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EURASIAN PYGMY-OWL *GLAUCIDIUM PASSERINUM* IN UKRAINIAN POLISSIA

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Background. The Eurasian Pygmy-owl *Glaucidium passerinum* (Linnaeus, 1758) is a rare and poorly studied species in Ukraine. It is listed in the Red Data book of Ukraine [2]. Its breeding locations can be found in the Carpathians, Roztochia and Polissia. There are insufficient data the on distribution and current state of abundance of Eurasian Pygmy-owl as well as breeding biology of the species on the territory of Polissia.

Materials and Methods. The published data, internet sources, and unpublished materials of colleagues were used in addition to our own observations. Special studies were conducted on permanent study sites in Polissia Nature Reserve (Olevsk and Ovruch districts, Zhytomyr region) and Desniansko-Starohutskyi National Nature Park (Seredyno-Buda district, Sumy region). Small expeditions were organized to other locations within Polissia. Studies of this species were conducted in conjunction with the study of other owl species. They included surveys, behavioral observations, and ecology studies. During the surveys, the registrations on the routes of natural vocalization of adult owls were made at twilight and at night; in cases when natural vocalization was absent, the recordings of mating calls of males and females were played [1]. The maximum distance of species registration by calling (500 m) was used for breeding density estimation.

Results. During the breeding period, the Eurasian Pygmy-owl was found in all regions of Polissia. The southern boundary of that area lies near the villages Perebrody, Dubrovytsia district [12] – Karasyn, Sarny district [12] – Kochychyne, Yemilchyn district – Lypnyky, Luhyny district – Velyki Klishchi, Narodychi district – Stavrovka, Ivankiv district. The second site of regular breeding is the territory of Desniansko-Starohutskyi National Nature Park, where the species has been detected since 1996 [13]. For the first time, on the territory of Polissia, two nests in Zhytomyr and Sumy regions were found. For the first time in Ukraine, the clutch was measured. Behavioral observations of owls in breeding sites were conducted. Food remains were collected and identified.

Conclusions. The Eurasian Pygmy-owl is a breeding species in Ukrainian Polissia. The average breeding density in Polissia is 5.8 pairs/100 sq. km. The permanent breeding range was identified; it covers the northeastern part of Rivne region, the northern part of Zhytomyr and Kyiv regions, the northeastern part of Chernihiv region and the northern part of Sumy region, on the area of 18.1 thousand sq. km. The estimated breeding population of this species is 330 pairs. During the mating season, there are two peaks of natural 24-hour vocalization activity: in the evening and morning twilight. In the evening, males often begin to call 30 min after sunset, in the morning – 30 min before sunrise. In the autumn-winter period, birds either stay within their breeding areas or migrate, flying outside the breeding habitats. The increase in the number of registrations is due to special surveys taking into account the narrow interval of 24-hour natural vocalization activity in the twilight period and the use of phonogram reproduction techniques.

Keywords: Eurasian Pygmy-owl, breeding, abundance, behavior, Polissia, Ukraine

INTRODUCTION

The Eurasian Pygmy-owl *Glaucidium passerinum* (Linnaeus, 1758) is a rare and little studied species in Ukraine. It is listed in the Red Data book of Ukraine [2] as vulnerable species and included into the species lists of Bern Convention (Appendix II), CITES (Appendix II) [11], Directive 2009/147EC of the conservation of wild birds (Appendix I) [37]. The main breeding locations of the species are in the Carpathians, some records are known for Roztochchia and Polissia [2]. The species abundance in Ukraine is estimated as 150–350 breeding pairs [3]. During the twentieth century, this species was out of field researchers' view, so it was assumed that the species was extremely rare. Data on Eurasian Pygmy-owl are scarce; the most thoroughly studied territories being Nature Reserves and National Nature Parks [10, 12, 13, 35]. There is insufficient data on the distribution and current state of abundance of the Eurasian Pygmy-owl as well as the breeding biology of the species on the territory of Polissia. Thus, there was a need to summarize the information collected during recent years with the presentation of the original data.

MATERIAL AND METHODS

For the current review, the published data, internet sources, unpublished materials of colleagues were used in addition to our own observations. Special studies were conducted on permanent study sites in Polissia Nature Reserve (Olevsk and Ovruch districts, Zhytomyr region, 1997, 2006–2008, 2012–2016, 2020) and Desniansko-Starohutskyyi National Nature Park (Seredyno-Buda district, Sumy region, 1997, 2000–2006, 2012, 2017, 2020). Small expeditions were organized to other locations within Polissia. Studies of this species were conducted in conjunction with the study of other owl species. They included surveys, behavioral observation, and ecology studies. During the surveys, the registrations on the routes of natural vocalization of adult owls were made at twilight and at night; in cases when natural vocalization was absent, the recordings of mating calls of males and females were played [1]. All registrations were mapped. The maximum distance of species registration by calling (500 m) was used for breeding density estimation. In order to estimate 24-hours vocalization activity the calls and their intensity (number of calls per hour) were recorded. For some areas, there is no information on the species, hence this review is preliminary.

