



Birds of Prey of Ukraine and surrounding territories

Ministry of Education and Science of Ukraine
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Working group on Birds of Prey and Owl of Ukraine
Ukrainian Birds of Prey Research Centre

Birds of Prey of Ukraine and surrounding territories



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The book intended for conservationists, ornithologists and bird-watchers, biology teachers and students.

The authors are responsible for the meaning of the abstract.

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Results and directions of research of birds of prey in Ukraine in the 21st century

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Introduction. The analysis of the ornithologists' publications over the last 20 years allows us to make some generalizations, to identify the main directions, to identify the prospects for further research and the conservation of birds of prey.

Material and Methods. For the period 2000-2019 the materials of the articles of five conferences of Northern Eurasia and Ukraine (Penza 2003, Ivanovo 2008, Krivoy Rog 2008, Krivoy Rog 2012, Sochi 2016) and four periodicals (Vestnik Zoologii, Journal Berkut, Branta, Troglodites) were analyzed. 377 sources were processed: their statistical processing, compiled tables, graphs, diagrams.

Results and Discussion. Of the 377 publications, most were in periodicals - 264, and fewer were in conference proceedings - 113. The share of general ornithofauna with predatory participation (nesting, wintering, migration) was 143; common with the Falcons - 186 and Owls - 48. The analysis of articles of nesting, wintering, migrating predators. The tables of distribution of the number of publications by editions, diagrams of dynamics by years, diagrams of correlation between groups and individual types are considered.

The vast majority of the articles is devoted to ornithofauna in the habitual studies of breeding populations, migrations and wintering. The statistics and quality of publications from certain types of day and night predators are considered.

Noteworthy is the small number of works and capital studies in many NNPs, reserves, conservations.

Other aspects of the study and protection of the Falcons and Owls are considered.

Keywords: Falcon, Owls, publications, statistics, Ukraine.

Variation of size and shape of eggs in owls (Strigiformes)

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Introduction. Among huge variety of egg shapes in birds, owls' eggs are distinguished by pronounced spherical shape. We previously suggested that such shape of eggs is associated with a specific shape of bird's pelvis (Shatkovska et al., 2018). Nevertheless, owls are a large group of Neornithes, whose members have a wide range of body mass and differ significantly in their habitat. The question arises: "How much is the variation of egg shape in owls, whether there is an allometric pattern of change of their eggs that is associated with body mass or exist specific patterns of eggs shapes variation?"

Material and Methods. We analyzed the variation of body mass, absolute sizes of eggs (length and diameter) and indices of egg shape (indices of cloacal, infundibular and lateral zones, as well as indices of elongation and asymmetry of an egg) using PCA analysis (PAST software (Hammer et al., 2001)). Our study was conducted on 10 species (223 specimens) representing 2 families and 7 genera of owls.

Results. We found that the first three principal components described 96% of the variance. PC1 accounted 43% of the total variance. All studied traits substantially influenced the first principal component, but the main loading is affected by size (length and diameter) of eggs, as well as indices of the cloacal zone and egg elongation. These traits had different trends of change: increase of egg size is associated with increasing index of egg elongation and decreasing index of cloacal zone. PC2 explained 19% of the variation and is associated mainly with the index of egg asymmetry and indices of cloacal and infundibular zones, which also had opposite trends of change: increasing index of cloacal zone correlated with decreasing index of infundibular zone. Index of lateral zone moderate affected the second principal component, it increasing is associated with increasing index of infundibular zone. Also, egg diameter in average extent loaded the second principal component. PC3 explained about 8% of the variation and is mainly connected to the indices of lateral zone, egg elongation and egg asymmetry. Elongated eggs have enlarged indices of lateral zone and egg asymmetry.

Discussion. In morphospace of first two principal components, differences are observed mainly between species with relatively small body mass, small eggs sizes, which have more rounded shape of eggs with blunt cloacal zone (negative PC1 values) and owls with medium or large body mass, which generally have more elongated egg shape with pointed cloacal zone (positive PC1 values). The outlier on the plot was barn owl (*Tyto alba*). This species has an average value of body mass and substantially elongated and asymmetrical eggs. If other studied owls had the expected pattern of egg shape changing that correlated with the change of egg size, eggs of barn owl had significant distinguishing features. Perhaps in the case of barn owl, other constrained factors affected egg shape. Another explanation is possible. *Tyto alba* is the only member of Tytonidae in our species sample. Increasing the sample size and adding other species of this family can extend our understanding of patterns of eggs shape variation in owls.

Keywords: owls, size and shape of eggs, principal component analysis

The Birds of Prey of the Kvernaki Ridge, Georgia

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Introduction. The Kvernaki Ridge located in central part of Eastern Georgia, i.e. in Caspian Sea basin, in the Shida Kartli Region along the northern, right side of the Mtkvari River valley. Northern macro-slope is covered with fragments of deciduous forests and scrublands as well as with agricultural fields. Deep gorges, volcanic rocks and ravines with arid (semi-desert and steppe vegetation) are cutting through the southern slope. Elevation: 450-1070 m above the sea level.

Material and Methods. Field works at Kvernaki Ridge as well and in adjacent areas were carried out in 1977-1982, 1988-1991, 1999-2000, 2017-2019. Total duration of field works was 287 days, including 93 days of direct visual observations from several vantage points located at highest points of relief. Data were collected in all seasons of year – during 84 in spring, 95 days in autumn, 77 days in summer and 31 days in winter. The presence of 32 raptor species was confirmed to study area. 22 species are regular elements and 10 species are occasional elements. Breeding was confirmed for 7 species. Some detailed data presented below.

Results and Discussion. *Aquila fasciata* - it should be emphasized that the Kvernaki Ridge is the only place in Georgia and one of the few in the entire Caucasus where cases of eagle nesting have been noted. Twice, in 1984 and 1995, occupied nests were found here. Perhaps they nested in 2005, when in April- June several times pairs and single individuals were observed here, but nest could not be found. *Neophron percnopterus* – migratory breeder and rare in small numbers transit migrant. Within the considered territory, 3 or 4 pairs nest annually. All nests are located in small, partially destroyed caves that were made by man several centuries ago. *Circaetus gallicus* – rare in small numbers irregularly nesting migratory breeder and more-or-less common but not numerous passage visitor. *Buteo buteo* – common migratory breeder (from 12 to 20 pairs in different years) and widespread and numerous passage visitor. Breeding habitats located in woodlands and southern macro-slope. *Buteo rufinus* – common but not numerous breeder (4 – 9 pairs) and transit migrant.

Falco tinnunculus – widespread and common migratory breeder and passage visitor. Breeding was confirmed in all parts of area under consideration. Numbers of breeding pairs during last two decades fluctuated by years from 7 pairs (2017 and 2019) to 12 pairs (1999). *Falco naumanni* - 5-7 pairs annually nested in a small colony on the southern slope of the central part of the ridge in 1970-1980's. The nests were situated in the roof of a seasonal sheep-fold. In 1989, this farm burned down and, since 1990, nesting was no longer observed. Following 11 raptor species are widespread and regular passage visitors, occurring every year but only during seasonal migrations in spring (from middle of March to late May) and in autumn (from middle of August to late of November): *Pernis apivorus*, *Milvus migrans*, *Circus aeruginosus*, *Circus macrourus*, *Circus pygargus*, *Accipiter brevipes*, *Clanga pomarina*, *Clanga clanga*, *Aquila nipalensis*, *Hieraaetus pennatus*, *Falco subbuteo*. *Falco vespertinus* is rare in small numbers irregular transit migrant, which in some years does not occur at all. *Circus cyaneus* should be considered as a common but not numerous transit migrant and winter visitor to open habitats of study area, the number of which varies greatly by years. *Accipiter nisus* is widespread and common year-round visitor without breeding, transit migrant and winter visitor observed in wide range of habitats. *Accipiter gentilis* has the same status, only its number is many times smaller than the *Eurasian Sparrowhawk*. *Gyps fulvus*, *Aegyptius monachus*, *Aquila heliaca*, *Falco peregrinus* are year-round non-breeding visitors. *Buteo lagopus* and *Falco columbarius* are rare, irregular in small numbers transit migrants and winter visitors. Usually recorded by solitary individuals. *Haliaeetus albicilla*, *Aquila chrysaetos*, *Falco biarmicus* and *Falco cherrug* are very rare occasional visitors, solitary individuals were watched only a few times over all years of observation.

