-count stations was established in the field using the Global Positioning System (GPS) Garmin eTrex 30x. Bird counts were made between 6:00 and 10:00 h local time in suitable weather conditions (without rain or wind). There was a setting down period of 2 min and the duration of a count was 5 min. All birds seen or heard were recorded. Birds in flight were not counted. All registrations were divided into two zones. The first zone is a circle of radius 30 m around the point; the second is outside that, to infinity. Population density is determined in pairs per sq.km. Singing males, two adult birds that worry, a living nest, and a brood are taken as a pair (the chicks are not included in the calculation).

Bird richness and abundance

The total density in the area in which the points fell is estimated as (Bibby et al., 2012):

$$D = \frac{n_1 + n_2}{\pi \cdot r^2 \cdot m} \log_e \left(\frac{n_1 + n_2}{n_2} \right) \text{ (pairs/m}^2\text{)}$$

where r = the radius of the first zone, m

n_1 = number of bird pairs detected in the first zone

n_2 = number of bird pairs detected in the second zone
 m = number of points

Bird diversity was described using the Shannon–Wiener diversity index (Krebs, 1999):

$$H' = \sum_{i=1}^S (p_i)(\log p_i)$$

where H' = the Shannon–Wiener diversity index,
 p_i = the relative abundance of species i ,
 S = the number of species

We classified the breeding avifauna concerning nest location (tree cavity, foliage, or ground). Cavity nesters were further divided into species that excavate their nest cavities (cavity excavators) and species that use previously excavated cavities (secondary cavity users). Foliage nesters were further divided into species that nest in trees and species that nest in shrubs. We also divided the breeding avifauna into four classes according to the sites for searching for food (trunk, canopy, shrub, or ground gleaners). Finally, we classified the breeding avifauna into three classes based on migration patterns (long-distance migrants, short-distance migrants, and species that occur year-round in the study area).

Statistical analysis

We used repeated measure analysis of variance (ANOVA) and Tukey's criterion to compare bird assemblage variables between types of forest. The PAST software (Hammer et al., 2001) and R 4.2.2 (R Core Team, 2022) were used for calculations.

Results

We registered 39 breeding bird species during point counts; of them, 3 were cavity excavators, 13 were secondary cavity users, 13 were tree and 3 shrub foliage nesters, and 6 were ground nesters. There were 7 trunk-foraging species, 15 canopy-foraging species, 3 shrub-foraging species, and 12 ground-foraging species. Eighteen species were long-distance migrants, 6 species were short-distance migrants, and 15 species were residents (Table 1).

Table 1. Bird species recorded during point counts, grouped into guilds on the basis of their nesting and foraging sites, and migration pattern (according to Snow and Perrins, 1998)

Bird species	Bird-guilds according to the nest sites ^{*)}	Bird-guilds according to the searching food ^{**)}	Bird-guilds according to the migration pattern ^{***)}
<i>Buteo buteo</i>	TF	- ****)	LDM
<i>Columba palumbus</i>	TF	G	SDM
<i>Streptopelia turtur</i>	TF	G	SDM
<i>Cuculus canorus</i>	- *****)	C	LDM
<i>Caprimulgus europaeus</i>	G	- *****)	LDM
<i>Upupa epops</i>	SC	G	LDM
<i>Dryocopus martius</i>	PC	T	R
<i>Dendrocopos major</i>	PC	T	R
<i>Dendrocoptes medius</i>	PC	T	R
<i>Jynx torquilla</i>	SC	T	LDM
<i>Anthus trivialis</i>	G	G	LDM
<i>Oriolus oriolus</i>	TF	C	LDM
<i>Garrulus glandarius</i>	TF	G	R
<i>Corvus cornix</i>	TF	G	R
<i>Corvus corax</i>	TF	G	R
<i>Sylvia atricapilla</i>	SF	Sh	LDM
<i>Curruca communis</i>	SF	Sh	LDM
<i>Curruca curruca</i>	SF	Sh	LDM

Bird species	Bird-guilds according to the nest sites ^{*)}	Bird-guilds according to the searching food ^{**)}	Bird-guilds according to the migration pattern ^{***)}
<i>Phylloscopus collybita</i>	G	C	LDM
<i>Phylloscopus sibilatrix</i>	G	C	LDM
<i>Regulus regulus</i>	TF	T	R
<i>Muscicapa striata</i>	SC	C	LDM
<i>Ficedula parva</i>	SC	C	LDM
<i>Ficedula albicollis</i>	SC	C	LDM
<i>Phoenicurus phoenicurus</i>	SC	G	LDM
<i>Erithacus rubecula</i>	G	G	SDM
<i>Luscinia luscinia</i>	G	G	LDM
<i>Turdus merula</i>	TF	G	SDM
<i>Turdus philimelos</i>	TF	G	LDM
<i>Cyanistes caeruleus</i>	SC	C	R
<i>Poecile palustris</i>	SC	C	R
<i>Poecile montanus</i>	SC	C	R
<i>Periparus ater</i>	SC	C	R
<i>Parus major</i>	SC	C	R
<i>Sitta europea</i>	SC	T	R
<i>Certhia familiaris</i>	SC	T	R
<i>Fringilla coelebs</i>	TF	C	SDM
<i>Carduelis carduelis</i>	TF	C	R
<i>C. coccothraustes</i>	TF	C	SDM

*) Nest location: PC – primary cavity user (cavity excavator), SC – secondary cavity user, TF – tree foliage nester, SH – shrub foliage nester, G – ground nester.

***) Forage searching: T – trunk gleaner, C – canopy gleaner, Sh – shrub gleaner, G – ground gleaner.

****) Migratory pattern: LDM – long-distance migrant, SDM – short-distance migrant, R – resident.

*****) Bird of prey.

*****) Nest parasite.

*****) Gets food in flight.

The smallest number of species (16) was recorded in pine forests less than 25 years old (Table 2). The number of species in other forest types varies slightly (23-25).

