Theriologia Ukrainica, **21**: 109–113 (2021)
p-ISSN 2616-7379 • e-ISSN 2617-1120
DOI: 10.15407/TU2109

THE CURRENT STATE OF THE GOLDEN JACKAL POPULATION IN THE LOWER DNISTER NATIONAL NATURE PARK

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Key words

jackal, population status, national park, Northern Black Sea Region

doi

http://doi.org/10.15407/TU2109

Article info

submitted 13.01.2021
revised 11.05.2021
accepted 13.06.2021

Language

English, Ukrainian summary

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Abstract

With the advent of the golden jackal in the Lower Dnister, certain changes have taken place in natural complexes, which are primarily related to the impact of the new species on the local fauna. Under such conditions, the number of jackals in certain areas, the spatial structure and location of separate packs are important information for the development of measures aimed at maintaining an optimal abundance of this species. Given the active impact of wildlife on natural systems, there are a number of both biological and purely social problems that need to be addressed. The effectiveness of solving such problems directly depends on the level of study of various aspects of biology and ecology of jackals. In addition, knowledge of the current state of the Dniester jackal population allows timely and effective response to new environmental challenges, which are associated with an increase in the abundance of new species and in its impact on the native mammal fauna. The results of the research indicate a certain competition of the jackal with other species of predatory mammals, in particular the fox and the raccoon dog. Thus, within the territories where the study was carried out, with the appearance of the jackal at the lower course of the Dnister, the red fox was not observed at all and the number of raccoon dogs decreased significantly. Habitats of separate jackal groups within the Lower Dnister National Nature Park have been identified and their total abundance has been established. The dynamics of settlement by the species of the Lower Dnister area is analysed, the conservatism of the species in relation to the residential areas is indicated. It has been established that in some parts of the park, in particular on the northern bank of the Dnister Estuary, the density of animals is about 12 individuals per 1000 hectares, which significantly exceeds the permissible sanitary and epidemiological standards. At the same time, in some parts of the floodplains of the Lower Dnister, density exceeds 0.5 individuals per 1000 ha, which indicates a complex spatial distribution of separate packs and groups of jackals. Mapping of the number of jackals in the park showed that groups far from the estuary are smaller in number (6–14 individuals), whereas groups near the estuary are more abundant (13–20 individuals).

Cite as

Rozhenko, M. 2021. The current state of the golden jackal population in the Lower Dnister National Nature Park. *Theriologia Ukrainica*, **21**: 109–113. [In English, with Ukrainian summary]

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The current state of the golden jackal population in the Lower Dnister National Nature Park. — M. Rozhenko. — With the advent of the golden jackal in the Lower Dnister, certain changes have taken place in natural complexes, which are primarily related to the impact of the new species on the local fauna. Under such conditions, the number of jackals in certain areas, the spatial structure and location of separate packs are important information for the development of measures aimed at maintaining an optimal abundance of this species. Given the active impact of wildlife on natural systems, there are a number of both biological and purely social problems that need to be addressed. The effectiveness of solving such problems directly depends on the level of study of various aspects of biology and ecology of jackals. In addition, knowledge of the current state of the Dniester jackal population allows timely and effective response to new environmental challenges, which are associated with an increase in the abundance of new species and in its impact on the native mammal fauna. The results of the research indicate a certain competition of the jackal with other species of predatory mammals, in particular the fox and the raccoon dog. Thus, within the territories where the study was carried out, with the appearance of the jackal at the lower course of the Dnister, the red fox was not observed at all and the number of raccoon dogs decreased significantly. Habitats of separate jackal groups within the Lower Dnister National Nature Park have been identified and their total abundance has been established. The dynamics of settlement by the species of the Lower Dnister area is analysed, the conservatism of the species in relation to the residential areas is indicated. It has been established that in some parts of the park, in particular on the northern bank of the Dnister Estuary, the density of animals is about 12 individuals per 1000 hectares, which significantly exceeds the permissible sanitary and epidemiological standards. At the same time, in some parts of the floodplains of the Lower Dnister, density exceeds 0.5 individuals per 1000 ha, which indicates a complex spatial distribution of separate packs and groups of jackals. Mapping of the number of jackals in the park showed that groups far from the estuary are smaller in number (6–14 individuals), whereas groups near the estuary are more abundant (13–20 individuals).