Keywords: Birds of Prey, migration, nesting, Kvernaki Ridge, Georgia.

Historical changes of birds of prey fauna of Ak-Kaya Mountain (Crimea Peninsula)

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Introduction. Ak-Kaya Mountain is located in the southeastern part of the Crimean peninsula, near Bilohirsk. It is vertical rocky wall with about 3 km length and height up to 200 m, stretching above the right bank of the Biyuk Karasu River. This area has been visited by several zoologists on some times, however, sufficiently complete data for comparison can only be found in the recently published field notes by M. A. Voinstvensky (2006), who had explored Ak-Kaya in 1958.

Material and Methods. The data was collected in 29.05.2008, 20.05.2009 and 21.05.2019. We explored all cliffs of Ak-Kaya Mountain, including rock locations adjacent to the north and east of the main cliff. The bone remains of birds of prey were also analysed from the Palaeolithic human camps located in this area at the end of the Pleistocene.

Results. Nowadays, in Ak-Kaya Mountain we revealed several bird species, namely *Buteo rufinus*, *Neophron percnopterus*, *Falco cherrug*, *Falco peregrinus*, *Falco tinnunculus*. Numerous bone remains of *Falco tinnunculus* are in all the investigated Pleistocene buries in different periods. Fragments of *Aquila chrysaetos* were much rarer than the former. Single bones of *Falco vespertinus*, *Falco naumanni* and *Circus cyaneus* were found also.

Discussion. Comparing the species composition of birds of prey recorded in Ak-Kaya in 2008-2019 with the data by M. A. Voinstvensky collected in 1958 it can be seen that *Buteo rufinus*, *Falco cherrug*, *Falco peregrinus* began to nest there in the last half of XX. We can determine time of appearance of birds of prey species basing on literature sources. We assumed that *Falco cherrug* began to nest in Ak-Kaya in the 1980th or in 1970th and *Falco peregrinus* in 1990th. Nest of the latter was found in Ak-Kaya for the first time 4.05.1997. At the same time *Buteo rufinus* began to nest in the study area. The living nest of this species was found 05.20.1997 near Ak-Kaya. In this area pairs and single individuals of *Neophron percnopterus* were spotted in the middle of the XX century. Currently, we recorded this species in 2019 on Ak-Kaya twice. Frequent records of this species in Crimea in last years suggest the resumed breeding of this species in study area. Analyzing the records of Late Pleistocene birds of prey it can be seen that *Falco tinnunculus* was common breeding species in the study area, as at present time. The time range for the records of this species is 20-100 thousand years ago. Perhaps, *Aquila chrysaetos* and *Falco naumanni* had been then breeding on Ak-Kaya, and *Falco vespertinus* had been nesting on floodplain. *Circus cyaneus* could have been a migrating or wintering species.

Keywords: Birds of Prey, fauna, transformation, Ak-Kaya Mountain, Crimea.

Birds of Prey and owls of National Nature Park «Hutsulshchyna»

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Introduction. National Nature Park «Hutsulshchyna» is situated in Carpathians within Kosiv district of Ivano-Frankivsk region with total area 322,71 km². Height limits are 270 - 1472 m over the sea level.

Materials and Methods. Surveys of birds of prey and owls were undertaken since 25.04 until 10.05.2019. Birds of prey were surveyed by two methods: observation on vantage points (11 points) and observation on pedestrian routs (44 km). Owls were surveyed by point-rout method (46 points, 30 km).

Results. By the result of research, 7 species of raptors and 4 owl species were identified on the territory of NNP (see table).

Table

**Species composition, abundance, and breeding density of birds of prey and owls in NNP
«Hutsulshchyna»**

No	Species	Registered pairs	Breeding density, per 100 km ²	Survey area, km ²
1	<i>Circus aeruginosus</i>	1	2,0	50,0
2	<i>Accipiter gentilis</i>	1	2,0	50,0
3	<i>Accipiter nisus</i>	2	5,7	35,0
4	<i>Buteo buteo</i>	14	28,0	50,0
5	<i>Aquila pomarina</i>	1	2,0	50,0
6	<i>Falco peregrinus</i>	1	2,0	50,0
7	<i>Falco subbuteo</i>	2	4,0	50,0
8	<i>Aegolius funereus</i>	2	5,0	40,1
9	<i>Glaucidium passerinum</i>	2	18,3	10,9
10	<i>Strix aluco</i>	9	18,3	49,3
11	<i>Strix uralensis</i>	4	8,1	49,3

Discussion. Among raptor species identified in NNP «Hutsulshchyna» 5 are rare and listed in Red Data Book of Ukraine (2009). **Lesser Spotted Eagle** (*Aquila pomarina*). On June, 11, 1 individual was observed in vicinities of town Kosiv by Oleg Pogribniy. **Peregrine** (*Falco peregrinus*) earlier was identified as wintering species for NNP's area (Horban and others, 2008). We register breeding pair within breeding habitat during May-July. **Tengmalm's Owl** (*Aegolius funereus*). Two singing males were registered in mountain spruce forests within 1200-1400 m over the sea level. **Pygmy Owl** (*Glaucidium passerinum*). Two males were identified within spruce forests in stripe of mixed forest (500-800 m over the sea level). **Ural Owl** (*Strix uralensis*). was observed in both mountain beech forests (400-800 m over the sea level) and plain oak forests (200-400 m over the sea level).

Acknowledgment Surveys were done within the frames of the project Carpathian Primeval Forest Conservation implemented by Ukrainian Society for the Protection of Birds and Frankfurt Zoological Society.

Key words: birds of prey, owls, Carpathians

Birds of prey of the eastern outskirts of Kryvyi Rih

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Introduction. The study of birds of prey of the city allows determining the features of their adaptation to urban landscapes.

Material and Methods. The material for the publication was collected in 2000-2019 on the eastern outskirts of Kryvyi Rih (Dnipropetrovsk region).

480 registrations were conducted with total length of 1680 km. 21 species of birds of prey, 51 nests and 81 nest sites were registered. The total investigated area is 30 km².

The area consists of residential buildings (45%), agrocenosis (35%), planted forests (10%), gullies, slopes and wastelands (8,7%) and water bodies (1,3%).

Standard methods of absolute registrations and mapping (Google Earth maps) of breeding fauna were used. Relative registrations were carried out during birds migration and wintering on 12 permanent routes from 0.5 to 5 km.

The nest density is given in terms of 100 km² of total area.

Results. During this period 21 species of birds of prey were marked: Accipitriformes (15 species), Falconiformes (6 species):

Nesting of 5 species of birds of prey has been registered.

Density ranged from 6 to 11 pairs/30km² (20-36 pairs/100km² of total land): *Circus aeruginosus* - 1 pair (3.3 pairs/ 100km²), *Accipiter gentilis* - 1 pair (3.3 pairs / 100km²), *Buteo buteo* - 1-2 pairs (3.3-6.7 pairs/100km²), *Falco subbuteo* - 1-2 pairs (3.3-6.7 pairs/100km²), *F. tinnunculus* - 2-5 pairs (6.7-16 pair/100km²).

Migrating: *Pandion haliaetus*, *Pernis apivorus*, *Hieraaetus pennatus*, *Milvus migrans*, *Buteo buteo*, *B. lagopus*, *B. rufinus*, *Circus cyaneus*, *C. macrourus*, *C.pygargus*, *C. aeruginosus*, *Falco peregrinus*, *F. cherrug*, *F. vespertinus*, *F. subbuteo*, *F. tinnunculus*.

Wintering: *C. cyaneus*, *A. nisus*, *A. gentilis*, *B. buteo*, *B. lagopus*, *B. rufinus*, *Haliaeetus albicilla*, *Aquila chrysaetos* *F. peregrinus*, *F. tinnunculus*.

The composition of breeding species of birds of prey is stable, the number depends on the food supply and ability to adapt in anthropogenic conditions.

Keywords: Krivoy Rog, day predators, species composition, nature of stay, number, mapping

Owls of the eastern outskirts of Kryvyi Rih

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Introduction. The diversity and abundance of owls in the city and surrounding areas are interesting for the overall characteristics of the birds of this group in the transformed ecosystems.

