



UDC 598.2:502.4(477.81)

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**THE ABUNDANCE AND SPATIAL  
DISTRIBUTION OF THE EURASIAN  
PYGMY OWL, *GLAUCIDIUM PASSERINUM*  
(STRIGIFORMES, STRIGIDAE), IN RIVNENSKYI  
NATURE RESERVE, UKRAINE**

The breeding status and abundance of the Eurasian pygmy owl *Glaucidium passerinum* (Linnaeus, 1758) in Rivnenskyi Nature Reserve was estimated based on results of field research conducted in 2013 to 2018. We suggest the nesting of 9 to 12 pairs of the Eurasian pygmy owl in the territory of the Reserve, in particular 7 to 10 pairs in Perebrody site, 1 or 2 pairs in Somyne site and a single pair in Syra Pohonia site. The Eurasian pygmy owl has diurnal activity, which facilitates the species' identification during field studies. It was noted that the voice activity of the tawny owl (*Strix aluco*), the great grey owl (*Strix nebulosa*) and the northern goshawk (*Accipiter gentilis*) leads to the termination of the pygmy owl's vocalization.

**K e y w o r d s:** *Glaucidium passerinum*, pygmy owl, breeding territory, daily activity, spatial distribution, abundance, Rivnenskyi Nature Reserve, Polissia.

**Introduction**

The Eurasian pygmy owl *Glaucidium passerinum* (Linnaeus, 1758) is listed in the Red Data Book of Ukraine as a vulnerable species (Bashta, Kuzmenko, 2009), and included into the species lists of Bern Convention (Appendix II), Birds Directive (Appendix I), IUCN (least concern), and CITES (Appendix II) (BirdLife..., 2015). Considering that the species is under protection on different levels of national and international law, the Eurasian pygmy owl is an object of permanent monitor-

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ing and conservation. This is especially relevant now since the fourth edition of the Red Data Book of Ukraine is to be published in 2019.

Unlike other protected owl species of the Ukrainian fauna, the Eurasian pygmy owl remains a scarcely studied species known from Polissia by few number of nesting localities (Bashta, Kuzmenko, 2009). Therefore, the aim of our research was to clarify the breeding status and abundance of the Eurasian pygmy owl in the territory of Rivnenskyi Nature Reserve.

### Material and methods

Owl censuses were conducted from 2013 to 2018 in Rivnenskyi Nature Reserve, Ukraine and its vicinities to a 2 km distance from the Reserve's borders (Fig. 1). Rivnenskyi Nature Reserve is located in the north of Rivne Oblast, Ukraine and consists of the following four sites: Somyne (Sarny Raion; coordinates of site centre N 51.415960 E 26.909066), Perebrody (Dubrovytsia and Rokytno Raions; coordinates of site centre N 51.709404 E 27.141858), Syra Pohonia (Rokytno Raion; coordinates of site centre N 51.513679 E 27.214423), and Biloozersky (Volodymyrets Raion; coordinates of site centre N 51.508019 E 25.712257). In total, the four sites area is 42,289 ha.

According to geobotanical division, all sites belong to Poliska Subprovince (Volynske Polissia), East European Province of the European broadleaf forest region (Didukh et al., 2007). The Reserve's territory is characterized by a high portion of wetlands (51.06 %) and forests (46.70 %) (Materials..., 2017). Forests are highly fragmented and have different levels of humidity.

Censuses of the Eurasian pygmy owl were conducted in March and April considering that it is the period of the species' most intense vocalisation in Polissia (Zhyla, Kuzmenko, 1998). During censuses, the method of playing phonograms was used, following the recommendations by Holt and Hills (1987 as cited in Zhyla, Kuzmenko, 1998) and Voronetsky et al. (1990).

Considering the fact of diurnal vocalisation activity of the species (Ryabitsev, 2001; Butyev et al., 2005), censuses were conducted during the daytime. Phonograms of the Eurasian pygmy owl were played by a portable 10 V audio speaker in habitats suitable for nesting. Such provocations were performed in each kilometre of route, and additionally in habitats estimated suitable earlier, including forest sites with a significant number of holes of the grey-headed woodpecker (*Picus canus*) and the black woodpecker (*Dryocopus martius*). Thus, censuses covered 70–80 % of the Reserve's area suitable, in our opinion, for nesting of the species.