Table 2. Variables describing breeding bird communities

Variable	Type of forest					
	Pine <25	Pine 71-90	Pine 91-110	Pine >110	Oak	Birch
Number of species	16	25	23	23	25	24
Number of species per point	5.00 ±0.37	8.00 ±0.42	8.40 ±0.45	8.50 ±0.54	8.90 ±0.69	9.10 ±0.38
Total density, pairs/sq.km	680 ±19	2123 ±20	2377 ±35	2615 ±36	2769 ±31	2356 ±30
Shannon H'	2.414 ±0.079	2.703 ±0.072	2.830 ±0.070	2.689 ±0.067	2.800 ±0.070	2.891 ±0.059

Eleven species were present in all type of forest: Common Wood Pigeon (*Columba palumbus*), Common Cuckoo (*Cuculus canorus*), Great Spotted Woodpecker (*Dendrocopos major*), Eurasian Blackcap (*Sylvia atricapilla*), Common Chiffchaff (*Phylloscopus collybita*), Wood Warbler (*Phylloscopus sibilatrix*), European Robin (*Erithacus rubecula*), Common Blackbird (*Turdus merula*), Song Thrush (*Turdus philimelos*), Great Tit (*Parus major*), and Common Chaffinch (*Fringilla coelebs*).

Nine bird species were recorded in only one type of forest: Common Buzzard (*Buteo buteo*) – in pine forests 91-110 years old, European Nightjar (*Caprimulgus europaeus*) and Northern Raven (*Corvus corax*)

– in pine forests over 110 years old, European Turtle Dove (*Streptopelia turtur*), Middle Spotted Woodpecker (*Dendrocoptes medius*), Eurasian Wryneck (*Jynx torquilla*), and Eurasian Blue Tit (*Cyanistes caeruleus*) – in patches of oak stands, The Lesser Whitethroat (*Curruca curruca*) – in patches of birch stands. Thrush Nightingale (*Luscinia luscinia*) was recorded only in deciduous forest types (patches of oak and birch stands).

The lowest total abundance was noted in pine forests less than 25 years old, and the highest in patches of oak stands. Total density differs between all types of forest ($F_{5,60}=660,5$; $p<0,001$), except for a couple of pine forests 91-110 years old – patches of birch stands.

Table 3. Density of breeding bird species (pairs/sq.km)

Species	Type of forest					
	Pine <25	Pine 71-90	Pine 91-110	Pine >110	Oak	Birch
<i>Buteo buteo</i>			+ ^{*)}			
<i>Columba palumbus</i>	+	35	+	43	+	+
<i>Streptopelia turtur</i>					43	
<i>Cuculus canorus</i>	+	+	+	+	+	+
<i>Caprimulgus europaeus</i>				+		
<i>Upupa epops</i>					+	
<i>Dryocopus martius</i>	+				+	
<i>Dendrocopos major</i>	35	+	41	49	177	98
<i>Dendrocoptes medius</i>					35	
<i>Jynx torquilla</i>					+	
<i>Anthus trivialis</i>	+	133	86	39		+
<i>Oriolus oriolus</i>	+	81	39	39	49	39
<i>Garrulus glandarius</i>	49	+			+	
<i>Corvus cornix</i>						+
<i>Corvus corax</i>				+		
<i>Sylvia atricapilla</i>	+	41	71	196	196	43
<i>Curruca communis</i>		+				35
<i>Curruca curruca</i>						+
<i>Phylloscopus collybita</i>	172	81	38	229	38	176
<i>Phylloscopus sibilatrix</i>	+	602	307	236	39	486
<i>Regulus regulus</i>		+		+		
<i>Muscicapa striata</i>		71	35	35		71
<i>Ficedula parva</i>		49	+	+		71
<i>Ficedula albicollis</i>		117	285	310	555	392
<i>Phoenicurus phoenicurus</i>		35	98			71
<i>Erithacus rubecula</i>	307	83	258	392	162	350
<i>Luscinia luscinia</i>					+	+
<i>Turdus merula</i>	+	49	162	+	81	+
<i>Turdus phylomelos</i>	+	+	+	+	39	+
<i>Cyanistes caeruleus</i>					+	
<i>Poecile palustris</i>		43	106	117		+
<i>Poecile montanus</i>		71	35			
<i>Periparus ater</i>		35		+		+
<i>Parus major</i>	39	126	236	334	534	210
<i>Sitta europea</i>		+	117	71	35	+
<i>Certhia familiaris</i>		35	+	35	176	
<i>Fringilla coelebs</i>	77	434	391	489	395	314
<i>Carduelis carduelis</i>	+				35	
<i>C. coccothraustes</i>			71		71	

^{*)} the species was registered in only one accounting zone; density calculation is not possible.

In pine forest less than 25 years old dominate European Robin (45,1%) и Common Chiffchaff (25,3%), in pine forest 71-90 years old – Wood Warbler (28,3%) and Common Chaffinch (20,4%), in pine forest 91-110 years old – Common Chaffinch (16,4%), Wood Warbler (12,9%), Collared Flycatcher (*Ficedula albicollis*, 12,0%), and European Robin (10,9%), in pine forest over 110 years old – Common Chaffinch (18,7%), European Robin (15,0%), Great Tit (12,8%) and Collared Flycatcher (11,9%), in patches of oak stands – Collared Flycatcher (20,1%), Great Tit (19,3%) and Common Chaffinch (14,3%), and in patches of birch stands – Wood Warbler (20,6%), Collared Flycatcher (16,7%), European Robin (14,9%) and Common Chaffinch (13,3%) (Table 3).

In pine forests less than 25 years old the most abundant birds were ground nesters (70,5%). In other age groups of the pine forest and the patches of birch stands, secondary cavity users and ground nesters co-dominated. In patches of oak stands secondary cavity users dominated (50,8%, Fig. 1a). In all types of forests, except for the pine forest less than 25 years old, canopy gleaners dominated (Fig.1b). Large distance migrants were the most abundant birds in pine forests, except the pine forest less than 25 years old, and patches of birch stands. In the pine forests less than 25 years old short-distance migrants dominated (56,5%). Residents dominated in patches of oak stands (39,7%, Fig. 1c).