Material and Methods. The material for this publication was collected during 2000-2019 on the territory of the eastern suburbs of Kryvyi Rih (Dnipropetrovsk region). 6 species of owls, 111 nests and 140 nest sites were registered. During this period 380 registrations were conducted. The total length of the routes was 1330 km. The total area, which was investigated, is 30 km².

The area consists of residential buildings (45%), agrocenosis (35%), planted forests (10%), gullies, slopes and wastelands (8,7%) and water bodies (1,3%).

Standard methods of questioning, absolute route registrations both with and without voice stimulation with it mapping (Google Earth maps).

The nesting density is given in terms of 100 km² of total area.

Results and discussion. During this period 6 species of owls have been marked. 3 nesting species were marked.

The nesting density 19-28 pairs/30 km² (67-93 pairs/100km²): *Asio otus* - 5-10 pairs (17-33 pairs/100 km²), *Otus scops* (after 2012) - 6-8 pairs (20-26 pairs/100 km²), *Athene noctua* - 8-10 pairs (27- 33 pairs/100 km²).

Wintering: *Asio otus*, *Athene noctua*

Stray birds: *Tyto alba*, *Bubo scandiacus*, *Asio flammeus*

Asio otus occupy abandoned or unfinished corvidae nests, mainly magpies'. Owls nest everywhere, including residential areas, due to the relatively high density of magpies' nests in such areas.

Otus scops has been nesting in the area since 2012. It chooses planted forests, but sometimes it can be found in a private construction sector.

Athene noctua nests in a residential area, choosing abandoned buildings or new buildings with concrete roofing.

Male of *Bubo scandiacus* was seen on the meadow near the lake Solone (26.02.2006)

The number of owls is relatively high. The main factors are food supply and anthropogenic activity.

Keywords: Kryvyi Rih, owls, species composition, nature of conditions, mapping.

Hen, Montagu's and Pallid Harriers in central Dnipropetrovsk oblast

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Introduction. Harriers are among the most frequently noticed birds of prey in Ukraine, but they are vulnerable to anthropogenic factors. Since all harriers in the Western Palearctic are highly migratory, monitoring of their status and phenology in Ukraine is of relevance not only at national level but also in the context of their global conservation.

Materials and Methods. Observations were in the central part of Dnipropetrovsk oblast between in 1996-2019. Sites covered included a chain of locations within the Samara floodplain between Orlovshina and Mezhirech, and the now defunct Samarski and Petrikovski fishpond complexes. The habitat was typically a mixture of floodplain meadow mixed with cultivated land and shallow lakes.

Results and discussion. Hen Harrier (*Circus cyaneus*) was the most frequently seen and most numerous. A total 222 birds were observed on 118 days, an average of 1.8 birds per day. It is a regular spring and autumn migrant and winter visitor, keeping to a strict phenology. The latest spring record is for 21 April 1996. The earliest autumn record concerns 16 September 2018. In winter 91 individuals were observed on 36 days, an average of 2.5 birds per day. The total figure for adult males for 1996 -2019 is 74, including 28 seen in the winter months, about 32% and 30% of the total. Juveniles and immatures were not usually distinguished. The vast majority of observations involved typical hunting behaviour with low and slow flight over open ground.

Montagu's Harrier (*Circus pygargus*) proved to be almost as numerous as the Hen Harrier but with a very different phenology, being a summer visitor rather than a winter visitor to Ukraine. A total of 183 individuals was seen on 109 occasions, an average of 1.6 birds per day. This total was composed of 46 adult males, 41 adult females, 83 juveniles, 8 subadult males, 2 subadult females and three birds of unspecified plumage. It was recorded on 34 days during the provisional summer season, ranging from 17 May to 23 July. Up to 2003 there were regular sightings during the breeding season. Within central Dnipropetrovsk oblast, the Montagu's Harrier remains a regular passage migrant, more numerous in autumn than in spring. The average first arrival date is 22 April, the earliest dates being 11 April 2004 (single males). The average latest date for the species is 22 September, the extreme final dates being 5 October 2008 and 2013. Observations on 49 days in autumn produced a total of 118 birds (mainly juveniles).

Pallid Harrier (*Circus macrourus*) is former breeder is now only an uncommon spring and rare passage migrant. All records include 10 occasions (1999-2019). They could be supplemented by a larger number of Pallid Harrier sightings from other birders in Dnipropetrovsk oblast. The species occurs mainly during a fairly narrow time window in late March and the first half of April and can appear almost randomly at any open country location, not just birding "hotspots".

Conclusion. The Hen Harrier is a common winter visitor and spring and autumn migrant in central Dnipropetrovsk oblast and has not declined over the past 24 years of observation. The Montagu's Harrier is now infrequently found in summer at what we assume to be former breeding sites in the Samara floodplain, but may still persist as a rare breeding species. It remains regular at the abovementioned sites, especially Bulahovka liman, on the return migration in August and September, when 70% of birds are juveniles. Pallid Harrier, which must have ceased breeding in the area decades ago with the conversion of natural steppe to cultivation, remains an uncommon but regular spring migrant in late March/first half of April and rare autumn migrant. The period of its spring migration overlaps with the presence of the last Hen and the first Montagu's Harriers. Pallid and Montagu's Harriers potentially overlap during the autumn migration and the last Montagu's Harriers can overlap with the first Hen in the second half of September/early October. Since the information presented above is drawn from observations at a very limited number of sites, it is clear that more geographically extensive and systematic study could add significantly to our knowledge of the smaller harriers in Dnipropetrovsk oblast.

Key words: Harriers, Dnipropetrovsk oblast, migration, breeding, winter visitor.

Patterns of the structural organization of the community of birds of prey in Belarus

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Introduction. In 1972-2017, we studied patterns of the structural organization of the community of bird of prey (*Falconiformes*) in the Belarusian Poozer'e district and noticed that the closest nests had those species that had insignificant trophic competition or when such competition was absent (Ivanovskiy, 2017). Moreover, sometimes these species occupied each other's old nests. An attempt has been made to identify a correlation between these indicators. Investigation of mechanisms of competition weakening between birds of prey during selection of breeding areas has both theoretical aspects (in terms of developing ideas for population ecology) and practical ones (in terms of developing recommendations for the protection of rare species).

Material and Methods. The ecological niche breadth of birds of prey was calculated according to the parameters of the “nesting site” and “trophic links”. By the term “nesting site” we understand the vegetation area (analogical to the taxation section in the forestry) within a radius of 50 meters around the nest. To calculate the parameter “trophic relations”, 23 categories of food resources were determined, the percentage of which was calculated in the diet of each predator. The percentage of biomass consumed was calculated (%BC). 5780 specimens of prey were identified in the diet of birds of prey. To calculate the ecological niche breadth using the parameters of the “nesting site” and “trophic relations”, we applied the Levins index $B = (\sum p_i^2)^{-1}$, where p_i are the shares of the corresponding resources.

We also compared the minimum distances between the inhabited nests for the same species and between different species of birds of prey.

Results. The Spearman's correlation coefficient between the “nesting site” and “trophic relationships” was equaled $r_s = 0.371$. The result shows that there is a linear positive weak relationship between these parameters. The difference between the mean distance for the inhabited nests of the same species and different species of birds of prey was statistically significant ($t = 2.567$, $df = 19$, $p < 0.05$).

Discussion. The selectivity of nesting and hunting habitats of different birds of prey species is a result of the fact that the territory of the Belarusian Poozer'e district is inhabited by these birds of prey very unevenly and the distribution of nesting sites is focal, often dotted. The nests of species with no or minor trophic competition are located most closely.

Comparison of the minimum distances between inhabited nests of one species and different species of birds of prey showed that in the majority of cases intraspecific competition for this parameter is more severe than interspecific competition.

From the considered examples it follows that the conducted analysis allowed us not only to identify the similarities and differences between the objects described by several parameters, but also to establish the factors that determine these similarities, differences and mechanisms of weakening competition.

Key words: Predatory birds, *Falconiformes*, ecological niche breadth, structure of nesting habitats, trophic relationships, mechanisms of competition weakening, Northern Belarus.