The names of birds are given according to the internet resource IOC WorldBirdList (v 10.2) [15], names of mammals – by the list of scientific names of mammals approved by the Commission of the zoological terminology 03.05.2007 [36], names of plants – by S.L. Mosyakin and M.M. Fedoronchuk [20].

RESULTS AND DISCUSSION

Distribution and abundance. The breeding range of Eurasian Pygmy-owl cover the area from Northern Europe throughout northern and central parts of Eastern Europe, central and southern parts of Siberia to the island of Sakhalin, as well as mountain massifs of Central and Southern Europe, Northern Mongolia and Northeastern China.

In the twentieth century, the southern border in the western part of Eastern Europe was drawn through Belarus in the northern part of Polissia (53 parallel), where the Eurasian Pygmy-owl was found in summer in a strip of spruce forests, and in the south of Belarusian Polissia – only during winter migrations [8, 9, 29]. By the end of the twentieth century, the species was already found during the breeding period in the southern part of Polissia [21, 30] and the whole territory of Belarus was included in the breeding range [22].

In the early twentieth century, Eurasian Pygmy-owl was considered as vagrant species during autumn and winter periods on the territory of Northern Ukraine. The first observation during the breeding period was done in the north of Zhytomyr region on the border with Belarus, where in the end of June 1934, M.O. Burchak-Abramovich captured one individual near the village of Chervonosilka of Ovruch district [34, with clarifications]. This finding made it possible to assume its breeding [7, 32]. The fact of breeding of the species for Ukrainian Polissia was established on July 10, 1993, when S.M. Zhyla observed a fledgling on the territory of Polissia Nature Reserve [35, with clarifications].

Since the beginning of the XXI century, the number of registrations of the Eurasian Pygmy-owl during the breeding period has increased significantly, and their geography has expanded. The permanent breeding range has been identified; it covers the northeastern part of Rivne region, the northern part of Zhytomyr and Kyiv regions, the northeastern part of Chernihiv region and the northern part of Sumy region. The southern boundary of that area lies near the villages Perebrody, Dubrovytsia district [12] – Karasyn, Sarny district [12] – Kochychyne, Yemilchyn district – Lypnyky, Luhyny district – Velyki Klishchi, Narodychi district – Stavrovka, Ivankiv district. The second site of regular breeding is the territory of Desnyansko-Starohutskiy National Nature Park, where the species has been detected since 1996 [13] (**Fig. 1**).

In total, 40 registrations of the Eurasian Pygmy-owl were documented during the period of 2017–2020 in Polissia. Surveys were made within the region described above. According to the surveys at a transect width of 1 km, the breeding density of the Eurasian Pygmy-owl amounted to 2 pairs per 32.2 sq. km (6.2 pairs/100 sq. km) in Polissia Nature Reserve and 7 pairs per 134.6 sq. km in Rivnenskiy Nature Reserve (5.2 pairs/100 sq. km) [12]. Using the same methodology, the breeding density of the species was estimated as 2 pairs per 30 sq. km (6.7 pairs/100 sq. km) in Luhyny district, 1 pair per 25.6 sq. km (3.9 pairs/100 sq. km) in Drevlianskiy Nature Reserve, and 1.4 pairs per 19.7 sq. km (7.1 pairs/100 sq. km) in Desniansko-Starohutskiy National Nature Park. An average breeding density is 5.8 pairs/100 sq. km. Within a total area of about 18.1 thousand sq. km, the Eurasian Pygmy-owl population is estimated as 330 pairs that is 18 pairs / 1000 sq. km in general.