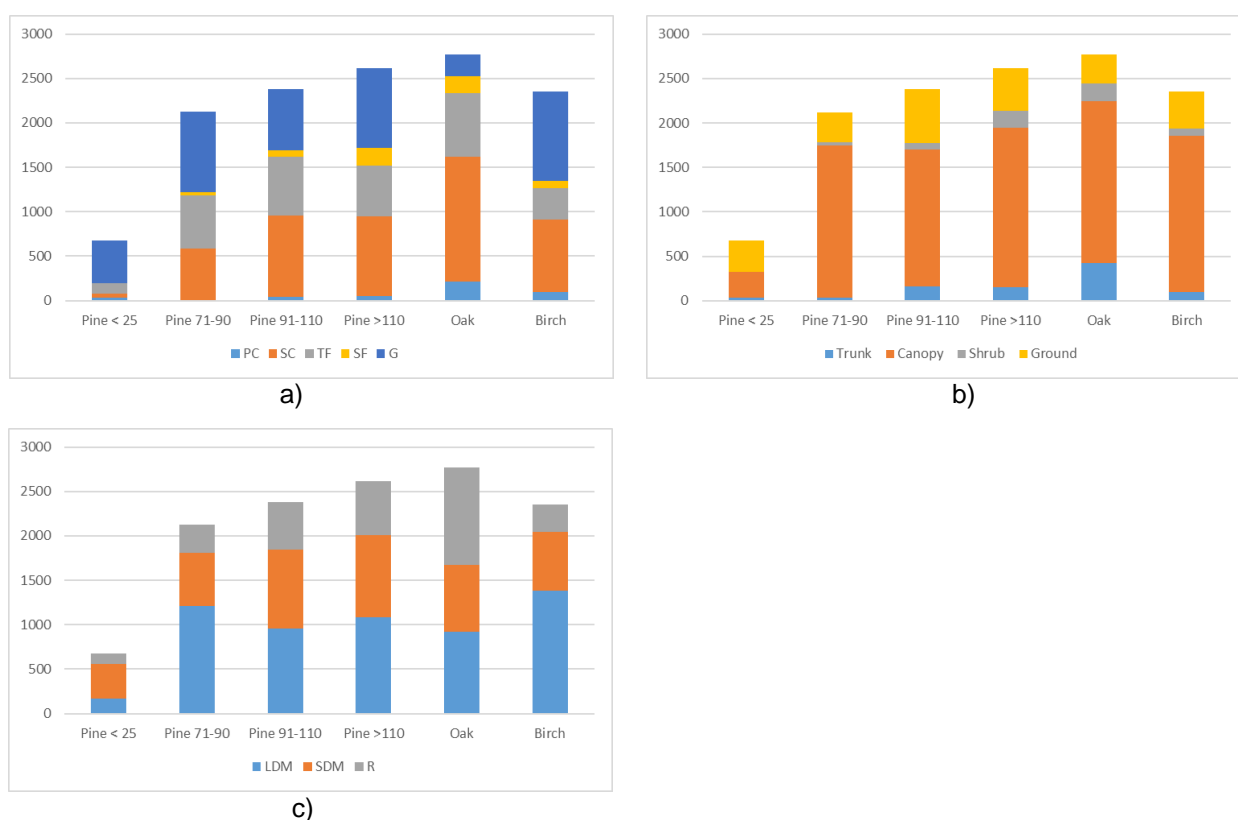


Figure 1. Structure of breeding bird communities: a) by nest location, b) by forage searching, c) by migratory pattern (designations see notes to Table 1)

Discussion

Our research covered pine forests of different ages: younger than 25 years and older than 70 years, as well as patches of oak forests and birch forests inside the pine forest. Censuses were not carried out in pine forests aged from 25 to 70 years due to their insufficient area on the territory of the National Park «Slobzhanskiy».

Our results suggest that the smallest number of species and the lowest population density were observed in pine plantations up to 25 years old. Some of the species were recorded only in the second recording zone (more than 30 m from the observer), so there is a high probability that they were located outside this area - in the territory of an older pine forest. These species include the Common Wood Pigeon,

Common Cuckoo, Great Spotted Woodpecker, Eurasian Golden Oriole (*Oriolus oriolus*), Common Blackbird, and Song Thrush. Great Spotted Woodpecker, recorded in both census zones, does not nest here due to the lack of trees of suitable size but flies in to feed. Both in terms of species number and abundance, this forest type is dominated by species that nest and forage on the ground. As the age of the forest increases, both the number of species and their abundance increase. The increase is due to primary and secondary cavity nesters and species nesting in tree crowns. Due to the contribution of these species, the greatest abundance is observed in patches of oak stands.

Studies of birds of pine forests, conducted earlier in the Kharkiv region, were either based on the analysis of faunal lists and did not contain quantitative indicators of abundance (Averin, Ostrovskaya, 1946; Lisetsky, 1952), or on data from transect counts (Lisetsky, Fedorov, 1979; Vergeles, 1993; Stegnyy, Pal'val', 2007), so we can only compare the species composition and relative abundance of species in a community (Table 4).

A significant number of species mentioned in publications devoted to the fauna of pine forests (Lisetsky, 1954) are confined to intrazonal elements within the forest and cannot in any way represent the fauna of the forest (mallards, quails, warblers, shrikes, crickets). Quite often, in the fauna of the forest, campophilous species associated with certain elements of the relief are indicated (sparrows, rollers, redstarts, wheatears, bee-eaters). Species nesting in open spaces or along the edges of forests are often included in the general list when the census is carried out not in the middle of the forest but covers the entire forest (especially if its area is small). Thus, the skylark, woodlark, common and garden buntings or white wagtails appear in the lists of boron species (Lisetsky, Fedorov, 1977). Such species were not taken into account in further comparative analysis.

The natural dynamics of fauna include both the appearance of new species and their disappearance. Examples of species that appeared in the pine forests include the Common Wood Pigeon and Black Woodpecker (*Dryocopus martius*). At the same time, the Saker Falcon (*Falco cherrug*), Eurasian Eagle Owl (*Bubo bubo*), White-tailed Eagle (*Haliaeetus albicilla*), Eastern Imperial Eagle (*Aquila heliaca*), and European Turtle Dove are disappearing. These species are characterized by a general decline in numbers throughout their range. Some species previously recorded in pine forests (Vergeles, 1993; Stegnyy, Pal'val', 2007) now prefer deciduous forests. In pine forests, their numbers have greatly decreased.