Black Stork nests as a place of interest for birds of prey

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Introduction. Information on usage of Black Stork nests by raptors at the beginning of the breeding season, before the arrival of storks, so far is very scarce. We managed to collect interesting data about this phenomena during our studies (Бокотей, 2017) of Black Stork breeding biology with the use of trailing cameras — autonomous devices able to record video and photos which are periodically triggered by movement sensors and/or by predefined programs. Nowadays it is one of the most efficient methods for studying Black Stork breeding biology (Cano et al., 2019).

Material and Methods. In 2016-2018 we used 5 trailing cameras Acorn Ltl-5310WMG and 5 cameras of Acorn Ltl-8210BR model. These cameras worked non-stop during the breeding season and have an infrared flash for night recording which is invisible for birds. Trailing cameras were installed in nests inhabited by storks for a long time, located in places with good feeding conditions and low disturbance. During the whole period cameras were installed in 12 nests: Rivne region – 4 nests, Volyn region – 4 nests, Ivano-Frankivsk region – 3, Lviv – 1. In one of the nests a camera was installed in four consecutive seasons, in 3 nests – for 3 years, on 4 nests – during 2 years and on 3 nests cameras worked only for 1 year. In 5 cases cameras were installed on artificial platforms built by us in previous years.

Results and discussion. In total 166 000 photos were collected. On 664 of them, raptor birds were detected. Among them 267 are day raptors (5 species) and 397 – owls (4 species). In the majority of cases (30) raptors were interested in nests only for a short time period, sitting on a nest or on nearby branches. It is true for all observations of Tawny Owl (7 cases), Short-eared Owl (1), Ural Owl (1), Black Kite (1), Greater Spotted Eagle (1), and in some cases for Common Buzzard (8), Goshawk (6), Great Grey Owl (2).

In 2016, on March 13, in Shatsk district of Volyn region, a pair of Great Grey Owls started to pay attention to a Black Stork nest located on an artificial platform. Owls visited the nest every evening in the dusk, dug up nesting hole in the nest and frequently sit in the nest. From March 29 till April 4 they did not visit the nest. In the same time, in the morning of each day, a female of Goshawk repaired the nest with green pine branches remaking the hole in the middle of the nest for its own needs. After that, the Goshawk disappeared. Since 4th of April Owls visited the nest every evening and on April 22 laid the first egg. On April 8 a Black Stork arrived for the first time and started to rebuild the nest in a stork way — flattened the hole made by owls and nest flanges built by the hawk. Later the stork visited the nest in 3-4 days and did not meet with owls. On April 22 the camera power supply was exhausted and it stopped to take pictures. On May 8, after the renewal of batteries, we found the empty nest, which was not visited this year by storks nor by owls.

In 2017, on the natural nest in Sarny district of Rivne region, Black Storks did not attempt to breed. However, the nest was renewed and frequently visited. On April 2 a Common Buzzard for 20 minutes checked the nest and tried to build it up. This individual visited the nest for 8 times. From 10th till 19th of May the nest was occupied by a pair of a Hobby who spent in it more than 1.5 hrs in total.

In 2019, in Shatsk district of Volyn region, a Great Grey Owl visited a Black Stork nest on an artificial platform every night in the period between 23 and 26 of March. On March 27 both storks arrived at the nest and one of them spent each night there until April 4. On 4th and 5th of April, the nest was visited by owls again, while the storks were absent. The owl started to dig a hole in the nest center. On April 6, late in the evening one of the storks came back to the nest and stayed there for night frequently taking aggressive postures, probably trying to scare Great Grey Owls off.

As a conclusion made based on collected materials we can state that Black Stork nests are visited by raptors at the beginning of the breeding season while storks are absent. Frequently they start to rebuild nests according to their needs with a purpose to breed there. Such facts were recorded for Great Grey Owl, Common Buzzard, Goshawk and Eurasian Hobby. During the breeding season, if a nest is used by storks for breeding, other bird species including raptors avoid visiting a nest because of aggressive behavior of storks. If a nest is not used by storks for breeding, it is usually visited by different species for a short time, while storks are absent.

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Keywords: Black Stork, *Ciconia nigra*, raptors, nests, trail cameras.

New data for breeding biology of the Scops Owl *Otus scops* (L.) in the Crimea

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Introduction. Breeding biology of the Crimean Scops Owl population is insufficiently studied. I tried to fill this gap partially presenting original data on the breeding biology of this owl collected in the area of Sevastopol.

Material and Methods. Research was fulfilled in 2000-2003 in vast artificial tree plantations and in rarefied low-rise oak forests on the Sapun-Gora hill east of Sevastopol. The data obtained on the Fedyuhiny Vysoty hill neighbours of Sapun-Gora and on the Maximova Dacha park in Sevastopol were also used. The main material was obtained during surveys of owl's nests in bird-boxes.

Results and Discussion. Scops Owl arrivals in the breeding habitats in late March – early April (the earliest registration in 29 March 2006, Sevastopol). The Scops Owl nests willingly in bird-boxes. During the research period, only one of them was found in the old nest of Magpie (*Pica pica*) on a low-rise oak at height of 3 m. Owl laid eggs on a thick litter of moss. In bird-boxes owls laid also frequently eggs on the moss litter or animal wool after tit's (*Parus major*) nests. Once in a nest with complete clutch a large rag was found, that was probably dragged by squirrel (*Sciurus vulgaris*) in winter. Complete brood contains 3-5 eggs, most often four eggs. Considerable part of broods and clutches lost. The abandoned nests with 2-4 eggs were revealed, as well as the dead nestlings. In some nests, eggs and nestlings disappeared. Once in the bird-box an owl with developed brooding patch was found, but the clutch was not. In other case, the same bird was registered in empty bird-box several days in a row. Significant mortality of Scops Owl's clutches was observed in the second half of June 2000, under long-term cold snap with rains, at night temperature dropped up to 10°C and in the afternoon to 15°C. The data allowing to judge about the time of hatching and development of nestlings are follows. In 2002, in one of the nests the latest (third) chick hatched on July 5. In 18 June 2003 in two nests females hatched complete broods and in the third nest there were already chicks. In 4 July 2003 in the first nest of them there were three grey down chicks and much smaller white one, and in the second nest the chicks were died. In the third nest, in all four chicks tail feathers (more than 1 cm) and wings began to grow. In 8 July 2003 in the first nest three chicks were in a grey down, and the latest chick has almost replaced the white down on grey. In the third nest, there was only one chick, and the other chicks have already departed. The time of departure of the Scops Owl fledglings can be detected by the following data. In one of the nests, the fledglings flew out before 2 July 2000. In other nest, grown chick with broken leg was found on 3 July 2001. It is obvious that other chicks have left the nest before. Finally, a young bird recently left the nest was caught by a mist net on 7 July 2001. Data on feeding were not collected on purpose. In one nest, a chick was found, that is eating the back half of the mouse (*Apodemus uralensis* or its sibling species *A. arianus*), which it could not swallow. Two wings of cicada (*Lyristes plebejus*) were found in another nest.

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Keywords: Scops Owl, breeding, Crimea.

Breeding stock of *Falco tinnunculus* Linnaeus, 1758 in Kryvyi Rih and surrounding territories

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Introduction. Kestrel (*Falco tinnunculus* Linnaeus, 1758) is the most abundant and widespread species of birds of prey in the Krivorozhye, but no breeding numbers have been estimated.

Materials and Methods. The study was conducted in the period from 1989 to 2019 within the city of Kryvyi Rih and adjacent territories (Shirokivskyi, Kryvyi Rih and partly Sophia and Apostolic districts of Dnipropetrovsk region). The materials were collected in different types of biotopes of urban and man-made landscapes in order to assess the breeding abundance of the species. Nesting pairs were registered, as well as mating nests with subsequent mapping within the framework of the Atlas of Nesting Birds of Krivorozhye. The whole territory of Kryvyi Rih is divided into 128 squares 2x2 km each. Nesting was estimated over five years. For establishment of biotopic distribution of breeding pairs, groups of types of biotopes are distinguished: settlement zone (residential quarters of different types of development), parks and forest park zones; technogenic biotopes (quarries, dumps, collapse zones, exclusion zones, sludge storages, tailings ponds), industrial sites (factories, factories, mining and processing plants), agrocenoses (fields with forest strips, tufts) steppe tracts (beams, woodlands, salt marshes and salt marshes).