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Submitted: 13.01.2021. Revised: 11.05.2021. Accepted: 13.06.2021.

Introduction

The golden jackal (*Canis aureus* Linnaeus, 1758) is a species that actively spreads in the territory of Ukraine (Zagorodniuk 2014) recovering parts of its former geographic range. Since the first appearance of the species in the territory between the valleys of the Danube and Dnister rivers in 1998 (Rozhenko & Volokh 2000), distribution patterns of carnivorans in the Northern Black Sea Region in general and in protected areas in particular have changed substantially (Rusev 2020). The wide spectrum of diet consumed by this species (Rozhenko 2006) significantly expands its impact on most animal species of the region. Distribution patterns of groups of red foxes and raccoon dogs are highly affected by the appearance of golden jackals in the Lower Dnister National Nature Park. The negative image of jackals amongst the population contribute to the decline in recreational attractiveness of natural complexes of the Lower Dnister. Obtaining objective information on the impact of new centres of the jackal's occurrence in the Lower Dnister Region on native species will facilitate the development of effective conservation measures.

The aim of this study is to analyse distribution patterns of jackal groups in the territory of the Lower Dnister National Nature Park. The obtained results would be of key importance in developing conservation measures, particularly actions to regulate the species' abundance.

Research Methods

Constant survey routes were designated, particularly on part of the northern bank of the Dnister Estuary, at the upper reaches of Karaholska Bay, and in floodplain meadows and interfluve of the Dnister and Turunchuk Rivers.

The golden jackal is a large carnivoran (Fig. 1) and its census is relatively easy to be carried out by direct observation, footprints, traces of residence, or vocalization. The census of animals was conducted by recording their footprints on the snow and on wet riparian areas. Vocalization between different jackals and between packs was also registered, which considerably amended the information on the species' abundance. In addition, interviewing of fishers and locals was carried out to obtain data on the jackal's occurrence on areas not covered by direct survey. The total abundance of jackals was estimated by differentiated extrapolation of census data for the entire area of the park.

When snow cover was present, the density of animals was estimated using the formula proposed by Formozov (1932) and corrected by Malyshev and Pereleshyn:

$$P = 1.57\ S / md,$$

where P is density, S is the number of crossings the animal's trace by the researcher, m is the length of census route (km), and d is the average length of the animal's route per day (km).

Results and Discussion

Since the creation of the Lower Dnister National Nature Park in 2008, studies of the dispersal and ecology of the golden jackal in the park's protected ecosystems have been carried out systematically. This allowed obtaining data on dynamics of the species' dispersal, abundance, spatial distribution, and impact on other carnivorans, particularly on the red fox and common raccoon dog.

The jackal's dispersal in the territory

The formation of jackal groups in the Lower Dnister Region has started in 1998, when at least two pairs settled here giving rise to further expansion of the species in the region. One pair settled at the upper reaches of Karaholska Bay and the other pair appeared at the mouth of the river Hlybokyi Turunchuk.

In the following years, a jackal pack of 8 to 10 individuals has formed in the area, and these very packs had acted as sources of dispersal to neighbouring territories until 2005. Noteworthy is that jackals had not been seen before in the area between the Dnister and Turunchuk rivers, which can be explained by the species' conservatism in habitat choice and by the presence of natural barriers, such as the Dnister River.