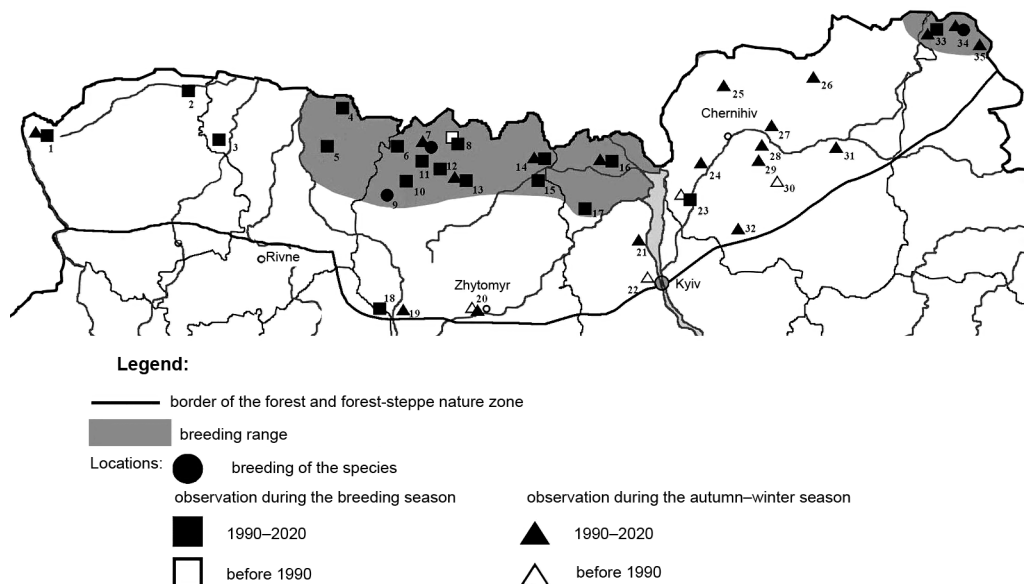


Fig. 1. Records of Eurasian Pygmy-owl in Ukrainian Polissia: **1** – Shatsk National Natural Park [16, 33]; **2** – Prypiat-Stokhid National Natural Park [17]; **3** – Rivnenskyi Nature Reserve, Biloozerska part (personal report by M.V. Franchuk); **4** – Rivnenskyi Nature Reserve, Perebrody part, surroundings of village Perebrody, Dubrovysia district [12]; **5** – Rivnenskyi Nature Reserve, Somyne part, surroundings of village Karasyn, Sarny district [12]; **6** – the surroundings of Zhurzhevychi village, Olevsk district (personal report by M.F. Veselsky); **7** – Polissia Nature Reserve, the surroundings of Selezivka village, Ovruch district [35], (our data); **8** – the surroundings of Chervonosilka village, Ovruch district [34], (our data); **9** – the surroundings of Kochychyne village, Yemilchyn district (our data); **10** – the surroundings of Stovpynka village, Olevsk district (personal report by M.F. Veselsky); **11** – the surroundings of Kovanka village, Ovruch district (our data); **12** – the surroundings of Lystvyn village, Ovruch district (personal report by M.F. Veselsky); **13** – the surroundings of Lypnyky village, Luhyn district (personal report by S.M. Vlasiuk and O.M. Hoptynets; our data); **14** – the surroundings of Grezlya village, Narodychi district [31], (our data); **15** – Drevlyanskyi Nature Reserve, the surroundings of Velyki Klishchi village, Narodychi district (our data); **16** – Chernobyl Exclusion Zone [10]; **17** – the surroundings of Stavrovka village, Ivankiv district (personal report by O.P. Cherinko; our data); **18** – the surroundings of the town of Polonne [38]; **19** – the surroundings of Myropil village, Romaniv district (personal report by O.V. Hryb); **20** – the surroundings of the city of Zhytomyr [27, 28]; **21** – Kazarovychi village, Vyshhorod district [10]; **22** – the surroundings of the city of Kyiv [6]; **23** – Mizhrychynskyi Regional Landscape Park (personal report by V.M. Babko) [24]; **24** – the surroundings of Smolyn village, Chernihiv district (personal report by O.P. Cherinko); **25** – the surroundings of Hrybova Rudnya village, Ripky district (personal report by A. Skiter); **26** – Snovsk district (personal report by V.V. Borisov); **27** – the surroundings of Mukolayivka village, Mena district (our data); **28** – the surroundings of Kovchyn village, Kulykivka district (our data); **29** – the surroundings of Kulykivka village (our data); **30** – the surroundings of Vertiyivka village, Nizhyn district [25]; **31** – the surroundings of Bondarivka village, Sosnytsia district (our data); **32** – the surroundings of Kobyzhcha village, Bobrovysya district (our data); **33** – Desniansko-Starohutskyi National Nature Park, Prydesnyanska part (personal report by S.V. Galushchenko; our data); **34** – Desniansko-Starohutskyi National Nature Park, Starohutska part [13]; **35** – the town of Seredyndy-Buda (our data).