Results. During the surveys of the city and surrounding territories, more than 370 breeding pairs of kestrel were found. For 5-year intervals the number of breeding pairs for Kryvorozhzhya was estimated by us: 1989-1993 - from 37 to 50 (incomplete coverage of the territory), 1994-1998 - from 80 to 110, 1999-2003 - from 85 to 120, 2004-2008 - 85 to 110, 2009-2013 - 95 to 130, 2015-2019 - 90 to 125 breeding pairs.

Discussion. During the whole thirty-year period, there is a significant increase in breeding habitat numbers in technogenic landscapes over the numbers in open landscapes (steppe tracts and agrocenoses) by 20-40 pairs, especially in the suburban area, which corresponds to the surrounding forest and park areas. collapses, settlers of different types, exclusion zones near mines. During the whole period the number of breeding pairs fluctuated - from 70 to 110 (against 45-72 in agrocenoses). In our view, this is due to a low level of anxiety. Dumpling complexes of rock and loose type have a considerable degree of artificial, natural overgrown with wood and shrub vegetation, adjacent to agrocenoses, so they attract birds, serving as a kind of refugium. Nesting numbers on industrial sites ranged from 22 to 37 pairs (accurate estimation of the numbers from the early 2000s to the present time is problematic due to the security regime of enterprises and difficult access). The preference was given to the territories of mining and processing enterprises (GCS), with high-rise buildings and pipes, mine ventilation shafts available here.

In the steppe tracts (beams, woodlands and salt marshes), the number of breeding pairs ranged from 18 to 31 pairs, with a tendency for their number to decline gradually from the early 2000s. The nested 11 artificial nests (galvanized old buckets) housed the nesting of 2 pairs of burrowers, most of them inhabited by an eared owl (*Asio otus* Linnaeus, 1758).

Breeding in the residential area of the city is single (8 to 14 pairs), with a gradual trend of decline over the last 20 years, with the simultaneous movement of breeding pairs to industrial sites and forest park areas. There were cases of nesting on the roofs of the buildings of the State Circus, the Executive Committee of the City Soviet of People's Deputies, high-rise 13- and 16-storey residential buildings. Preference was given to sockets on main transmission line supports and portals of power stations, transformer stations.

Keywords: Kestrel, breeding population, biotopic distribution, Kryvyi Rih, Ukraine.

Characteristics of diet of the Long-eared Owl *Asio otus* L. in the southwest west of Dnepropetrovsk region

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Introduction: One of the most widespread and widespread species of region is Long-ears Owl, but diet is not well understood.

Material and Methods: We studied the feeding of Long-eared owls on the basis of pellet collection (n = 102) and their laboratory analysis. Camel determinants and reference collections of complete skeletons of small birds, skulls of micromammalia were used.

Results: In the vicinity of Geykivka village, Kryvyi Rih District, Dnipropetrovsk Oblast, there is a significant winter accumulation of Long-eared owls. During the 2010-2011 winter season, we observed 35 individuals of Long-eared owls. Locusts were observed in the hospital square, and no owls were noted in the forest strips and garden, in the rural settlement of the owl. The logs (2 places) of owls were located on large willows in the park.

During the winter, quite high temperatures were observed, frequent thaws, and a short period of time was unstable snow cover. In November, there was no day at all with temperatures below 0°C. Weather conditions and vegetation nature of the stationary experimental site contributed to the formation of a large wintering group of Long-eared owls in the vicinity of the village of Geykovka. In the winter of 2011, 33 individuals of Long-eared owls hibernated, in 2012 - 28, in 2018 - about 67.

Discussion: Long-eared owl was studied for the first time in the vicinity of the village of Geykovka. Analysis of the results showed the presence in the pellets of 3 of victims:

- *Mus musculus* L. (109, or 41.92%, an average of 1 pellet - 0.94, the number of pellets with a presence - 66, the maximum number per pellet - 5),
- *Sylvaemus* sp. (75, or 28.85%, number of pellets with presence - 50, average per pellet - 0,647, maximum number per pellet - 3),
- *Microtus levis* Miller (76, or 29.23%, the number of pellets with a presence of -55, an average of 1 pellet - 0.655, the maximum number per pellet is -3).

Representatives of the "fistula ordinary" ("arvalis" group), whose determination is possible only by genetic markers. Rather, there is a species of *Microtus laevis* present, than theoretically possible - *Microtus arvalis*.

The total number of registered victims of the Long-eared owl is 260 individuals in 116 pellets, which is an average of 2,241 individuals per pellet, which is significantly less than for all other surveyed samples for the Kryvorizhzh research sites.

Attention should be paid to the absence of Long-eared owl birds among the victims, which testifies to the high number of micromammals and the specific nature of the surrounding owl landscapes. The forest park area is located among the agrocenoses, rare forests, forest protection strips.

Keywords: Long-ears Owl, diet, Dnepropetrovsk region, Ukraine.

New data on the nesting of the White-tailed Eagle (*Haliaeetus albicilla*) in Zaporizhzhya region

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Introduction. Materials on the nesting of rare species of birds of prey always cause some interest, therefore, of course, the following new case of white-tailed eagle nesting in treeless landscapes of the Northern Azov region deserves attention.

Material and Methods. In 2019, during the work on establishing the species composition and distribution of birds of prey in the south-west of Zaporizhzhya region, mainly within the framework of the planned wind farm in the Akimovsky district, a number of interesting finds were made, one of which is the eagle's nest in a forest belt among agrolandscapes far from water bodies.

Results and discussion. Here, in the region of the village of Davydovka, we repeatedly observed an adult eagle in April-May of this year at the Utlyuk estuary and at settling ponds. An assumption was made about possible nesting, but unfortunately, it was not possible to examine this section of the territory for various reasons in the spring, so the nest was found only in the fall (12.09.). It was located in a fragmented forest strip remote from settlements, consisting of elms of different ages. Nearby, on both sides of the forest belt, sunflower fields were located, closely, without dirt roads, adjacent to it. The distance from the forest belt to the nearest body of water was at least 1.5 km. The nest was built in the apical fork of one of the old elms at an altitude of about 12 meters from the ground. The construction is quite massive - at least 1.7-1.8 m in diameter and about 0.8 m in height. According to the indirect signs (bone remnants of food, droppings), there probably were no chicks this year. Fly feathers were found under the nest.

When communicating with local hunters, it later became clear that this nest has existed for at least two years. This year, indeed, breeding was unsuccessful, as one of the birds died. Hunters saw a dead eagle lying under the nest in the summer. True, when visiting the site, we did not notice any remains of the eagle, but still the information received from the local residents seems quite reliable. Moreover, in the spring of 2019, due to the abundance of mouse-like rodents, local farmers actively used pesticides, which led to the mass death of various birds, including birds of prey (buzzards, winter flies, harriers) and animals (foxes). Perhaps for the same reason the eagle died.

Thus, this fact of the eagle nesting in the new territory confirms the ongoing process of the resettlement of this species in the steppe zone of Ukraine, which was repeatedly mentioned in the literature.

Key words: eagle, nesting, steppe, Zaporizhzhya region, Ukraine.

Recording of birds of prey in the southern right-bank steppe of Ukraine

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Introduction. Regular recording of birds of prey number make it possible to assess the status of their populations, identify tendencies and early conservation measures in advance.

Material and Methods. The research materials were collected on May 25-28, 2019 in the territory of Mykolaiv and Odessa regions within the framework of planned international monitoring of the success of *Falco cherrug* nesting in artificial nests and the study of vertebrates of roadside steppe strips.

The relative numbers were recorded on motor routes with a total length of 1485 km. All data were recorded on a 1: 2000000 topographic map.

Results. A total of 76 pairs of 9 birds of prey species of 2 families are registered: Accipitridae - 5 species and 13 pairs; Falconidae - 4 and 63 respectively. Clear dominants were *Falco vespertinus* (42.1%) and *Falco tinnunculus* (35.5%); subdominant species - *B. vuteo* (7.9% of the total population). The largest types of diversity is observed in the Odessa region. A map and analysis of the territorial distribution of birds of prey of the studied territory are added.