Several species prefer edges and areas with sparse trees. Therefore, they are usually recorded at survey plots that include the forest edge. Since in our study, the survey points were located at a distance of at least 200 meters from the border of the forest plot or edge, these species were not recorded frequently. Thus, the Hoopoe (*Upupa epops*) was noted only in fragments of oak stands. Other researchers recorded it in young plantings, subors, and ripening pine forests (Lisetsky, Fedorov, 1977; Vergeles, 1993; Stegnyy, Pal'val', 2007). The species was recorded in forest edge or mosaic habitats. The same can be said about species nesting in trees, bushes, or on the ground at the edge of the forest (typical warblers, Tree Pipit (*Anthus trivialis*), Thrush Nightingale, Goldfinch (*Carduelis carduelis*), Wood Lark (*Lullula arborea*).

The set of forest-core dwelling species includes the following species. The Great Spotted Woodpecker lives in forests of different ages, except for young pine plantations, where it flies to feed. The Finch is the dominant species in all forest communities. However, it makes up a different proportion of the community in pine forests with different anthropogenic loads. In heavily disturbed communities, its share can increase to 52% (Lisetsky, Fedorov, 1977). In the balanced and diverse communities of pine forests of the National Park "Slobozhanskiy", the share of this species is 16-20 %. Common Chiffchaff and Wood Warbler are recorded in forests of various ages (from young to mature). They are often dominant in the community (including in the National Park "Slobozhanskiy"). The Eurasian Golden Oriole is present in greater numbers in the pine forests of the National Park "Slobozhanskiy" than in the other forests studied. This species prefers pine stands between 70 and 90 years old. The presence of the Eurasian Blackcap means that the shrub layer is well-developed in the forest (Lisetsky, Fedorov, 1977). The Spotted Flycatcher (*Muscicapa striata*) was recorded in almost all studied pine forests. This species reaches its greatest abundance in old-growth forests (up to 7% of the total community size; Lisetsky, Fedorov, 1977). In the National Park "Slobozhanskiy", the Spotted Flycatcher is found in pine forests of different ages, except for young plantings. The Red-breasted Flycatcher (*Ficedula parva*) was found in pine forests only on the territory of the National Park "Slobozhanskiy". In our region, this species is a typical, but not numerous, inhabitant of deciduous forests (Atemasov et al., 2011). This group also includes five species of tits, the Eurasian Nuthatch (*Sitta europaea*), and the Eurasian Treecreeper (*Certhia familiaris*).

Publications from the 1950s to the 1990s allow us to mark the time of expansion of the Collared Flycatcher and European Robin. Back in the 1950s, these species have not been recorded in the Izyum forests (Lisetsky, 1954). In the 1980s, Collared Flycatcher was also not registered, European Robins have

been recorded in small numbers (relative abundance 0.7-1.1 %) in old pine forests and subories (Lisetsky, Fedorov, 1977). In the 1990s the authors noted a large number of the Collared Flycatcher in the pine forests of Izyumskaya Luka (the south-eastern part of the Kharkiv region). In the same years, Collared Flycatcher were recorded in large numbers in middle-aged and ripening forests (Vergeles, 1993) and deciduous forests among pine forests along the entire left bank of the Seversky Donets River in the Donetsk region (Taranenko et al., 1994). In the 1990s, the share of the European Robins in the community was already up to 2.2 % of the population in young, middle-aged and mature forests (Vergeles, 1993). Currently, the Collared Flycatcher is one of the dominant species of deciduous forests in the southern part of the Central Russian Upland (Atemasov et al., 2011). In the bird population of the pine forests of the National Park "Slobozhanskiy", its share ranges from 5 to 12%. Findings of birds are confined to patches of deciduous forests and groups of deciduous trees among pine forests. In the pine forests on the territory of the National Park "Slobozhanskiy", the European Robin is one of the dominant species, especially in the population of young pine plantings (45 %).

The Goldcrest (*Regulus regulus*) is considered a migratory and wintering species in the Kharkiv region (Somov, 1897; Atemasova, Atemasov, 2006; Banik et al., 2013, 2014). During the work on compiling the atlas of breeding birds in Europe, the species was not recorded breeding in this UTM grid 50 x 50 km square (Keller et al., 2020). We noted singing males at two survey points in pine forests 71-90 years old and in pine forests over 110 years old. This gives grounds to consider the Goldcrest as a breeding species according to criterion A2 (A. Possible breeding: 2. Singing male(s) present (or breeding calls heard) in breeding season) (Keller et al., 2020). Back in the late 19th century N. Somov assumed that the Goldcrest could nest in the western and northwestern regions of the Kharkov province, but there was no reliable information confirming this (Somov, 1897).

The age of the forest stand and the development of layering are the factors that determine the overall population density and species richness (Kirk, Hobson, 2001; Venier, Pearce, 2005; Nicolov, 2009; Abramova, 2024; and others). Both oak forests and pine forests are characterized by an increase in population density with increasing age of plantings (Vergeles, 1993; Atemasov et al., 2011; Bergner et al., 2015; Abramova, 2023; and others). Also, as the age of forest stands increases, the number of bird species increases. However, this increase, like the increase in population density, occurs up to a certain point. In mature plantations, it decreases somewhat and stabilizes depending on the ecological characteristics of the community members (Volchanetsky, 1952; Novikov, 1959; Budnichenko, 1968; Vladyshevsky, 1975; etc.). The connection between the development of the layered structure of forest ecosystems and the general indicators of the bird population is expressed in the fact that the overall population density is not always higher in habitats with greater layers, but the species composition of birds is always richer in such habitats (Vergeles, 1993).