Рис. 1. Знахідки сичика-горобця в Українському Поліссі: **1** – Шацький національний природний парк [16, 33]; **2** – Національний природний парк “Прип’ять-Стохід” [17]; **3** – Рівненський природний заповідник, ділянка Білоозерська (особ. повідом. М.В. Франчука); **4** – Рівненський природний заповідник, ділянка Переброди, в окол. с. Переброди Дубровицького р-ну [12]; **5** – Рівненський природний заповідник, ділянка Сомине, в окол. с. Карасин Сарненського р-ну [12]; **6** – окол. с. Журжівичі Олевського р-ну (особ. повідом. М.Ф. Весельського); **7** – Поліський природний заповідник, в окол. с. Селезівка Овруцького р-ну [35] (наші дані); **8** – окол. с. Червоносілка Овруцького району [34]

(наші дані); **9** – окол. с. Кочичине Ємільчинського р-ну (наші дані); **10** – окол. с. Стівпинка Олевського р-ну (особ. повідом. М.Ф. Весельського); **11** – окол. с. Кованка Овруцького р-ну (наші дані); **12** – окол. с. Листвин Овруцького р-ну (особ. повідом. М.Ф. Весельського); **13** – окол. с. Липники Лугинського р-ну (особ. повідом. С.М. Власюка та О.М. Холтинця; інші дані); **14** – окол. с. Грезля Народницького р-ну [31] (наші дані); **15** – Древлянський природний заповідник, в окол. с. Великі Кліщі Народницького р-ну (наші дані); **16** – Чорнобильська Зона Відчуження [10]; **17** – окол. с. Ставровка Іванківського р-ну (особ. повідом. О.П. Черінка; інші дані); **18** – окол. м. Полонне [38]; **19** – окол. смт Миропіль Романівського р-ну (особ. повідом. О.В. Гриба); **20** – окол. м. Житомир [27, 28]; **21** – с. Казаровичі Вишгородського р-ну [10]; **22** – окол. м. Київ [6]; **23** – Міжрічинський регіональний ландшафтний парк (особ. повідом. В.М. Бабка) [24]; **24** – окол. с. Смолин Чернігівського р-ну (особ. повідом. О.П. Черінка); **25** – окол. с. Грибова Рудня Ріпкінського р-ну (особ. повідом. А. Скітера); **26** – Сновський р-н (особ. повідом. В.В. Борисова); **27** – окол. с. Миколаївка Менського р-ну (наші дані); **28** – окол. с. Ковчин Куликівського р-ну (наші дані); **29** – окол. смт Куликівка (наші дані); **30** – окол. смт Вертіївка Ніжинського р-ну [25]; **31** – окол. с. Бондарівка Сосницького р-ну (наші дані); **32** – окол. с. Кобижча Бобровицького р-ну (наші дані); **33** – Національний природний парк “Деснянсько-Старогутський”, Придеснянська ділянка (особ. повід. С.В. Галуценка; інші дані); **34** – Національний природний парк “Деснянсько-Старогутський”, Старогутська ділянка [13]; **35** – м. Середина-Буда (наші дані)

Reproduction. In 2017, we found two nests in the hollows of the Great Spotted Woodpecker *Dendrocopos major*. The nests were discovered during the calling period in mid-March.

The first breeding site was located on the territory of Desniansko-Starohutskiy National Nature Park. It was discovered in autumn 2016. On October 6, 2 birds responded to the phonogram and flew up. During the inspection on December, 23, the male responded to the phonogram. In 2017, on March 22, a pair was found near a hollow in which they bred. Previously, callings of males were also registered near that breeding area: 1.5 km away from the nest on March 12, 2002 and 800 m away – on March 23, 2012 and December 9, 2015 (the male responded to the phonogram).

The breeding site was located in a middle-aged pine-aspen forest. Norway maple *Acer platanoides* and Common oak *Quercus robur* were also present in the stand. The undergrowth included Common hazel *Corylus avellana* and Alder buckthorn *Frangula alnus*; the grass layer was presented by Lily of the valley *Convallaria majalis*; there were several fallen dry trees on the ground. The hollow was located in a live Eurasian aspen *Populus tremula* (height 28 m, age 60, trunk diameter 46 cm) at a height of 7 m (hard to reach), in the upper 1/3 of the trunk, the hole (size 4.5×4.5 cm) oriented to the South. The diameter of the nesting chamber was 16 (from the hole to the rear wall)×13 (between the side walls) cm, the depth – 18 cm. The hollow was checked on April 13 – a female was hatching a clutch of 6 eggs laid on the nesting bed of small passerines bird feathers. The size of the eggs (mm) in the order of deposition (determined by water test) was as follows: 29.5×23.6; 28.6×23.7; 29.7×23.7; 28.8×23.7; 29.0×23.7; 29.4×23.5, their weight (g), respectively, – 8.86; 8.79; 9.09; 8.82; 8.75; 8.89. The extreme size of the eggs was 28.6–29.7×23.5–23.7 mm.