Each locality of observation of the Eurasian pygmy owl was recorded with the corresponding geographic coordinates and each sighting was documented by photo or video with subsequent description of habitats, the species' behaviour, and the reaction of other bird species to the Eurasian pygmy owl's phonogram.

The map on Fig. 1 was created in QGIS.

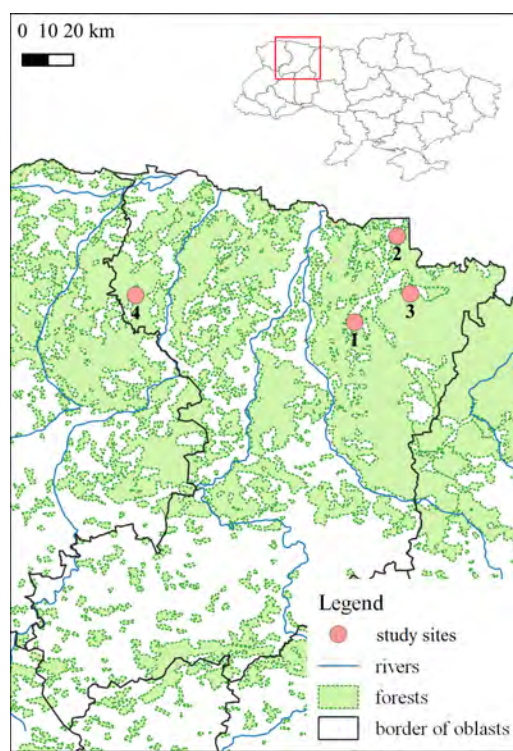


Fig. 1. Map of study sites. 1 – Somyne, 2 – Perebrody, 3 – Syra Pohonia, 4 – Biloozersky.

## Results and discussion

### Analysis of literature sources

***The Eurasian pygmy owl in Polissia.*** According to the latest data, the estimated nesting abundance of the Eurasian pygmy owl in Ukraine is 150 to 350 pairs (Birds..., 2004; Bashta, Kuzmenko, 2009), while the main part of the species' population is concentrated in the Ukrainian Carpathians (Bashta, Kuzmenko, 2009; Bokotey et al., 2010; Kuzmenko et al., 2015). The species' abundance in Polissia is not entirely clarified, which is evidenced by single observations and new records during recent years (Knysh, Bugayev, 2009; Gnatyna, Shkaran, 2011; Domashevsky et al., 2012; Kuzmenko et al., 2016; Domashevsky, 2017). According to Zhyla (1998), the Eurasian pygmy owl is the least studied owl species in Polissia and this statement still stands after 20 years since its publication. For the past 20 years, only fragmented data are available on the species' nesting and sightings during breeding period. Such data mainly originate from protected areas, where the fauna is permanently monitored. The nesting of the species was proved only in the Polissian Nature Reserve, although courting males were observed in Rivnenskyi Nature Reserve and Desna–Starogutsky National Nature Park as well (Khymyn, 2006, 2009). Single records were reported from Pripyat-Stokhid National Nature Park, Mizhrichinsky Regional Landscape Park (Kuzmenko et al., 2016), Shatsky National Nature Park (Gnatina, Shkaran, 2011), Chernobyl Exclusion Zone, which since 2016 has been part of Chernobyl Radiation and Ecological Biosphere Reserve (Domashevsky et al., 2012; Domashevsky, 2017), as well as from Left-bank Ukraine (Knysh, Bugayev, 2009).

***The Eurasian pygmy owl in Rivnenskyi Nature Reserve.*** The species was first mentioned for Rivnenskyi Nature Reserve during data collection for the first edition of the European Breeding Bird Atlas by the time the Reserve was created in 1999. According to the Atlas, abundance of the species was estimated to 10 nesting pairs (1 to 10 pairs according to the criteria used in the atlas), although exact affiliation of records to the territory was absent (Gorban et al., 2003). During the Reserve's fauna survey in 2005 to 2010, M. V. Khymyn first documented the presence of the species in Rivnenskyi Nature Reserve in the breeding period. In particular, on 30 April 2006 in Somyne site a male displaying territorial behaviour was observed (Khymyn, 2006; Chronicle..., 2006), and a hollow used in previous year with remains of food storage was found as well in Syra Pohonia site (Khymyn, 2009). However, the breeding of the species was not confirmed.

