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The red deer (*Cervus elaphus*) in Ukraine: population trends and modern distribution

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Zagorodniuk, I. **The red deer (*Cervus elaphus*) in Ukraine: population trends and modern distribution.** — A brief overview of information on the population dynamics and distribution of the red deer in Ukraine has been prepared. Data on the absolute number of deer for the last 30 years (1991–2020) are presented by years based on data from state statistic reports (form 2tp-hunting). According to the same source, the last known distribution of the species by administrative regions was analysed (data for 2017). It is shown that zones of high abundance and density of populations cover three areas: the Carpathians and adjacent regions, the Crimea and adjacent regions, and Central Polissia and adjacent regions. Current highly populated areas (data for 2017) are unchanged compared to data for 1991–2001. The distribution of the species is fragmentary and determined by the spatial distribution of wealthy game farms and the three natural centres of high population abundance and density are located at the Carpathians, Central Polissia, and the Crimean Mountains.

Introduction

This report has been prepared as a guide for a research group to prepare a review of the red deer in Europe. Specialists from this group (including Dr Stefano Mattioli) have shown that not a single review of the distribution of the red deer in Ukraine is available in the literature, although there are mixed data on the findings and status of populations of this species in some regions.

The author made a relevant analysis, generally preliminary, since a more detailed study would require many months of work. Here are the materials prepared at the request of European colleagues. Accordingly, the aim of this paper is to review the current state of knowledge about changes in population and features of geographic distribution of the red deer in Ukraine, important for assessing the current state of the species' populations in Ukraine and their changes.

Analysed Data

Three data sets were used: '2tp-hunting' state statistic forms, publications of colleagues, and expert advice. Features of the 2tp state statistics form, which is widely used by game experts as a source of monitoring information, are described in a review by P. Khoetsky (2017). There is a large number of publications on the

state of local red deer populations in different regions of Ukraine, so only the most significant ones are considered here in the light of the objectives of the study. In addition, the review uses data for 1991–2001 from the master's thesis of V. Kornienko, with the permission of the author.

Species abundance in time and space

Long-year dynamics

Historically, the abundance of red deer has changed significantly, mainly due to the extirpation of its populations during wars, economic crumbs, and social cataclysms, especially during World War I and II (Sokur 1961; Zagorodniuk 1999). In other periods, the general population was at about the same level, without significant fluctuations, which was facilitated by the system of game management, including measures to support populations and licensing of hunting. The last significant cycle was a marked increase in population abundance during 1973–1991 (Domnich *et al.* 2010).

After Ukraine gained independence in 1991 (about 5–10 years), there was a decrease in the number of red deer in all regions and natural areas (Fig. 1). Compared with 1991, until 2002 population abundance had decreased by 2 times in the Carpathians and Crimea, until 1994 by 1.2 times in Polissia, until 2001 by 1.7 times in the Forest-Steppe, and until 2001 by 2.5 times in the Steppe (Domnich *et al.* 2010). Subsequently, the population abundance has stabilized, and then there were minor changes, with a cycle of up to 20 years between peaks and depressions.

The current abundance of the red deer in Ukraine is about 13.7 thousand specimens, according to the 'Annual 2020 report of the head of the state agency of forest resources of Ukraine for 2020' (not including data from the Chornobyl Exclusion Zone and areas occupied by the Russian Federation in the Crimea, Donetsk and Lugansk oblasts).

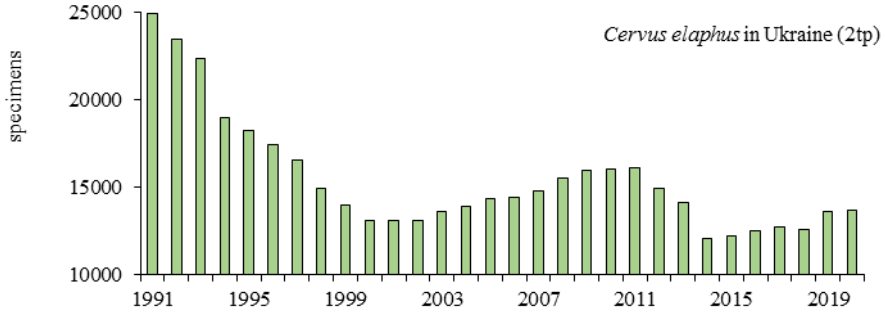

Fig. 1. Dynamics of the absolute abundance of the red deer (*Cervus elaphus*) in Ukraine according to data from the 2tp-huntic state statistic form for the last 30 years (from various sources).

Рис. 1. Динаміка абсолютної чисельності оленя шляхетного (*Cervus elaphus*) в Україні за даними з державної статистики за формою 2тп-мисливство за останні 30 років (з різних джерел).

In general, population dynamics is described in some special publications, such as the papers 'Trends in population dynamics of the Ukrainian game mammal fauna...' (Rizun & Bondarenko 2016) and 'Characteristics of limiting factors affecting the state of hunting resources of Ukraine' (Sheihas 2021).

Species abundance in space

The spatial distribution of red deer in Ukraine is uneven. Formally, we can talk about a continuous spread throughout mountains, forest and mixed forest zones, with a clear concentration of numbers in the most highly forested regions—the Carpathians, Polissia, and the Crimean Mountains. So, there is a solid range of red deer distribution, which reaches the southern border of the forest-steppe zone. The second part of the species' range covers the Crimean Peninsula, its mountainous part (borders of natural zones are shown in Fig. 2). There are also many toponyms related to the common name of the red deer: *olen'* (in western regions also *volyn'*) (Terletsky 2020); for example, there are 30 entries for 'Olenivka' in Wikipedia. Such toponyms are found almost all over Ukraine.