Table 4. Species composition and relative abundance of birds in pine forests of the Kharkiv region

Species	Lisetskiy, 1952					
	Subor	Old pine forest	Pine plantation 7-15 year old	Swampy minor round depressions	Wet minor round depressions	Dry minor round depressions
<i>Anas platyrhynchos</i>				+		
<i>Spatula querquedula</i>				+		
<i>Milvus migrans</i>	+	+				
<i>Haliaeetus albicilla</i>	+					
<i>Accipiter gentilis</i>	+	+				
<i>Accipiter nisus</i>	+					
<i>Buteo buteo</i>	+					
<i>Clanga sp.</i>		+				
<i>Aquila heliaca</i>		+				
<i>Falco tinnunculus</i>	+	+				
<i>Falco cherrug</i>	+	+				
<i>Coturnix coturnix</i>			+			
<i>Burhinus oedicephalus</i>			+			

Species	Lisetskiy, 1952					
	Subor	Old pine forest	Pine plantation 7-15 year old	Swampy minor round depressions	Wet minor round depressions	Dry minor round depressions
<i>Columba oenas</i>	+					
<i>Columba palumbus</i>						
<i>Streptopelia turtur</i>	+		+	+	+	
<i>Cuculus canorus</i>	+	+	+	+	+	+
<i>Bubo bubo</i>	+					
<i>Strix aluco</i>	+					
<i>Asio otus</i>	+					
<i>Caprimulgus europaeus</i>		+	+		+	
<i>Merops apiaster</i>						
<i>Coracias garrulus</i>	+				+	
<i>Upupa epops</i>	+					
<i>Picus canus</i>	+				+	
<i>Dryocopus martius</i>						
<i>Dendrocopos major</i>	+	+			+	
<i>Dendrocoptes medius</i>	+				+	
<i>Dryobates minor</i>	+					
<i>Jynx torquilla</i>	+	+				
<i>Lullula arborea</i>		+	+			+
<i>Alauda arvensis</i>			+			
<i>Anthus campestris</i>	+					
<i>Anthus trivialis</i>	+	+	+		+	
<i>Motacilla alba</i>	+					
<i>Erithacus rubecula</i>						
<i>Luscinia luscinia</i>	+					
<i>Phoenicurus phoenicurus</i>	+	+				
<i>Oenanthe oenanthe</i>	+	+				
<i>Turdus merula</i>				+	+	
<i>Turdus pilaris</i>						
<i>Turdus philimelos</i>	+	+	+			
<i>Turdus iliacus</i>						
<i>Locustella luscinioides</i>				+		
<i>Acrocephalus palustris</i>				+		
<i>Acrocephalus arundinaceus</i>				+		
<i>Hippolais icterina</i>	+				+	
<i>Sylvia nisoria</i>					+	
<i>Sylvia borin</i>	+				+	
<i>Sylvia atricapilla</i>	+				+	
<i>Curruca communis</i>						
<i>Curruca curruca</i>						
<i>Phylloscopus sibilatrix</i>	+		+		+	+
<i>Phylloscopus collybita</i>	+		+	+	+	
<i>Regulus regulus</i>						
<i>Muscicapa striata</i>	+	+				
<i>Ficedula parva</i>						
<i>Ficedula albicollis</i>						
<i>Ficedula hypoleuca</i>						
<i>Aegithalos caudatus</i>	+				+	

Species	Lisetskiy, 1952					
	Subor	Old pine forest	Pine plantation 7-15 year old	Swampy minor round depressions	Wet minor round depressions	Dry minor round depressions
<i>Poecile palustris</i>	+				+	
<i>Poecile montanus</i>						
<i>Lophophanes cristatus</i>		+				
<i>Periparus ater</i>						
<i>Cyanistes caeruleus</i>	+					
<i>Parus major</i>	+	+		+	+	
<i>Sitta europea</i>	+					
<i>Certhia familiaris</i>	+					
<i>Oriolus oriolus</i>	+	+				
<i>Lanius collurio</i>	+	+	+		+	
<i>Lanius minor</i>	+					+
<i>Garrulus glandarius</i>	+		+		+	
<i>Pica pica</i>	+		+		+	
<i>Corvus frugilegus</i>		+				
<i>Corvus cornix</i>	+	+			+	
<i>Corvus corax</i>	+	+				
<i>Sturnus vulgaris</i>	+			+	+	
<i>Passer domesticus</i>	+	+				
<i>Passer montanus</i>	+	+				
<i>Fringilla coelebs</i>	+	+	+	+	+	+
<i>Chloris chloris</i>	+		+	+	+	+
<i>Carduelis carduelis</i>	+	+	+		+	
<i>Coccothraustes coccothraustes</i>	+					
<i>Emberiza citrinella</i>	+				+	+
<i>Emberiza hortulana</i>						

Table 4. (continuation)

Species	Lisetskiy, Fedorov, 1979						
	Young pine forest	Pole pine forest	Old pine forest	Subor	Dry minor round depressions	Wet minor round depressions	Swampy minor round depressions
<i>Anas platyrhynchos</i>							
<i>Spatula querquedula</i>							
<i>Milvus migrans</i>				0.0009			
<i>Haliaeetus albicilla</i>							
<i>Accipiter gentilis</i>							
<i>Accipiter nisus</i>							
<i>Buteo buteo</i>							
<i>Clanga sp.</i>							
<i>Aquila heliaca</i>							
<i>Falco tinnunculus</i>				0.0013			
<i>Falco cherrug</i>							
<i>Coturnix coturnix</i>							
<i>Burhinus oedicephalus</i>							
<i>Columba oenas</i>							

Species	Lisetskiy, Fedorov, 1979						
	Young pine forest	Pole pine forest	Old pine forest	Subor	Dry minor round depressions	Wet minor round depressions	Swampy minor round depressions
<i>Columba palumbus</i>							
<i>Streptopelia turtur</i>		0.0595	0.0202	0.0155		0.0247	0.0545
<i>Cuculus canorus</i>		0.0158	0.0096	0.0093	0.0145	0.0071	0.0214
<i>Bubo bubo</i>							
<i>Strix aluco</i>				0.0018			
<i>Asio otus</i>							
<i>Caprimulgus europaeus</i>	0.0015		0.0018		0.0010		
<i>Merops apiaster</i>							
<i>Coracias garrulus</i>				0.0031			
<i>Upupa epops</i>				0.0044		0.0137	
<i>Picus canus</i>							
<i>Dryocopus martius</i>							
<i>Dendrocopos major</i>			0.0219	0.0288		0.0225	
<i>Dendrocoptes medius</i>				0.0009		0.0005	
<i>Dryobates minor</i>							
<i>Jynx torquilla</i>				0.0080		0.0071	
<i>Lullula arborea</i>	0.0462		0.0035	0.0018	0.0039		
<i>Alauda arvensis</i>							
<i>Anthus campestris</i>							
<i>Anthus trivialis</i>	0.1058	0.1138	0.1122	0.0722	0.1484	0.0663	
<i>Motacilla alba</i>				0.0004		0.0115	
<i>Erithacus rubecula</i>			0.0079	0.0111	0.0116		
<i>Luscinia luscinia</i>				0.0332		0.0510	0.1519
<i>Phoenicurus phoenicurus</i>			0.0009	0.0009			
<i>Oenanthe oenanthe</i>							
<i>Turdus merula</i>			0.0088	0.0181		0.0461	
<i>Turdus pilaris</i>							
<i>Turdus philimelos</i>	0.0462		0.0053	0.0208			
<i>Turdus iliacus</i>							
<i>Locustella luscinioides</i>							
<i>Acrocephalus palustris</i>							
<i>Acrocephalus arundinaceus</i>							
<i>Hippolais icterina</i>							
<i>Sylvia nisoria</i>							0.1358
<i>Sylvia borin</i>				0.0363		0.0367	
<i>Sylvia atricapilla</i>			0.0219	0.0571		0.0515	0.0727
<i>Curruca communis</i>			0.0359				
<i>Curruca curruca</i>							
<i>Phylloscopus sibilatrix</i>			0.1183	0.0151	0.1368		
<i>Phylloscopus collybita</i>	0.0775	0.1786		0.0040	0.0485	0.0230	
<i>Regulus regulus</i>							
<i>Muscicapa striata</i>			0.0692	0.0394	0.0795	0.0208	
<i>Ficedula parva</i>							
<i>Ficedula albicollis</i>							
<i>Ficedula hypoleuca</i>							
<i>Aegithalos caudatus</i>							