### Results of field research

In the beginning of our research on the Eurasian pygmy owl (2013–2015), we suggested the presence of 5 to 7 territorial males in the Reserve (Kuzmenko et al., 2016). Conducting a number of field studies, we obtained the following results, which we present separately for each site of Rivnenskyi Nature Reserve.

***Somyne.*** In total, two cases of observation of the species occurred in the breeding period. The first was recorded in late April by M. V. Khymyn in 2006 (Khymyn, 2006), and the second was recorded by us on 24 March 2016 at 3.30 pm, when we found a male in the northwestern part of the site. This male responded to the phonogram, so did a northern goshawk (*Accipiter gentilis*), which had a nest nearby. When the goshawk revealed itself, the pygmy owl ceased vocalising. We assume that the Eurasian pygmy owl occurred in this territory in previous years too. In March 2014, we found here two roosts of the species with remains of pellets. Preliminary we can suggest the nesting of 1 or 2 pairs of the Eurasian pygmy owl in Somyne site.

***Syra Pohonia.*** Literature sources mention only one observation of the species based on a finding of its nest with remains of food stocks used in the previous year (Khymyn,

2009). During censuses in 2016 to 2018, signs of presence of the Eurasian pygmy owl in this site were not revealed. Possibly, it is related to the fact that most of the site's area is afforested with a monoculture of the scots pine (*Pinus sylvestris*), and deciduous forests, which are concentrated in the north of the site, were practically demolished as result of large-scale fires in 2015–2016. Besides, those areas that, in our opinion, are suitable for nesting are located within the nesting territory of raptors, which prey on the Eurasian pygmy owl, including the northern goshawk and the tawny owl (*Strix aluco*). Therefore, only based on the record by M. V. Khymyn we can assume the nesting of at least one pair of the Eurasian pygmy owl in the site, more likely in its northern part.

**Biloozersky.** Signs of presence of the species here were not discovered. It is confirmed by both Khymyn's (2014) data and our results for 2017–2018. However, this site was the least covered by owl censuses, so the territory can be promising for further research.

**Perebrody.** During research period, 7 facts of occurrence of the Eurasian pygmy owl were discovered in the site. The species was first recorded in the territory by us in 2015, namely in Starosilske Forestry District. The list of records is given below.

- 5 March 2015 (at 22:00). Quarter 3, Starosilske Forestry District. One male in a sparse middle-aged pine forest. The bird was displaying territorial behaviour making unclear calls, which is probably related to the simultaneous vocalisation of a tawny owl, which can threaten the Eurasian pygmy owl (Wiesner, 1987), 1.5 km far from the site of observation. The discovered pygmy owl was within the nesting territory of the great grey owl (*Strix nebulosa*) (a pair of birds was sighted 300 m far from the nest, which in 2014 was occupied by the great grey owl). A similar case was observed in the Polissian Nature Reserve earlier (Zhyla, Kuzmenko, 1998), where the co-existence of three owl species — the Eurasian pygmy owl, the boreal owl (*Aegolius funereus*), and the great grey owl — was registered.
- 27 March 2015 (at 18:45). Quarter 40, Pivnichne Forestry District. Two males in a middle-aged pine forest located nearby a bog. The first male was spotted after 1–2 minutes of playing the phonogram; it flew close actively and displayed courting behaviour. Within 10 minutes the bird was attacked by another male, a fight occurred after which the second male left the conflict scene. It suggests the territoriality of the Eurasian pygmy owl in this site. On the next day, 28 March 2015, at 00.20 during repeated examination of this site, the male of the Eurasian pygmy owl appeared within 1 minute after the provocation with the phonogram started, and actively attacked the audio speaker. This fact confirms the diurnal activity of the species observed earlier in other parts of its geographic range (Ryabitsev, 2001; Butyev et al., 2005). However, the species could be characterized by a variation in the peak of daily activity within the breeding range. For instance, researchers established three peaks of the species' daily activity in Europe such as matutinal (Austria), diurnal (Norway), and crepuscular (Finland) (Mikkola, 1970 as cited in Butyev et al., 2005).
- 27 March 2015 (at 20:15). Quarter 27, Pivnichne Forestry District. A courting male was spotted in a mature pine forest with a significant amount of dead trees and woody debris. After 2–3 min of playing the phonogram, the bird started to display territorial behaviour and attacked the audio speaker. When we played the phonogram one km away, a male of the great grey owl appeared displaying territorial behaviour and pursuing us to the place where the Eurasian pygmy owl was sighted. The Eurasian pygmy owl disappeared after 4–5 min of courting displayed by the male of the great grey owl nearby. During an additional survey (7:45) on the following day, we discovered a nest of the common buzzard (*Buteo buteo*)