The species diversity of birds of prey increases from the east to the west of the southern steppe of right-bank Ukraine. Some species, such as *F. vespertinus* and *F. tinnunculus*, have successfully adapted to nesting in forest areas and hunting in steppe roads.

Keywords: Southern steppe, Ukraine, birds of prey, species, number.

Distribution and number of black kite (*Milvus migrans*) in the Kropyvnytskyi region

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Introduction. Black kite is a species whose breeding population in Ukraine has been sharply reduced over the last 20 years and since 2009 it has been listed in the Red Data Book of Ukraine. Therefore, all information about distribution, breeding and abundance in modern conditions is urgent and necessary.

Material and Methods. The material for this study was collected during 1994-2019. Methods of relative and absolute accounting, mapping were used. In order to establish the distribution of breeding pairs across the territory of the region in the years 2000-2010, in addition to a detailed survey of forest areas, pedestrian and bicycle expeditions were carried out along the streams of the largest rivers in the region.

Results and discussion. During the twentieth century. Black kite was a common breeding species, sometimes numerous. The distribution of breeding population across the territory of the region has always been and remains rather uneven, which is connected with the breeding of the species in the places near the reservoirs.

During 2000-2010, the distribution of breeding pairs of black kite throughout the region underwent partial changes, although the numbers remained almost at the same level. In some woodlands, it has ceased to nest at all. In the beginning of the 21st century. species found in 14 points in 6 administrative districts. In the Oleksandri district there are 5 breeding habitats on a regular basis, 3 on the Znamiansky, 2 on the Novoukrainsk, 2 on the Epiphany (Bogovyavlensky), Vilshansky, Kirovograd and Oleksandrivsky on one breeding pair.

In the third edition of the Red Data Book of Ukraine, the black kite (*Milvus migrans*) for the territory of Kropyvnytskyi (Kirovohrad) region is not listed as a breeding species, although its breeding range covers almost the entire territory of the state, including the Steppe zone

The current number of black kite in the territory of the Kropyvnytskyi region is about 15-20 breeding pairs. The main area of its concentration is the Ingulets River basin, where 57.2% of the breeding population of the species are concentrated.

Keywords: black kite, breeding, numbers, Kropyvnytskyi region, Ukraine.

Movements of Satellite-tracked Saker Falcons (*Falco cherrug*) in Ukraine: Juvenile Dispersal, Migration, Wintering, Threats and Relations to the Central-European Population

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Introduction. The Saker Falcon is classified “Endangered” by IUCN and its global population has been decreasing for decades. The core of the population can be found in Asia (Mongolia, China, Russia and Kazakhstan), but its range expands to Central Europe towards west. The European population has been split to a western and an eastern population divided by the Carpathian Mountains. The recent study analyses the movements of Saker Falcon in the eastern area including satellite tracked birds in both populations regarding dispersal, migration, wintering, revealed threats and relations between the two European populations.

Material and Methods. We have tagged 12 Saker Falcons in Ukraine since 2011 and more than 100 in Central Europe. We used GPS-Argos and GPS-GSM loggers to track the movements of the tagged birds. We have analyzed the movements by using QGIS.

Results. Ukrainian birds showed a relatively smaller distribution range compared to the Central European birds, however they were more likely to migrate long-distance and spend the winter in the Sahel, North Africa. Long-distance migration, however, increasingly exposed birds to threats like electrocution or illegal trapping, which can be one important reason for population decrease in East Europe. Gene exchange exists, but it is limited between the two disjunctive populations: there was only one Central European Saker Falcon among the tagged birds, which started to breed in East Europe (in the Crimea), even though a considerable number of tagged birds visited East Europe during juvenile dispersal.

Discussion. The difference between the two populations regarding migration strategies may be caused by the difference in prey availability: there are more preys available in winter in Central Europe than in the vast agricultural areas in East Europe, thus Central European birds are not forced to leave the area for winter. Subsequently, they are less exposed to the risks of a long-distance migration, though a small percentage of the juveniles do long-distant migration. Level of gene exchange is low and it is likely to be decrease further with the decreasing population and so decreasing range.

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Keywords: Saker Falcon, *Falco cherrug*, movement, migration, gene exchange

Migration of Ospreys (*Pandion haliaetus*) from northern Belarus by the data from GPS/GSM-transmitters

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Introduction. The main objective of our current study was to obtain migration route and wintering sites of ospreys from northern Belarus.

Materials and Methods. In June of 2018 we caught two adult ospreys, male and female from different pairs and tagged them with GPS/GSM-transmitters. The nests of these ospreys are located at Rassony and Verhnyadzvinsk districts of Vitsebsk region at northern Belarus and distance between them is 21 km.

Results and discussion. In 2018 there were three chicks in the nest of tagged male named Vova. This bird left its breeding area on August, 31. Vova went through Ukraine and Romania and stayed in Bulgaria from September, 6 to September, 18. His jump over the Mediterranean Sea osprey-male began in Greece on September, 19. He flew over Sahara through Libya, Algeria and Niger. Then on September, 29 he arrived to Nigeria where later spent more than five months. On March, 15 Vova started flying back. His spring migration route in Africa lays through Niger, Mali, Algeria and Tunisia. On March, 22 Vova left African continent and went to Italy. Then he flew through Albania, Kosovo, Serbia, Romania, Hungary, Slovakia, Poland, Belarus, Lithuania and Latvia. On April, 3 Vova arrived home.

A female named Elena had not been leaving the nest with two chicks till July, 16. Then she did some short journeys to the river or lakes and always went back to the nesting tree. On July, 31 Elena flew right to the south 650 km and spend several days in Ukraine. It looked as a beginning of autumn migration but then, on August, 6 she turned back to the nest. On August, 14 Elena started her way again to Ukraine to the same spot where she was two weeks ago. Here she spent about two weeks and flew further towards the south on August, 29. Her migration route in Europe went through Romania, Bulgaria and Greece. She crossed Mediterranean Sea flying non-stop more than 400 km and landed in Libya on September, 2. It took 12 days for osprey to get over Sahara desert: she flew through Chad and reached wintering site at Central African Republic on September, 14. There she spent six months and on March, 20 began facing to the north. Spring migration route was lying through Chad, Libya and Egypt. On March, 31 Elena was by Mediterranean Sea. First she got Cyprus, then Turkey, Bulgaria, Romania and Ukraine. On April, 15 Elena was at home at her nest.

The breeding season of 2019 for Elena and Vova was successful and they both had one chick per nest fledged. After breeding period birds went migrating to the south.

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Keywords: osprey, migration, GPS/GSM-transmitter, place of wintering

Migrations of the Osprey (*Pandion haliaetus*) in area of the Kaniv Nature Reserve (Central Ukraine)

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Introduction. The Osprey (*Pandion haliaetus*) is a rare but regularly migrating bird species in Ukraine. It listed in the Red Book of the country. Peculiarities of its migrations are studied insufficiently. The Kaniv Nature Reserve is located on the Dnieper river near the town of Kaniv (Cherkasy region). Research of bird migrations in this area represents the main features for the whole country.

Material and Methods. We studied migration of birds in the nature reserve and its environs in 1987-2019. Observations conducted regularly during the whole year. We used also the information from the Chronicle of Nature of the Kaniv Nature Reserve for 1970-1986. Thus, the collected data cover the period in 50 years. All the average values are given with standard error. For the analysis of changes in timing of migrations and numbers of birds we used the linear regression.