Species	Lisetskiy, Fedorov, 1979						
	Young pine forest	Pole pine forest	Old pine forest	Subor	Dry minor round depressions	Wet minor round depressions	Swampy minor round depressions
<i>Poecile palustris</i>							
<i>Poecile montanus</i>							
<i>Lophophanes cristatus</i>			0.0026		0.0204		
<i>Periparus ater</i>							
<i>Cyanistes caeruleus</i>							
<i>Parus major</i>			0.0272	0.0235		0.0559	0.0781
<i>Sitta europea</i>			0.0061	0.0164		0.0230	
<i>Certhia familiaris</i>				0.0040			
<i>Oriolus oriolus</i>			0.0114	0.0071		0.0038	
<i>Lanius collurio</i>	0.4232	0.0490	0.0149	0.1124		0.0373	
<i>Lanius minor</i>							
<i>Garrulus glandarius</i>		0.0368	0.0079	0.0106	0.0078	0.0104	0.0267
<i>Pica pica</i>				0.0018		0.0126	
<i>Corvus frugilegus</i>							
<i>Corvus cornix</i>		0.0228		0.0027		0.0203	
<i>Corvus corax</i>			0.0009	0.0004			
<i>Sturnus vulgaris</i>			0.0114	0.0367		0.0630	
<i>Passer domesticus</i>							
<i>Passer montanus</i>				0.0288			
<i>Fringilla coelebs</i>		0.5236	0.4680	0.3063	0.4675	0.2111	0.2952
<i>Chloris chloris</i>	0.1326			0.0190		0.0724	0.1636
<i>Carduelis carduelis</i>				0.0124		0.0302	
<i>Coccothraustes coccothraustes</i>				0.0168			
<i>Emberiza citrinella</i>	0.0999		0.0123	0.0120	0.0601	0.0647	
<i>Emberiza hortulana</i>	0.0671			0.0049		0.0126	

Table 4. (continuation)

Species	Vergeles, 1993			Stegniy, Pal'val', 2007			
	Middle-aged pine forest	Young dry pine forest	Young wet pine forest	Near Osnova neighbourhood (Kharkiv)	Near Vasischevo village	Near Chemuzhovka village	Near Zadonetskoe village
<i>Anas platyrhynchos</i>							
<i>Spatula querquedula</i>							
<i>Milvus migrans</i>							
<i>Haliaeetus albicilla</i>							
<i>Accipiter gentilis</i>	0.0017				0.0036	0.0074	0.0040
<i>Accipiter nisus</i>							
<i>Buteo buteo</i>							
<i>Clanga sp.</i>							
<i>Aquila heliaca</i>							
<i>Falco tinnunculus</i>							
<i>Falco cherrug</i>							
<i>Coturnix coturnix</i>							

Species	Vergeles, 1993			Stegniy, Pal'val', 2007			
	Middle-aged pine forest	Young dry pine forest	Young wet pine forest	Near Osnova neighbour hood (Kharkiv)	Near Vasischevo village	Near Chemuzhovka village	Near Zado-netskoe village
<i>Burhinus oedicnemus</i>							
<i>Columba oenas</i>							
<i>Columba palumbus</i>			0.0013			0.0017	0.0040
<i>Streptopelia turtur</i>	0.0075		0.0051				
<i>Cuculus canorus</i>			0.0005		0.0015		
<i>Bubo bubo</i>							
<i>Strix aluco</i>							
<i>Asio otus</i>							
<i>Caprimulgus europaeus</i>			0.0001				
<i>Merops apiaster</i>	0.0004						
<i>Coracias garrulus</i>							
<i>Upupa epops</i>	0.0005		0.0006		0.0060	0.0085	
<i>Picus canus</i>							
<i>Dryocopus martius</i>							
<i>Dendrocopos major</i>	0.0080		0.0006	0.0207	0.0059	0.0188	0.0155
<i>Dendrocoptes medius</i>							
<i>Dryobates minor</i>							
<i>Jynx torquilla</i>	0.0025		0.0028				
<i>Lullula arborea</i>					0.0251	0.0216	0.0027
<i>Alauda arvensis</i>							
<i>Anthus campestris</i>							
<i>Anthus trivialis</i>	0.0918	0.1604	0.1170		0.0074	0.0469	0.0545
<i>Motacilla alba</i>	0.0011						
<i>Erithacus rubecula</i>	0.0223		0.0207	0.0100	0.0092	0.0199	0.0123
<i>Luscinia luscinia</i>	0.0149		0.0127				
<i>Phoenicurus phoenicurus</i>		0.0223		0.0067		0.0057	
<i>Oenanthe oenanthe</i>							
<i>Turdus merula</i>	0.0308		0.0076	0.0151	0.0063	0.0080	0.0109
<i>Turdus pilaris</i>	0.0007						
<i>Turdus philimelos</i>	0.0235	0.0111		0.0466	0.0471	0.0245	0.0177
<i>Turdus iliacus</i>	0.0034						
<i>Locustella luscinioides</i>							
<i>Acrocephalus palustris</i>							
<i>Acrocephalus arundinaceus</i>							
<i>Hippolais icterina</i>							
<i>Sylvia nisoria</i>	0.0034						
<i>Sylvia borin</i>							
<i>Sylvia atricapilla</i>	0.0087		0.0398				
<i>Curruca communis</i>							
<i>Curruca curruca</i>							
<i>Phylloscopus sibilatrix</i>	0.0717	0.1281	0.1377		0.0042	0.0068	
<i>Phylloscopus collybita</i>	0.0784	0.0835	0.2094	0.0848	0.0683	0.0692	0.0776
<i>Regulus regulus</i>							
<i>Muscicapa striata</i>	0.0483	0.0223	0.0013			0.0148	0.0232