The second breeding site was found on March 16, 2017 on the territory Zubkovytske forestry department of Olevske forestry state enterprise in the surroundings of Kochychyne village of Yemilchyn district, Zhytomyr region, where both members of the couple responded to the phonogram and flew up. In the evening, both birds hid for the night in a hollow, in which later they had a nest. The breeding site was located in an oak forest about 60 years old, with single Silver birches *Betula pendula* and Common alders *Alnus glutinosa*, medium-density undergrowth of Alder buckthorn and Pontian azalea *Azalea pontica*; there were Quaking-grass sedge *Carex brizoides*, Common bracken *Pteridium*

aquilinum, European blueberries *Vaccinium myrtillus*, as well as fallen trees and branches in the ground cover. There were drying middle-aged plantations of Scots pine *Pinus sylvestris* 100 m away from the nest. The nesting hollow was located in a live oak (height 23 m, age 70, trunk diameter 43 cm) at a height of 6.5 m (hard to reach), in the middle 1/3 of the trunk, the hole (size: height – 5.0, width – 4.5 cm) was oriented to the North to an open area – a lowland mire. The diameter of the nest chamber was 17×18 cm, the depth – 18 cm. During the inspection on May 25, a female was in the hollow with 5 owlets, on June 8 there were two fledglings in the hollow, three others had already flown out.

Hatching usually lasts for 28–30 days. Unlike with other owl species, it begins with the last egg [26, citation from: 19]. The owlets stay in the nest for 30 days [23]. Thus, we can assume that the first eggs in the two nests appeared on April 3 and 13. Owlets hatch in the first half of May and leave the nests in the first half of June.

The breeding habitats of the Eurasian Pygmy-owl in Polissia are in mature and ripening pine forests with an admixture of deciduous species – Eurasian aspen, Silver birch, Common oak, Common alder near open areas – meadows, clearings and mires. In Desniansko-Starohutskyi National Nature Park the habitats of the species were found near scarce old spruce trees.

Autumn and winter period. In the autumn period, most birds stay in their breeding areas, while some individuals migrate – fly outside the breeding habitats, occasionally reaching the forest-steppe nature zone and even the northern steppe areas.

On August 10, 2014, a Eurasian Pygmy-owl was caught with a mist-net in the reed bushes of a settling tank near Cholhyni village of Yavoriv district (personal report by M.V. Skyrpan).

In Luhyny district, from the end of August to the end of October 2017 owls were observed near the village of Lypnyky. The birds were observed close to the forest edges, fields and field-protecting shelterbelts 300 m away from the village. Two groups of three and two individuals were detected; together with adult birds, there were also the young. The birds actively vocalized and responded to playing phonograms (personal report by S.M. Vlasiuk and O.M. Hoptynets).

In Chernihiv region, birds were observed in large forests of the northern districts – Ripky (personal report by A. Skiter) and Snovsk (personal report by V.V. Borisov). In the central sparsely forested areas, birds appear in island forests among the fields, moving through small forests and even field-protecting shelter belts. Thus, in October 1972, one bird was observed in Nizhyn district [25]; on October 3, 2019, one bird was registered in the surroundings of Mykolayivka village, Mena district, on October 4 – in the surroundings of Kulykivka village, and on November 11 – in the stripe Black poplar *Populus nigra* forest on the Desna River banks in the surroundings of Kovchyn village, Kulykivka district (our data). A similar case was registered in the forest-steppe part of Sumy region [18].

Some individuals appear in settlements. In the park of the village of Stara Huta, Seredyno-Buda district, a single bird was observed on December 25, 2019 and on January 1, 2020 (personal report by O.P. Herasymchuk). There were also observations in the forest park in the town of Seredyno-Buda on January 22, 2009 (personal report by D.O. Bardachov), on October 25–26, 2013 (our data), in October 2018 and 2019 (personal report by S.V. Galushchenko). A weakened bird was found on a private territory in the village of Kazarovychi, Vyshhorod district [10, with clarifications]. On January 17, 2018

a female collided with a car in the village of Stara Huta. As a result, the bird's wing was broken, and it eventually died having spent 2.5 months in captivity (our data).

Some birds appear far away from the breeding range. During the last century, flights were recorded in Kyiv region, Poltava region [14], and Dnipropetrovsk region [4]. The last registration in Dnipropetrovsk region was in the winter of 1995 near the town of Verchniodniprovsk (personal report by V.V. Syzhko).