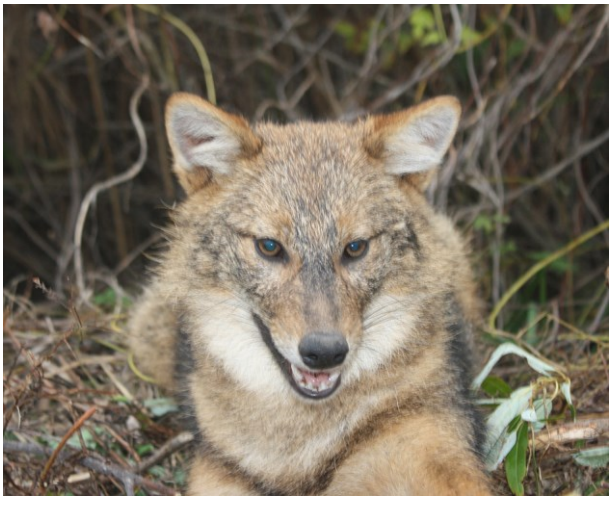

Fig. 1. Golden jackal from the Lower Dnister Region. Photo by the author. 13.05.2021.

Рис. 1. Шакал звичайний з пониззя Дністра. Фото автора. 13.05.2021 р.

Estimations of abundance and spatial distribution

Since the golden jackal's appearance in 1998 at the Dnister River, its surveys have been carried out in the Lower Dnister National Nature Park on standard census routes and in various habitats, which allowed the existence of eight jackal groups to be revealed in the park's territory with a total abundance of at least 120 individuals.

Studies showed an uneven colonization of the Lower Dnister area by jackals. The highest density of the species (12 individuals per 1000 ha) was recorded in the riparian strip of the estuary, lakes, and of the rivers Turunchuk and Dnister. In floodplain habitats near the estuary and in the Dnister–Tulunchuk interfluve, the highest density of jackals reaches only 0.5 individuals per 1000 ha, which indicates an uneven spatial distribution of the species in the park's territory according to various habitat types.

A map of the location of the main sites of the jackal's occurrence in the park is presented in Fig. 2. As it can be seen, most records of the species are concentrated in floodplain areas or nearby to them. The quantitative assessment of jackal groups in the park shows that, in general, the species is distributed evenly in the protected area. However, there is a certain spatial differentiation: groups that are distant from the estuary are smaller (6 to 10 individuals), whereas groups of jackals nearby to the estuary are larger (13 to 20 individuals).

Impact on other animals

In the studied region, the red fox (*Vulpes vulpes*) and the common raccoon dog (*Nyctereutes procyonoides*) were common representatives of the mammal fauna. Three years after the golden jackal's appearance, we have not recorded traces of residence of these species, except for migrating individuals in winter. On the other hand, the jackal's dispersal in the Dnister–Turunchuk interfluve has not affected the abundance and spatial distribution of the European badger, which is also a common species in this part of the park.

The golden jackal is a new species for the natural complexes of the Lower Dnister to which the native fauna is not adapted. In particular, such a common species as the mallard mainly nests on the ground and thus quite often becomes the jackal's prey. In addition, considering the wide range of habitats used by the golden jackal, we can expect that the species' impact on the region's biota will increase substantially.