30 m far from the site, which in this year was inhabited by the great grey owl (a female was sitting in the nest, a male was courting nearby).

- 27 March 2015 (at 23:00). Quarter 28, Pivnichne Forestry District. One courting male in a sparse mature pine forest. The bird responded to the phonogram and was courting for 1–3 min, but ceased vocalising when a male of the great grey owl, in response to the phonogram, also started courting 1 km far from the pygmy owl's location.
- 13 March 2017 (at 15.01). Quarter 19, Starosilske Forestry District. A male was recorded, which responded to the phonogram.
- 14 March 2017 (at 9:45). Quarter 61, Pivnichne Forestry District. A male responded to the phonogram and was courting for a few minutes at the edge of a mixed pine-birch-alder forest.
- 24 December 2017 (at 12.20). Quarter 64, Pivnichne Forestry District. A male responded to the phonogram (flew close, to 10 m); it was actively courting and attacking the audio speaker. This spot is located 1.5 km far from the territory, where the species was recorded in the breeding period (observed on 14 March 2017).



Fig. 2. Typical landscapes of Perebrody site.



All record localities of the Eurasian pygmy owl in Perebrody were associated with fragmented pine forests growing on sand moraines (dunes) surrounded by bogs and with patches of raised bogs within the fragments (Fig. 2).

Additionally, it should be mentioned that the Eurasian pygmy owl was also recorded in Olmanskye Bolota Reserve, Belarus (Dombrovsky et al., 2014; Solovey, Yanuta, 2018), which neighbours with Rivnenskyi Nature Reserve and, in fact, the two resemble a single forest–wetland complex. It allows suggesting that the species was present in Perebrody before our investigation started. Our results indicate the nesting of 7 to 10 pairs of the Eurasian pygmy owl in Perebrody site.

## Conclusions

Based on the results of our research we came to the following conclusions.

1. The Eurasian pygmy owl is a rare breeding species in Rivnenskyi Nature Reserve, which is confirmed by both our results and literature sources.
2. Research results suggest the nesting of 9 to 12 pairs of the Eurasian pygmy owl in the Reserve's territory, in particular 7 to 10 pairs in Perebrody site, 1 or 2 pairs in Somyne site, and a single pair in Syra Pohonia site.
3. Our results confirm the data from former publications on the diurnal activity of the species during breeding period, which allows obtaining more accurate information not only during night-time but also daytime censuses by playing phonograms using audio devices.
4. Obtained data confirm that the Eurasian pygmy owl ceases vocalising when its natural enemies start to display courting behaviour, in particular the tawny owl, the great grey owl, and the northern goshawk.

## Acknowledgements

We would like to thank to our colleagues V. Ilchuk, R. Zhuravchak, O. Dobrynskyi, S. Churylovych, I. Tarhonskyi, O. Kybukevych, P. Hryniuk, and T. Kryvulskyi for participation in owl censuses in different times. The equipment used during field research was the courtesy of Idea Wild organization. We also thank to Z. Barkaszi for translating and editing of the manuscript.