Winter food stocks of the Eurasian Pygmy-owl were found in the nest boxes in Polissia Nature Reserve (personal report by S.M. Zhyla), in the surroundings of Grezlya village, Narodychi district [31], on the territory of Kobyzhchnske forestry, Bobrovytsya district (our data) and in Desniansko-Starohutskyi National Nature Park (our data).

Behavior. Males start calling early. A male's voice is a high-pitched whistle. Dates of the first recordings of calls in Polissia Nature Reserve were as follows: March 5, 2000 (personal report by G.V. Bumar), February 28, 2002 [5], March 5, 2007, February 4, 2008, February 27, 2013. In Desniansko-Starohutskyi National Nature Park, calls were recorded on February 28, 2012. In early March calling is regular. On March 10, 1997, in Desniansko-Starohutskyi National Nature Park an owl "whistled" continuously for 43 min with small pauses. During the calling (from 17:27 to 18:10), the bird flew around from time to time, covering a distance of 700 m in total.

Daytime and twilight activity of the Eurasian Pygmy-owl was observed. The natural 24-hour vocalization activity is characterized by two peaks: in the evening and morning twilight. In the evening, males often begin to call 30 min after sunset, in the morning – 30 min before sunrise (**Fig. 2**). It was registered that calling lasts from 1 to 43 min, on average ($n = 32$) – 16.8 min. The maximum registered intensity of the male's calling was 33 calls/min.

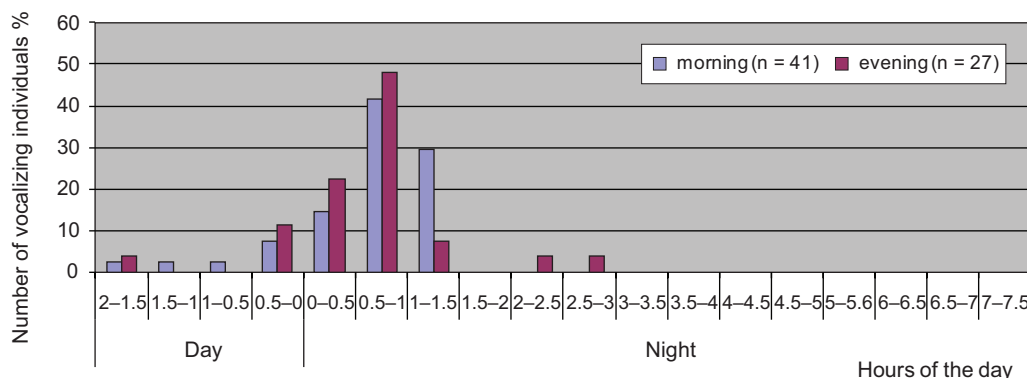


Fig. 2. Natural 24-hour vocalization activity of Eurasian Pygmy-owl during the mating season (0 on the abscissa – time of sunset and sunrise)

Рис. 2. Природна добова вокалізаційна активність сичика-горобця у шлюбний період (0 на осі абсцис – час заходу та сходу сонця)

The narrow interval of the 24-hour vocalization activity is a feature of the Eurasian Pygmy-owl, which was the reason for the lack of data on this species in the past. When the technique of playing phonograms is used, the bird responds well to phonograms both at twilight and during the day.

In mid-March, couples appear in breeding sites near the selected hollow. Observations at the breeding site near the village of Kochychny, Yemilchyn district, on March 16 (from 7:35 to 18:45) and March 17, 2017 (from 5:00 to 7:35) showed how the owls spent the day during this period:

- 7:35–8:00 – a female and a male were sitting in the upper parts of the crowns of neighboring pines;
- 8:00 – the female was “hissing” quietly, the male flew away;
- 8:15 – the female began to “hissing”, the male flew up to her and owls copulated, the male quietly “tickled” and quickly whistled, the male flew away;
- 8:20 – copulation (the whole routine repeated), the male flew away, the female was sitting;
- 10:00 – the female dropped a pellet;
- 10:30 – the female was “hissing”, the male didn’t appear;
- 10:40 – the female flew 30 m away and sat on a large horizontal oak branch in the middle of the crown;
- 11:25 – the female flew 50 m away and sat on a large horizontal branch of another oak, ran along a branch, grabbed a rodent lying on a branch, and ate it for 15 min piece by piece, did not eat the whole rodent and left it on a branch, cleaned its beak, sat on the end of this branch and stayed there, cleaning and looking around;
- 16:10 – the female dropped a second pellet;
- 16:15 – the female continued eating the same rodent for 5 min;
- 17:10 – the female jumped to another place on the branch;
- 18:04 – the male started whistling 100 m away from the female, whistled 4 times and flew closer to the oak with a hollow (future nest). The female “hissed”, but the male did not fly up to her, she continued “hissing” and cleaning;
- 18:08 – the female came up to the male;
- 18:12 and 18:18 – the owls copulated twice;
- 18:20–18:26 – the male and the female flew together around the hollow, the male shouted 3 times, and the female “hissed”, then both flew into the hollow;
- 18:31 – the first call of Tawny Owl male in the night;
- 5:34 – the last call of Tawny Owl male in the night;
- 5:40 – the male began to whistle near the oak with the hollow, called 7 times, then 4 more times, at a faster rate;
- 5:42 – the female began to hiss, copulation took place 30 m away from the hollow;
- 5:50 – the male whistled quietly 4 times, the female answered, then copulation;
- 6:00–7:35 – no calling.

Before laying eggs by the female, the male vocalizes non-actively near the hollow and provides the female with food. The female spends the day sitting open in the tree canopy at a distance of up to 100 m from the nesting hollow. The birds copulate (in the morning and in the evening, in total 6 times per day) (**Fig. 3**) and spend the night in the nest hollow.

In April and in the first half of May, during the incubation period, the female stays in the hollow, while the male provides her with food. During this period, the male continues regular calling out of the nest.

During the period of feeding the fledglings, the female spends time with the fledglings in the hollow, the male hunts, delivers and passes the prey to the female. Contact between the male and the female occurs when the male, flying up to the breeding area,

begins to vocalize: at this point, the female “hisses” in the hollow in response and flies out. The transfer of food takes place on a branch near the hollow and is accompanied by short, frequent sounds. The female plucks the birds in the hollow and throws the feathers out of the hole. Garbage accumulates under the nest hollow – prey feathers, pellets and egg shells.



Fig. 3 Copulation of Eurasian Pygmy-owls [author's photo]

Рис. 3. Копуляція сичиків-горобців (фото автора)

During the period when the owlets fly out of the hollow, one can hear their voice – a hissing whistle. The owlets do not leave the hollow at the same time: after the older ones do, the younger ones stay in the hollow for a few more days. The older ones also hide in the nest hollow at night. The owlets are fed by both parents during the day. The female is already hunting during this period. The male passes the food to the owlets in silence, flies with the prey into the hollow and feeds in the canopy. The male still whistles softly early in the morning and evening.

Birds are generally not scary. During the calling period, you can walk openly in the breeding area. During the inspection of the nest, the female does not fly out of the hollow. If it is expelled by knocking, it sits 2–3 m away from the observer and immediately returns to the hollow. Owls are shy only when fledglings can actively fly.

Foraging. Pellets, food remains and the contents of two nesting bottoms were collected at the nesting sites. Pellets were found on the ground under perching places (tree branches), a total of 21 pellets were collected, their size limits are as follows (mm): 15.3–33.2×8.0–12.0, on average 24.4±1.01×10.7±0.24, weight (g): 0.15–1.11, on average – 0.53±0.05. In 18 pellets (consisting of fur and bones of mammals) there were no skulls and mandibles, by which the species could be identified, in three pellets there were remains of a Eurasian Pygmy shrew *Sorex minutus*, a Great Tit *Parus major* and a Siskin *Spinus spinus*. Besides, the remains of a Bank vole *Myodes glareolus*, a Blue Tit *Cyanistes caeruleus* and a Siskin were collected. In the nesting bottoms, feathers of 25 individuals of 10 species of birds that are the Eurasian Pygmy-owl prey were found (see **Table**).

Feathers collected in the nest bottom
Пера птахів, зібрані у гніздових вистилках

Species	Kochychyne village of Yemilchyn district	Desniansko-Starohutskyi National Nature Park
<i>Anthus trivialis</i>	1	-
<i>Phylloscopus sibilatrix</i>	1	-
<i>Ficedula hypoleuca</i>	1	1
<i>Aegialos caudatus</i>	-	1
<i>Cyanistes caeruleus</i>	2	1
<i>Parus major</i>	3	2
<i>Certhia familiaris</i>	2	1
<i>Fringilla coelebs</i>	1	5
<i>Spinus spinus</i>	-	2
<i>Emberiza citrinella</i>	-	1
Total	11	14

In the autumn and winter period of 2018/2019, the owl visited two nest boxes (hole 5×5 cm) out of 20 hung on the breeding territory in Desniansko-Starohutskyi National Nature Park. On February 15, 2019, a Coal Tit *Periparus ater* without the head and feathers of a Treecreeper *Certhia familiaris* were found.