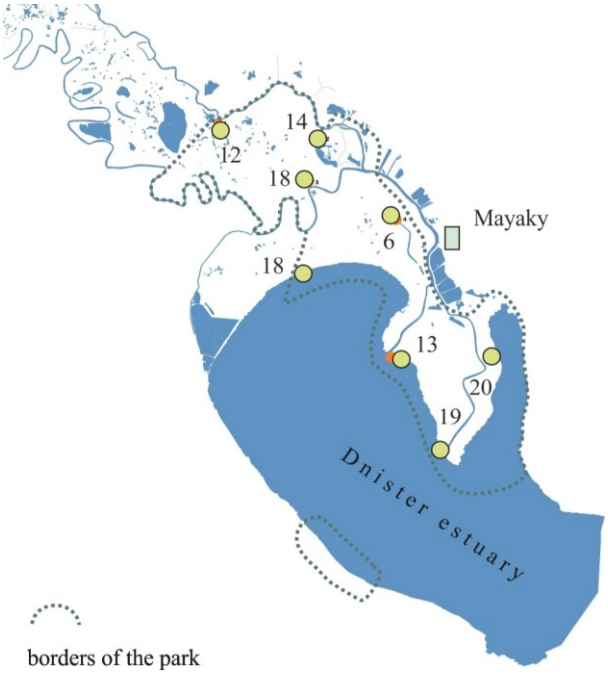

Fig. 2. Map of the location of jackal groups in the Lower Dnister National Nature Park. Marks: *circles*—centres of packs or places of regular registration of jackals in the park or in its vicinities; *numbers*—estimated number of jackals at the respective sites.

Рис. 2. Картосхема розміщення центрів осередків шакала на території Нижньодністровського НПП. Позначення: точки — центри зграй або місця регулярної реєстрації шакала в межах території Парку або в його околицях, цифри — оцінки кількості шакалів на таких ділянок.