Species	Vergeles, 1993			Stegniy, Pal'val', 2007			
	Middle-aged pine forest	Young dry pine forest	Young wet pine forest	Near Osnova neighbourhood (Kharkiv)	Near Vasischevo village	Near Chemuzhovka village	Near Zado-netskoe village
<i>Ficedula parva</i>							
<i>Ficedula albicollis</i>	0.0136		0.0045				
<i>Ficedula hypoleuca</i>	0.0032						
<i>Aegithalos caudatus</i>							
<i>Poecile palustris</i>					0.0795	0.0525	0.0954
<i>Poecile montanus</i>							
<i>Lophophanes cristatus</i>	0.0121					0.0262	0.0131
<i>Periparus ater</i>							
<i>Cyanistes caeruleus</i>	0.0141		0.0024			0.0011	0.0072
<i>Parus major</i>	0.0831	0.0612	0.0478	0.2088	0.1481	0.1022	0.1390
<i>Sitta europea</i>	0.0069	0.0167				0.0011	0.0054
<i>Certhia familiaris</i>	0.0034			0.0078	0.0079	0.0091	0.0064
<i>Oriolus oriolus</i>	0.0094		0.0019				
<i>Lanius collurio</i>	0.0036						
<i>Lanius minor</i>							
<i>Garrulus glandarius</i>			0.0040	0.0686	0.0361	0.0468	0.0027
<i>Pica pica</i>				0.0367			
<i>Corvus frugilegus</i>							
<i>Corvus cornix</i>	0.0009						
<i>Corvus corax</i>	0.0001		0.0003	0.0033	0.0118	0.0102	0.0099
<i>Sturnus vulgaris</i>							
<i>Passer domesticus</i>							
<i>Passer montanus</i>	0.0268	0.0668					
<i>Fringilla coelebs</i>	0.3419	0.3163	0.2548	0.4505	0.4683	0.4249	0.4681
<i>Chloris chloris</i>	0.0194	0.0557	0.0104		0.0100	0.0343	0.0099
<i>Carduelis carduelis</i>	0.0042	0.0557			0.0426	0.0148	0.0054
<i>Coccothraustes coccothraustes</i>	0.0208		0.0275	0.0404	0.0079	0.0103	0.0104
<i>Emberiza citrinella</i>	0.0168		0.0892		0.0032	0.0125	0.0045
<i>Emberiza hortulana</i>							

Table 4. (continuation)

Species	National park "Slobozhanskiy" (our data)					
	Pine forest <25 year old	Pine forest 71-90 year old	Pine forest 91-110 year old	Pine forest >110 year old	Oak patches	Birch patches
<i>Anas platyrhynchos</i>						
<i>Spatula querquedula</i>						
<i>Milvus migrans</i>						
<i>Haliaeetus albicilla</i>						
<i>Accipiter gentilis</i>						
<i>Accipiter nisus</i>						
<i>Buteo buteo</i>			+			
<i>Clanga sp.</i>						

Species	National park "Slobozhanskiy" (our data)					
	Pine forest <25 year old	Pine forest 71-90 year old	Pine forest 91-110 year old	Pine forest >110 year old	Oak patches	Birch patches
<i>Aquila heliaca</i>						
<i>Falco tinnunculus</i>						
<i>Falco cherrug</i>						
<i>Coturnix coturnix</i>						
<i>Burhinus oedichnemus</i>						
<i>Columba oenas</i>						
<i>Columba palumbus</i>	+	0.0167	+	0.0165	+	+
<i>Streptopelia turtur</i>					0.0155	
<i>Cuculus canorus</i>	+	+	+	+	+	+
<i>Bubo bubo</i>						
<i>Strix aluco</i>						
<i>Asio otus</i>						
<i>Caprimulgus europaeus</i>				+		
<i>Merops apiaster</i>						
<i>Coracias garrulus</i>						
<i>Upupa epops</i>					+	
<i>Picus canus</i>						
<i>Dryocopus martius</i>					+	
<i>Dendrocopos major</i>	0.0520	+	0.0171	0.0188	0.0639	0.0416
<i>Dendrocoptes medius</i>					0.0128	
<i>Dryobates minor</i>						
<i>Jynx torquilla</i>					+	
<i>Lullula arborea</i>						
<i>Alauda arvensis</i>						
<i>Anthus campestris</i>						
<i>Anthus trivialis</i>	+	0.0627	0.0362	0.0151		+
<i>Motacilla alba</i>						
<i>Erithacus rubecula</i>	0.4514	0.0393	0.1087	0.1501	0.0585	0.1485
<i>Luscinia luscinia</i>					+	+
<i>Phoenicurus phoenicurus</i>		0.0167	0.0413			0.0300
<i>Oenanthe oenanthe</i>						
<i>Turdus merula</i>	+	0.0231	0.0682	+	0.0294	+
<i>Turdus pilaris</i>						
<i>Turdus philimelos</i>	+	+	+	+	0.0140	+
<i>Turdus iliacus</i>						
<i>Locustella luscinioides</i>						
<i>Acrocephalus palustris</i>						
<i>Acrocephalus arundinaceus</i>						
<i>Hippolais icterina</i>						
<i>Sylvia nisoria</i>						
<i>Sylvia borin</i>						
<i>Sylvia atricapilla</i>	+	0.0192	0.0298	0.0750	0.0709	0.0183
<i>Curruca communis</i>		+				0.0150
<i>Curruca curruca</i>						+
<i>Phylloscopus sibilatrix</i>	+	0.2834	0.1291	0.0902	0.0143	0.2065
<i>Phylloscopus collybita</i>	0.2533	0.0384	0.0161	0.0875	0.0138	0.0747