Results. The Osprey was a rare but regularly migrating bird species in the study area. It occurred more frequently during the autumn passage. The spring migration lasted as a rule about one month: since late March or early April till late April or the first half of May. The first birds were observed on average on 5.04 (± 1.7 days; range: 27.03 – 18.04; n = 14). The end of the spring passage was registered on average on 6.05 (± 3.4 days; range: 28.04 – 15.05; n = 5). The autumn migration was more prolonged. We observed the first migrating Ospreys on average on 20.08 (± 3.1 days; range: 26.07 – 14.09; n = 20). The last birds can be stayed up to late September and October. The mean date of the last departure was 5.10 (± 2.8 days; range: 22.09 – 25.10; n = 13). Timing of migrations during 50 years of studies remained stable. Ospreys were registered as a rule singly, very rarely we found two birds at once. Hunting Ospreys were observed most frequently on the Dnieper or in its flood-plane, sometimes we met them also in flood-plane of the Ros river (a right tributary of the Dnieper) and on fish-farming ponds. For the rest birds stayed on river islands. We saw them in trees and on sandy spits. Passing Ospreys did not bound up with waterbodies, we encountered them even above ravines in the rolling landscape on the right bank of the Dnieper. Migrating birds were registered almost yearly but in very small numbers. We observed usually no more than 3-5 individuals during a season. Ospreys occurred most often in August and September. Frequency of records during the spring migration remained stable but for the autumn passage we found the positive linear trend ($p < 0.01$). During the last decade Ospreys began to appear more often. Sometimes on the Dnieper near Kaniv we found also summering birds. Ospreys were observed on river islands in June and July in 1987, 1989 and 2001. V.I. Strigunov (1986) has encountered a bird in the mouth of the Ros river (to the south from the Kaniv Nature Reserve) on 18.07.1980.

Discussion. According to L.A. Smogorzhevsky (1952), studied the birds of the Kaniv Nature Reserve in 1947-1950, the Osprey was a common migrating bird. It occurred on the Dnieper during the autumn migration. First birds appeared in the second half of August. These features remain to be actual, only the species became rare. The present rise of the frequency of occurrence can be related to the number increasing of the Osprey in some countries of North Europe (Schmidt-Rothmund et al., 2014). Ringing and satellite tracking has shown that via Central Ukraine migrate Ospreys from Sweden, Finland, Estonia, Belarus and other European countries (Zubarobsky, 1977; Saurola, 1994; Väli & Sellis, 2015, etc.).

Keywords: timing, number, summering, habitat, the Dnieper.

Winter counts of white-tailed eagle (*Haliaeetus albicilla*) in the territory of the Chernobyl radiation-ecological biosphere reserve in the winter 2018-2019

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Introduction. The main objective of our current study was to obtain data on the number of wintering white-tailed eagles and their concentration in the part of the reserve

Materials and Methods. The counts were carried out during 17-20.12.2018, 21-24.01 and 11-14.02.2019, the research covered a significant part of the reserve.

Results and discussion. We conduct periodic surveys of wintering birds of prey on the territory of the Exclusion Zone of the Chernobyl NPP since 2008 (Domashevsky, Chizhevsky, 2009, 2016). Since the focus of such work is on the white-tailed eagle (*Haliaeetus albicilla*), unfinished parts of water bodies are surveyed above all. These places include the Pripyat River (left and right banks to the confluence of the Dnieper River), the Dnieper (left and right banks to the southern border of the zone), Already (the mouth part and some places along the course), Nesvich (near the settled village Gorozhane), as well as large land-reclamation areas. Another method to search for eagles was to detect the remains of successful hunting of wolves (*Canis lupus*) on ungulates. Corvids (*Corvidae*) and birds of prey (*Falconiformes*) are always concentrated in such places, which makes it easier to identify the latter. On the river. There were small ice holes in Pripyat in places where no concentrations of waterfowl were detected. Since most of the wetland birds migrated from the study area, the eagles were little tied to the wetlands, visiting them only periodically.

In the course of research, we managed to find two points where wolves killed a wild boar (*Sus scrofa*) - on the left bank of the Pripyat. On the remnants of their prey concentrated from 4 to 8 eagles. Another place of concentration of eagles was a plot on the river. Nesvich, where 6 birds were observed. On the right bank of the Pripyat and its tributaries, only one bird is noted. The highest concentration of birds was recorded in February in the Pripyat Valley (left bank), where 28 eagles were counted. Among the white-tailed eagles encountered are 5 adults and 23 young ones. In December, 16 eagles were counted, in November 18, in February 28 birds. Among the recorded eagles, local birds nesting in the reserve were also recorded. But a greater number of birds were individuals that arrived from the northern regions. We also tried to adjust the number of eagles to reduce the possibility of repeated counts of birds. In general, we assume that in the winter period of 2018-2019 35-40 white-tailed eagles wintered in the reserve. The number of birds was slightly lower than in the winter of 2008–2009. - 54 individuals, in February 2014, 25 birds were counted.

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Keywords: white-tailed eagle, wintering, concentration, Chernobyl biosphere radioecological reserve

Winter diet of Barn Owl (*Tyto alba*) in Crimea

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Introduction. Barn Owl (*Tyto alba*) is a widespread polytypic species. In Ukraine it is a rare breeding and wintering species which estimating about 30 breeding pairs (Bashta & Bokotey, 2009). In Crimea Peninsula a few migrating and wintering birds and breeding pairs registered since XXI (Prokopenko & Beskaravayny, 2009; Kucherenko et al, 2017). In contrast another sympatric species of owls – *Asio otus* – the ecology of Barn Owls in Crimea is poorly studied due to the rarity of this species (Tovpinets & Evstav'ev, 2013; Kucherenko & Kalinovskiy, 2018). This species included in Red Data Book of Ukraine, so the data about the trophic relationship is very important for management its populations.

Material and Methods. Our study was conducted in the western part of Crimea Peninsula in the area with open cultivated and uncultivated steppe land. Pellets of Barn Owl (totally 24) were collected in ruined military buildings in Saky Raion (45°19'40" N, 33°03'55" E) 12.02.2018. Prey was identified comparing the bones fragment in pellets with our own bones collection. We estimated the numbers of individuals of each prey species to investigate the feed preference. We calculated the trophic diversity we used the Shannon Index. To standardize prey diversity for comparison with *Asio otus* we calculated evenness.

Results. We registered eight prey species, of which seven are mammals: *Mus spicilegus* (16 ind.), *Microtus socialis* (65), *Crocidura leucodon* (28), *Crocidura suaveolens* (14), *Cricetulus migratorius* (1), *Sylvaemus witherbyi* (3), *Mustela nivalis* (1) and one bird species – *Turdus merula* (1). The length of pellets was 50±3.1, width 28.1±0.7. Barn Owl pellets contain 1-11 prey per pellet (mean 5.4±0.5). Prey diversity and evenness values were 1.38 and 0.5.

Discussion. We found small mammals to be the most important prey of *Tyto alba* in the study area. In other sites of Europe have also been reported to prey mainly on small mammals. Comparing prey species composition of mammals in *Tyto alba* pellets and that of *Asio otus*, described in the literature (Tovpinets & Evstav'ev, 2013), it can be seen that the dominant species are the same – *Microtus socialis* – about 50% in Barn Owl and about 55% in Long-eared Owl. In contrast to *Asio otus*, *Tyto alba* more often preyed on shrews – about 33%, in *Asio otus* pellets shrews are infrequent. The same feeding activity noted in Western Ukraine and in some countries of Europe – Greece, Poland. The Shannon Index of *Tyto alba* mammal prey species were very similar to the *Asio otus* (1.38 and 1.36 respectively), but evenness values in *Tyto alba* was higher (0.5 and 0.34 respectively). The ratio of mammals, containing in *Tyto alba* pellets did not correspond to the data of proportions of mammals numbers in steppe Crimea, gathered by trapping (Evstav'ev, 2017). The most common species in traps was *Sylvaemus witherbyi* (36.2%), in contrast to it in pellets of *Tyto alba* it was *Microtus socialis*. Proportions of shrews in the traps were small (0.3-6%), but it were important prey species for *Tyto alba*.

Keywords: Barn owl, diet, Crimea.

Wintering of with Long-eared owl (*Asio otus L.*) in Kryvyi Rih and surrounding territories

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Introduction. The first printed materials on winter feeding of the Long-eared owl in Kryvorizhzhia - the work of IG Sole (1932, 1936). The wintering of Long-eared owls in Kryvorizhzhia was studied from the late 80's of the 20th century to this time, the collected materials were mostly not published, except for the winter feeding of the Long-eared owl in the parks of the city of Kryvyi Rih (Kotsyuruba, Vtorushina, Yablonskaya, 2012).

Material and Methodos. The study was conducted in the period from 1989 to 2019 within the city of Kryvyi Rih and adjacent territories (Shirokiv, Kryvyi Rih, Sofiyiv, Apostolic, Pyatikhat, Verkhnodniprovsky, Krynichan, Nikopol, districts of Dnipropetrovsk region, Dnipropetrovsk region Kropyvnytskyi region; Vysokopol district of Kherson region). The materials were collected in different types of biotopes of natural, urban and man-made landscapes in order to estimate the winter abundance of the species. Meetings of wintering Long-eared owls and their subsequent mapping were recorded. The abundance was estimated for the main types of biotopes.