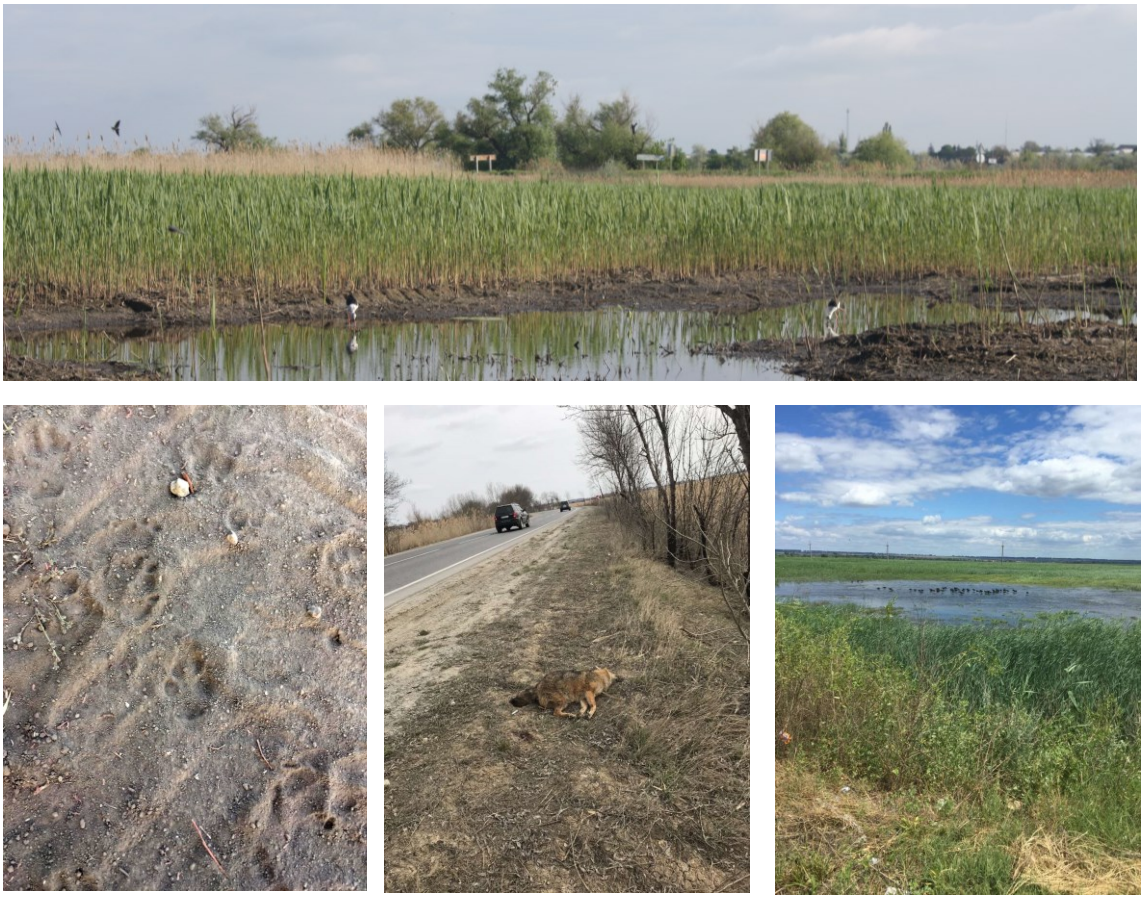

Fig. 3. Habitats and traces of the jackal in floodplains of the Lower Dnister: *top*, a view of the Maiaky–Palanka section of highway M15 crossing the floodplain, along which jackals often move; *bottom*, jackal footprints on the ground in the riparian strip; a jackal roadkill; a view of the floodplain from the highway.

Рис. 3. Місця та сліди перебування шакала в плавнях нижнього Дністра: вгорі — вид на автотрасу М 15, що прорізає плавню по лінії «Маяки–Паланка» і уздовж якої часто переміщуються шакали; нижній ряд: сліди шакала на ґрунті у прибережній смузі, шакал, збитий автомашиною, вид на плавні з автотраси.

Jackals often move in floodplains along local roads, in particular along the Maiaky–Palanka section of highway M15. There are various gradients from lands to waters, and therefore habitats are more diverse (and richer in food and shelters, respectively) compared to the much more homogeneous floodplains. This is the very site where jackal footprints and roadkill can be found often (Fig. 3).

Agriculture, particularly animal husbandry, has also been negatively affected, especially in territories adjacent to the floodplains, since jackals quite often attack livestock. Such attacks were observed near the villages Udobne and Mykolaivka, which territory borders with floodplains of the Dnister. In the first case, the jackals took a goat kid, while in the second case they attacked domestic geese. The jackal's occurrence in anthropogenic environments, such as vicinities of villages, creates serious difficulties for animal husbandry. In addition, low public awareness of the species' biology negatively affects regional tourism, which leads to decrease in demands for touristic products of the Lower Dnister Region.

Further tasks for monitoring and management

For the last decade, jackal packs and distribution centres have formed in the Lower Dnister Region, the information on which is quite important for population management of the golden jackal.

To assess the total abundance of the species in these areas is of key importance for making decisions regarding population management, which was in focus when conducting our study.

Considering the species' density, which in separate areas of the park exceeds the permissible norm by more than 10 times, it is necessary to develop measures to prevent outbreaks of rabies, which is distributed by all carnivorans, including the golden jackal. For the last years, several cases of rabies have been registered in jackals, which is an important fact for establishing effective monitoring of the local population of the species.

At present, many aspects of the jackal's ecology in the Lower Dnister National Nature Park remain unclear, which complicates population management and control. Further research is needed into the impact of the golden jackal on the abundance and spatial distribution of other carnivorans and into the potential role of the species in spreading infectious diseases among animals and humans.

Conclusions

1. Newly established centres of distribution of the golden jackal in the Northern Black Sea Region caused substantial changes in local natural complexes.

2. Currently, there is no accurate information on the total abundance of this species in the region, except for separate protected areas where respective studies have been carried out.

3. According to preliminary data, the formation of separate centres of occurrence of the golden jackal in new areas has a substantial impact on the spatial distribution of other carnivorans, such as the red fox and the common raccoon dog.

4. At separate sites of the Lower Dnister National Nature Park, the density of jackals is nearly 12 individuals per 1000 ha, which significantly exceeds the current sanitary-epidemiological norms.

Acknowledgements

The author thanks the colleagues for providing help during field studies and in obtaining important information, particularly the staff of the Zoological Museum of I. I. Mechnikov National University of Odesa and fellow scientists of the Lower Dnister National Nature Park. The journal's editors are acknowledged for their help in preparing the manuscript for publication, as well as Z. Barkaszi for the English translation of the paper.

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