- Bashta A-T. V., Kuzmenko Yu. V., 2009. The Eurasian Pygmy Owl *Glaucidium passerinum* (Linnaeus, 1758). In: Akimov I. A. (Ed.) *Red Data Book of Ukraine. Animals*. K.: Globalkonsalting, 467 [In Ukrainian].
- BirdLife International., 2015. *European Red List of Birds*. Luxembourg: Office for official publication of the European Communities, 1–67.
- Birds in Europe: population estimates, trends and conservation status*. 2004. Cambridge: Bird Life International, 1–162.
- Bokotey A. A., Dziubenko N. V., Gorban I. M. et al., 2010. *Breeding Birds of the Upper Dniester's Basin*. Lviv, 1–400 [In Ukrainian].
- Butyev V. T., Zubkov N. I., Ivanchev V. P. et al., 2005. The Eurasian pygmy owl. *Birds of Russia and Adjacent Regions*. M.: KMK Scientific Publishing, 28–41 [In Russian].
- Chronicle of Nature of Rivnenskyi Nature Reserve*. 2006. Volume 7. Sarny, 1–54 [In Ukrainian].
- Didukh Y. P., Minarchenko V. M., Protopopova, V. V., Tkachenko V. S., Shelyag-Sosonko, Y. R., 2007. Geobotanical regionalization. In: *National Atlas of Ukraine*. Kyiv: SSPE "Cartography", 197 [In Ukrainian].
- Domashevsky S. V. 2017. Sightings of the Eurasian pygmy owl (*Glaucidium passerinum*) in Chernobyl Exclusion Zone (Ukraine). *Berkut*, **26** (1), 73–74 [In Russian].
- Domashevsky S. V., Gashchak S. P., Chyzhevsky I. V., 2012. Diurnal birds of prey and owls of Chernobyl Exclusion Zone (Ukraine). *Berkut*, **21** (1-2), 64–81 [In Russian].

- Dombrovsky V. Ch., Zhuravlev D. V., Dmytrenok M. G., Ostrovsky M. G., 2014. Birds of Olmaskye Bolota *Subbuteo*, **11**, 51–73 [In Russian].
- Gnatyna O. S., Shkaran V. I., 2011. The first record of the Eurasian pygmy owl, *Glaucidium passerinum* (Strigiformes, Strigidae), in Shatsky National Nature Park. *Vestnik Zoologii*, **45** (4), 342 [In Ukrainian].
- Gorban I. M., Bumar G. V., Zhyla S. M. et al., 2003. Rare species of the Ukrainian Polissia. *Abstracts of the VII Scientific Conference of West Ukrainian Ornithologists "Priorities in Ornithological Studies"*. Kamianets-Podilskyi, 23–30 [In Ukrainian].
- Gryshchenko Yu. M. (Ed.), 2008. *Protected Areas of Rivne Oblast*. Rivne : Volynski Oberehy, 1–216 [In Ukrainian].
- Khymyn M. V., 2006. Fauna of vertebrates Vertebrata of Rivnenskyi Nature Reserve. *Materials of the scientific and practical conference "The Nature of Western Polissia and Adjacent Regions"*. Lutsk, **3**, 305–334 [In Ukrainian].
- Khymyn M. V., 2009. *Report on the scientific research theme: "Investigation of the vertebrate fauna of Rivnenskyi Nature Reserve, their biotopic distribution, creation of experimental sites for some groups of vertebrates and video addition"* (Materials to the Chronicle of Nature of Rivnenskyi Nature Reserve for 2008). Lutsk, 1–27 [In Ukrainian].
- Khymyn M. V., 2014. *Atlas of Breeding Birds of Biloozersky Forestry District of Rivnenskyi Nature Reserve (2011–2013)*. Lutsk : World of Birds, 1–63 [In Ukrainian].
- Knysh N. P., Bugayev I. A., 2009. The Eurasian pygmy owl in Left-bank Ukraine. *Berkut*, **18** (1-2), 69–71 [In Russian].
- Kuzmenko Yu. V., Franchuk M. V., Zhuravchak R. O., 2016. Owls of the Ukrainian Polissia. *Abstracts of the VII International Conference "Birds of Prey of Northern Eurasia. Problems and Adaptations in Modern Days"*. Rostov-on-Don : Yuzniy Federal University Press, 486–490 [In Russian].
- Kuzmenko Yu. V., Skyrpan M. V., Nastachenko O. S., 2015. Sightings of the Eurasian pygmy owl in Skole Beskids National Nature Park. *Troglodytes*, **5–6**, 107–109 [In Russian].
- Materials of the continuous forest management in Rivnenskyi Nature Reserve, Rivne Oblast., 2017. Irpin, 1–169 [In Ukrainian].
- Ryabitsev V. K., 2001. *Birds of the Urals, Pre-Urals, and Western Siberia: key and handbook*. Ekaterinburg : Ural University Press, 1–322 [In Russian].
- Solovey I. A., Yanuta G. G., 2018. Mammal species of the Republican Landscape Reserve "Olmanskye Bolota": results of the 2018 summer field season. *Materials of the I International Scientific and Practical Conference "Current issues of animal protection in Belarus and adjacent regions"*. Minsk, 351–353 [In Russian].
- Voronetsky V. I., Tyshechkin A. K., Demyanchik V. T., 1990. Methods of Owl Census. *Methods of investigation and conservation of birds of prey*. Moscow, 23–36 [In Russian].
- Wiesner J., 1987. Verursacht Brutverlust beim Sperlingskauz *Glaucidium passerinum*. *Thüring ornithol. Mitt.*, **37**, 73–74.
- Zhyla S. M., 1998. Studies on rare owls in Polissia. *Nature Reserves in Ukraine*, **4** (2), 47–48 [In Ukrainian].
- Zhyla S. M., Kuzmenko Yu. V., 1998. Biotopic distribution and specifics of census of some rare owl species of the Polissia Reserve. *Abstracts of the conference "Role of Protected Areas in Biodiversity Conservation" devoted to the 75th anniversary of Kaniv Nature Reserve*. Kaniv, 180–182 [In Ukrainian].