CONCLUSIONS

1. The Eurasian Pygmy-owl is a breeding species of Ukrainian Polissia. The average breeding density in Polissia is 5.8 pairs/100 sq. km.
2. The permanent breeding range was identified; it covers the northeastern part of Rivne region, the northern part of Zhytomyr and Kyiv regions, the northeastern part of Chernihiv region and the northern part of Sumy region, on the area of 18.1 thousand sq. km. The breeding population of the species is estimated as 330 pairs.
3. During the mating season, there are two peaks of natural 24-hour vocalization activity: in the evening and morning twilight. In the evening, males often begin to call 30 minutes after sunset, in the morning – 30 min before sunrise.
4. In the autumn–winter period, birds stay at their breeding areas or migrate, flying outside the breeding habitats.
5. The increase in the number of registrations is due to special surveys that take into account the narrow interval of 24-hour natural vocalization activity in the twilight period and the use of phonogram reproduction techniques.

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COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Human Rights: This article does not contain any studies with human subjects performed by the any of the authors.

Animal studies: All institutional, national and institutional guidelines for the care and use of laboratory animals were followed.

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СИЧИК-ГОРОБЕЦЬ *GLAUCIDIUM PASSERINUM* В УКРАЇНСЬКОМУ ПОЛІССІ

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Вступ. В Україні сичик-горобець *Glaucidium passerinum* (Linnaeus, 1758) рідкісний і мало вивчений вид. Його включено до Червоної книги України [2]. Місця гніздування виду є у Карпатах, Розточчі та на Поліссі. Поширення й сучасний стан чисельності сичика-горобця на території Українського Полісся залишаються недостатньо з'ясованими. Невідома і гніздова біологія цього виду.

Матеріали та методи. Під час підготовки огляду, крім власних спостережень, було використано літературні відомості, публікації на веб-сайтах, неопубліковані матеріали колег. Спеціальні дослідження проводили на стаціонарах у Поліському природному заповіднику (Олевський і Овруцький р-ни Житомирської обл.) та Деснянсько-Старогутському національному природному парку (Середино-Будський р-н Сумської обл.). Також інформацію по сичику-горобцю збирали під час експедиційних виїздів у різні місця регіону. Дослідження цього виду проводили попутно з вивченням біології інших видів сов. Вони включали проведення обліків, спостереження за поведінкою та вивчення екології. Обліки являли собою реєстрацію на маршрутах природної вокалізації дорослих сов у сутінковий і нічний час, у разі відсутності природної вокалізації програвали записи шлюбних криків самців і самок [1]. Для перерахунку зустрічей на щільність було прийнято максимальну відстань реєстрації виду за голосом 500 м.

Результати. У гніздовий період, сичик-горобець знайдений у всіх поліських областях. Південна межа суцільного гніздового ареалу пролягає поблизу сіл: Перерброди Дубровицького р-ну [12] – Карасин Сарненського р-ну [12] – Кочичине Ємільчинського р-ну – Липники Лугинського р-ну – Великі Кліщі Народицького р-ну – Ставровка Іванківського р-ну. Другим осередком регулярного гніздування є територія Деснянсько-Старогутського національного природного парку, де вид виявляють починаючи з 1996 р. [13]. Уперше для території Полісся знайдено два гнізда у Житомирській і Сумській областях. Уперше для України виміряно кладку. Проведено спостереження за поведінкою птахів на гніздових ділянках. Зібрано та визначено рештки живлення.

Висновки. Сичик-горобець є гніздовим видом Українського Полісся. Середня щільність гніздування у Поліссі – 5,8 пари/100 км². Суцільний гніздовий ареал охоплює північно-східну частину Рівненської, північну – Житомирської та Київської, північно-східну – Чернігівської та північну – Сумської областей на площі 18,1 тис. км². Гніздову популяцію виду оцінено у 330 пар. У шлюбний період спостерігаються два

піки природної добової вокальної активності: у вечірні та ранкові сутінки. Звечора найчастіше самці починають токувати через 30 хв після заходу сонця, зранку – за 30 хв до сходу. У осінньо-зимовий період птахи перебувають на своїх гніздових територіях і кочують, вилітаючи за межі гніздових біотопів. Збільшення кількості реєстрацій обумовлено проведенням спеціальних обліків з урахуванням вузького інтервалу добової природної вокальної активності у сутінковий період і використанням методу відтворення фонограм.

Ключові слова: сичик-горобець, гніздування, чисельність, поведінка, Полісся, Україна