Results. In the course of surveys of the territory of the city and the surrounding territories, 117 places of concentration of Long-eared owls in the winter were established.

Discussion. Most of the established wintering locations were not permanent owls (lasting from several days to 2-3 weeks). There are several places of annual localization of wintering owls, located mainly in forest park areas outside settlements and park massifs within the suburban zone of Kryvyi Rih and villages (Dendropark Dovgintsevo, or Tract "Botanical Garden", pine tree near the village of Vilna-3 Forest nursery, Dniprovka, Geykivka, Sofiyivka, Nezalezhnoye, Romanivka, the Park "Merry Terns", the reserve "Red beam North" and others). In the field of diurnal pellets were collected and further analyzed in laboratory conditions (more than 3000). Within the city of Kryvyi Rih, local concentrations of Long-eared owls are observed mainly in squares, parks, exclusion zones near mines, industrial sites, and rarely in residential areas. Owls concentrated in coniferous growth sites (pine, thuja, spruce), buckthorn plantations, and willows along the shores of ponds, rivers, and lakes. Populations of owls on the poplars were often observed in the residential area. The length of stay in such locations depended on the effect of the anxiety factor and the forage base. The maximum number of owls registered during the winter is 124 (Dendropark Dovgintseve), several more locations with more than 100 individuals (Lisopitomnyk, Heikivka, Vilna-3). There were 16 wintering sites from 50 to 100 individuals (pine tree village of Vilna-3, Shiroke township, Dendropark Dovgintsevo, forest park of the Guards mine, Vesely Terni park, Vysokopillya), 26 locations numbered from 20 to 50 Long-eared owls (with Geykivka, Vilne-3, Dendropark Dovgintseve, Dniprovka, Novozhytomyr, Novohortytsya, Sofiiivka, Novoselivka, Ingulets, street Heroes of ATO in Kryvyi Rih). The vast majority of Long-eared owl meeting points were from 2 to 20 individuals, mainly within settlements of various types. In urban parks, squares and residential quarters, most wintering groups of owls numbered 2-4, rarely more individuals. There are much more winter accumulations within the forest park zones in the exclusion zones near the mines, at industrial sites - from 2 to 36 individuals. Significant differences are in the winter feeding of Long-eared owls in the urban area and remote locations. In the conditions of the city the negative share in feeding of owls by small birds (big and blue tit, snap, greenhorn, field sparrow, golden-eared yolk, snipe, barnacle and other species) with a simultaneous decrease of micromammalia (house mouse, mussel, mussel forest mouse, etc.), by instilling some cases of hunting gray rats. In urban environments, bats (Mediterranean bats, seasonal parties) often come across owl feeding during a long thaw. Thus, significant differences were found in wintering Long-eared owls in natural and urban areas.

Keywords: Long-eared owl, wintering, Kryvyi Rih, Ukraine.

Wintering of the White-tailed Eagle near poultry farms on the middle Dnieper

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Introduction. The White-tailed Eagle (*Haliaeetus albicilla*) is included on the Red Book of Ukraine (2009). There were 260-370 birds wintering in Ukraine at the end of 2000s. The main places of wintering are situated near non-freezing parts of the Dnieper, on the coast of the Black Sea and Sea of Azov (Gavrilyuk, 2009). The eagles wintering on the Middle Dnieper near Kyiv, Kaniv and Kremenchuk hydroelectric power stations (Grishchenko, Gavrilyuk, 2009).

Material and Methods. The material about wintering of the White-tailed Eagle is collecting from the beginning of 1990s. The article presents the research data about during tree winter - 2016/2017, 2017/2018 та 2018/2019. The main method was a count of birds near wintering places.

Results. On the first decade of February a young White-tailed Eagle with transmitter spent time near vil. Kedyna Hora (Zolotonosha Rajon, Cherkasy Oblast, Ukraine) (M. Babushkin, pers. comm.). The Eagle has been tagged in the summer of 2016 at the nest in Darwin Nature Reserve (Vologda Oblast, Russian Federation). We discovered near vil. Kedyna Hora a dump of a poultry farm with remains of ducks during the first visit of its place. There were 70-80 White-tailed Eagles finded here. Next more 9 eagles was founded near a coast of Kremenchuk reservoir in some kilometres from this place. The most of White-tailed Eagles was immature. We counted White-tailed Eagles at this area during the next two winters. The table below presents the results of this censuses.

Table

The number of wintering White-tailed Eagles near the poultry farm in Zolotonosha Rajon (Cherkasy Oblast)

Wintering period	The number of birds and date		
2017/2018	60-70 (23.12.2017)	60-70 (13.01.2018)	70-80 (11.03.2018)
2018/2019	35-40 (25.11.2018)	50-60 (23.12.2018)	60-70 (03.02.2019)

According to the data in the table the number of wintering White-tailed Eagles was stable during two winters.

The new case of White-tailed Eagle's wintering near a poultry farm was received in 2019. Another young White-tailed Eagle with a transmitter spent time near a poultry farm in Vyshhorod Rajon (Kyiv Oblast, Ukraine) on the third decade of January. It has been tagged in the summer of 2018 at the nest in Volga-Kama Nature Reserve (Republic of Tatarstan, Russian Federation) (R. Bekmansurov, pers. comm.). Sergey Domashevsky founded near the poultry farm 7 eagles on 9.02.2019. One from its has rings and the transmitter (Domashevsky, Gavrilyuk, 2019).

Discussion. The aggregation of wintering White-tailed Eagles in Cherkasy Oblast formed due to permanent food availability, low level of disturbance and available suitable places for Eagle's rest and sleep. New data about wintering of White-tailed Eagles near poultry farms oblige to change our stable opinion about the main wintering places of this species on the Middle Dnieper. We need to overestimate the number of wintering birds. Aggregations of wintering White-tailed Eagles near poultry farms existed at Russian Federation. For example in Kuban region (Mnatsekanov, Tilba, 2003) and Ulyanovsk Oblast (Adamov et al., 2016) ets.

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Keywords. White-tailed Eagle, wintering, poultry farm, Middle Dnieper.

Birds of Prey in the collections of Zoological Museum of Dnipro National University

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Introduction. Zoological Museum of DNU was founded in 1924. The basis for its origination were stuffed animals made by the teacher of the gymnasium M.I. Podosinnikov, since the early 1900's. They formed the basis of the Department of Nature of the Katerynoslav Regional Museum named after O.M. Pol. Today, the total number of faunistic exhibits is 7623, including birds - 3586.

Materials and Methods. Falconiformes are represented in a collection of 28 species (93 stuffed birds and 118 carcasses) out of 33 available in Ukraine (missing Red Kite, Lesser Spotted Eagle, Egyptian Vulture, Gyrfalcon, Lesser Kestrel). Family: Pandionidae number 6 specimens, Accipitridae - 135, Falconidae - 70. Quantitatively prevail in the collection is a Red Footed Falcon – 30, Black Kite – 21, Kestrel – 20, Sparrowhawk – 17.

Results and discussion. One of the important features of the collection is its regionality – almost all specimens are collected from the territory of southeastern Ukraine (Dnipropetrovsk and Zaporozhye regions – outskirts of Dnepropetrovsk, Samara Forest, Buzulutsk wetlands, island Khortytsia, outskirts of Berdyansk), birds from Crimea are represented in small numbers, from Siberia alone. Griffon Vultures came from mobile zoo-exhibition.

The whole period of formation of a collection can be divided into four stages. The first stage (1900-1917) – 43 specimens, second stage (1917-1941) – 79 specimens, third stage (1946-1960) – 79 specimens, four stage (1960 - 2019) – 10 specimens.

At one time, the collection was supplemented by the famous zoologists V.V. Stakhovsky, I.I. Barabash-Nikiforov, Yu.V. Kostin, V.L. Bulakhov.

The collection of the Zoological Museum of DNU is not used scientifically, it can be important in faunal studies, especially in terms of retrospective assessment of the status of rare species.

Keywords: zoological museum, birds, collections, Birds of Prey