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ЧИСЕЛЬНІСТЬ ТА ПРОСТОРОВИЙ РОЗПОДІЛ СИЧИКА-ГОРОБЦЯ, *GLAUCIDIUM PASSERINUM* (STRIGIFORMES, STRIGIDAE), У РІВНЕНСЬКОМУ ПРИРОДНОМУ ЗАПОВІДНИКУ (УКРАЇНА)

Встановлено сучасний гніздовий статус та чисельність сичика-горобця, *Glaucidium passerinum* (Linnaeus, 1758), на території Рівненського природного заповідника за результатами польових обстежень 2013–2018 рр. Припускається гніздування 9–12 пар сичика-горобця на масивах заповідника (7–10 пар на масиві Переброди; 1–2 пар — Соми-

не, одна пара на масиві Сира Погоня). Сичик-горобець на території дослідження проявляє денну активність, що полегшує польові роботи по його ідентифікації. Відмічено, що на припинення вокалізації сичика-горобця впливає активізація токування сови сірої (*Strix aluco* Linnaeus, 1758), борогатої (*Strix nebulosa* Johann Reinhold Forster, 1772) та яструба великого (*Accipiter gentilis* Linnaeus, 1758).

**К л ю ч о в і с л о в а:** *Glaucidium passerinum*, сичик-горобець, гніздова територія, добова активність, просторове розміщення, чисельність, Рівненський природний заповідник, Полісся.

*М. В. Франчук, В. А. Яненко*

**ЧИСЛЕННОСТЬ И ПРОСТРАНСТВЕННОЕ РАСПРЕДЕЛЕНИЕ ВОРОБЬИНОГО СЫЧА, GLAUCIDIUM PASSERINUM (STRIGIFORMES, STRIGIDAE), В РОВЕНСКОМ ПРИРОДНОМ ЗАПОВЕДНИКЕ (УКРАИНА)**

Установлен современный гнездовой статус и численность воробьиного сыча, *Glaucidium passerinum* (Linnaeus, 1758), на территории Ровенского природного заповедника по результатам полевых исследований 2013–2018 гг. Сделано предположение о гнездовании 9–12 пар воробьиного сыча на территории массивов заповедника (7–10 пар в массиве Переброды; 1–2 пар — Сомыне, одна пара на массиве Сырая Погоня). Воробьиный сыч на территории исследования проявляет дневную активность, чем облегчает полевые работы по его идентификации. Отмечено, что на прекращение вокализации воробьиного сыча влияет активизация токования серой неясыти (*Strix aluco* Linnaeus, 1758), борогатої неясыти (*Strix nebulosa* Johann Reinhold Forster, 1772) и ястреба-тетеревятника (*Accipiter gentilis* Linnaeus, 1758).

**К л ю ч е в ы е с л о в а:** *Glaucidium passerinum*, воробьиный сыч, гнездовая территория, суточная активность, пространственное распределение, численность, Ровенский природный заповедник, Полесье.