Species	National park "Slobozhanskiy" (our data)					
	Pine forest <25 year old	Pine forest 71-90 year old	Pine forest 91-110 year old	Pine forest >110 year old	Oak patches	Birch patches
<i>Regulus regulus</i>		+		+		
<i>Muscicapa striata</i>		0.0333	0.0149	0.0135		0.0300
<i>Ficedula parva</i>		0.0231	+	+		0.0300
<i>Ficedula albicollis</i>		0.0549	0.1198	0.1187	0.2005	0.1666
<i>Ficedula hypoleuca</i>						
<i>Aegithalos caudatus</i>						
<i>Poecile palustris</i>		0.0203	0.0447	0.0446		+
<i>Poecile montanus</i>		0.0333	0.0149			
<i>Lophophanes cristatus</i>						
<i>Periparus ater</i>		0.0167		+		+
<i>Cyanistes caeruleus</i>					0.0383	
<i>Parus major</i>	0.0581	0.0595	0.0993	0.1276	0.1928	0.0891
<i>Sitta europea</i>		+	0.0491	0.0271	0.0128	+
<i>Certhia familiaris</i>		0.0167	+	0.014	0.064	
<i>Oriolus oriolus</i>		0.0384	0.0166	0.0148	0.0177	0.0164
<i>Lanius collurio</i>						
<i>Lanius minor</i>						
<i>Garrulus glandarius</i>	0.0722	+			+	
<i>Pica pica</i>						
<i>Corvus frugilegus</i>						
<i>Corvus cornix</i>						+
<i>Corvus corax</i>				+		
<i>Sturnus vulgaris</i>						
<i>Passer domesticus</i>						
<i>Passer montanus</i>						
<i>Fringilla coelebs</i>	0.1130	0.2044	0.1645	0.1871	0.1426	0.1332
<i>Chloris chloris</i>						
<i>Carduelis carduelis</i>	+				0.0128	
<i>Coccothraustes coccothraustes</i>			0.0298		0.0256	
<i>Emberiza citrinella</i>						
<i>Emberiza hortulana</i>						

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Гніздові угруповання птахів соснових лісів лісостепової зони А.А. Атемасов, Т.А. Атемасова

Орнітофауна соснових лісів Північного Сходу України мало вивчена. Аналіз гніздових угруповань птахів показав, що орнітофауністичні комплекси соснових лісів бідніші та мають мінімальну схожість із такими у широколистяних лісах. Метою даного дослідження було оцінити видовий склад та щільність птахів у соснових лісах різного віку. Дослідження проводили на території національного природного парку «Слобожанський», розташованого в межах Краснокутської об'єднаної територіальної громади Богодухівського району, у північно-західній частині Харківської області (Україна). Більшість лісів парку мають штучне походження. Угруповання птахів досліджували у травні 2023 року в шести типах лісу: сосновий ліс віком до 25 років, сосновий ліс віком 71-90 років, сосновий ліс віком 91-110 років, сосновий ліс віком понад 110 років, ділянки дубових насаджень та ділянки березових насаджень. Використовувався метод точкових обліків. Загалом 60 облікових точок (по 10 у кожному типі лісу) були розташовані за допомогою карти лісів. Гніздову орнітофауну було класифіковано за місцем розташування гнізд, відповідно до місць пошуку їжі та на основі моделей міграції. Під час точкових обліків нами зареєстровано 39 гніздових видів птахів; з них 3 були первинними дуплогніздниками, 13 були вторинними користувачами дупел, 13 видів були деревними, 3 чагарниковими та 6 наземними гніздовими. Видів, що живляться на стовбурі відмічено 7, таких, що живляться у кроні – 15, у чагарнику – 3, аких, що збирають корм на землі – 12 видів. Вісімнадцять видів були далекими мігрантами, 6 видів – ближніми, 15 видів – осілими. Найменша кількість видів (16) зареєстрована в сосновому лісі віком до 25 років. Чисельність видів в інших типах лісу коливається незначно (23-25). Найменша сумарна чисельність відмічена в сосновому лісі віком до 25 років, найвища - в ділянках дубових насаджень. Загальна щільність різна між усіма типами лісу, за винятком пари соснових лісів віком 91-110 років – ділянок березових насаджень. У сосновому лісі віком до 25 років переважають вільшанка (45,1%) і вівчарик-ковалик (25,3%), у сосновому лісі віком 71-90 років – вівчарик жовтобровий (28,3%) і зяблик (20,4%), у сосновому лісі 91-110 років – зяблик (16,4%), вівчарик жовтобровий (12,9%), мухоловка білошия (12,0%), вільшанка (10,9%), у сосновому лісі віком понад 110 років – зяблик (18,7%), вільшанка (15,0%), синиця велика (12,8%) та мухоловка білошия (11,9%), у ділянках дубових насаджень – мухоловка білошия (20,1%), синиця велика (19,3%) та зяблик (14,3%), а в ділянках березових насаджень – вівчарик жовтобровий (20,6%), мухоловка білошия (16,7%), вільшанка (14,9%) та зяблик (13,3%). Найчисельнішими птахами у сосновому лісі віком до 25 років були наземні гніздові (70,5%). В інших вікових групах соснового лісу та ділянках березових насаджень співдомінували вторинні користувачі дупел та наземні гніздові види. У ділянках дубових насаджень переважали вторинні дуплогнізники (50,8%). В усіх типах лісів, крім соснового лісу віком до 25 років, переважали птахи, що збирають корм у кроні дерева. Далекі мігранти були найпоширенішими птахами в соснових лісах, за винятком соснового лісу віком менше 25 років та ділянок березових насаджень. У населенні соснового лісу віком до 25 років домінували ближні мігранти (56,5%). У ділянках дубових насаджень переважали осілі види (39,7%). Результати досліджень порівняно із даними інших дослідників, отриманими у соснових лісах регіону з середини 19 століття.

Ключові слова: орнітофауна, угруповання гніздуючих птахів, точкові обліки, соснові ліси, лісостеп, Харківська область.

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