Geographic changes in the population density of the species are shown in Fig. 2, which shows data for three periods, separated by intervals of five years: 1991, 1996, and 2001. It can be seen that the situation is stable and practically does not change over time. Zones of high and low abundance are unchanged in general.

The number and density of red deer in different regions varies more than five times. However, it is obvious that the difference in density increases over time: the zone of very low density (or lack) of red deer clearly increases over time, and now covers not only the steppe but also forest-steppe regions, that is, most of the southern and eastern regions of Ukraine. The map on Fig. 3 demonstrates the distribution of the number of recorded specimens by administrative oblasts according to data from the state statistics for 2017; the situation is the same.

It should be noted that the configuration of administrative units is not consistent with natural regions. Therefore, the fill zones on the maps are formal. For example, the northern segment of the high-population zone (Kyiv Oblast) should essentially concern only the northern part of the oblast. Similarly, the southern segment of the high-population zone (Crimea and adjacent districts of Kherson and Zaporizhia oblasts) essentially corresponds not to these three administrative territories in general, but to the narrow coastal strip of both Kherson and Zaporizhia oblasts and of the Crimean Mountains.

The blue dotted line in Fig. 3 indicates the boundaries of the most numerous spatial groups of the red deer (on the scale of administrative areas). This zone as a whole corresponds to the borders of the main forest-covered areas of Ukraine, and its borders correspond to the borders of the forest-steppe (but not to the south and not to the north, but approximately in the middle part of them). However, this whole area of concentration is not continuous. In many places, there are local populations, limited by the boundaries of game farms.

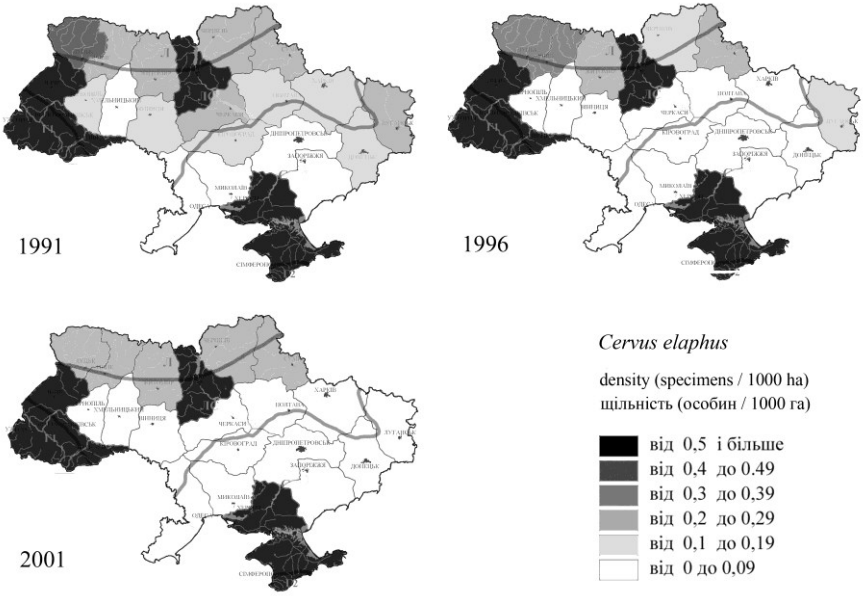

Fig. 2. Density of distribution of the red deer (*Cervus elaphus*) by administrative oblasts of Ukraine according to data of state statistics (materials kindly presented by V. Kornienko). Wide lines show the boundaries between natural zones—forest (Polissia), forest-steppe, and steppe. Peak density levels (> 0.5 individuals per 1000 ha) apply to the Carpathians, Central Polissia, and the Crimea.

Рис. 2. Щільність розповсюдження оленя шляхетного за адміністративними областями України у 1991, 1996 та 2001 рр. за даними державної статистики (матеріали люб'язно представлені В. Корнієнком). Товсті лінії покажуть межі між природними зонами — лісовою (Полісся), лісостеповою та степовою. Пікові рівні щільності (> 0,5 особин на 1000 га) відносяться до Карпат, Центрального Полісся і Криму.

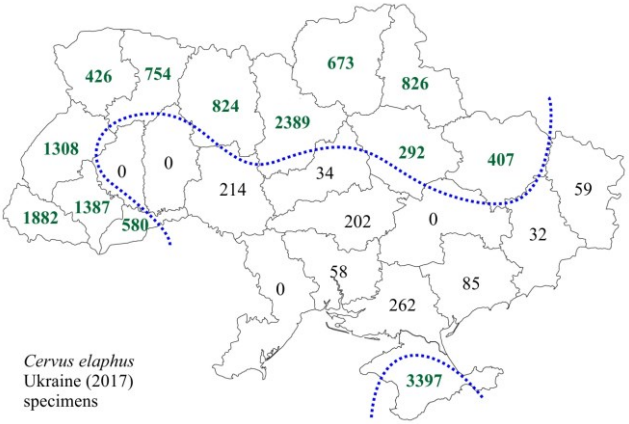

Fig. 3. Distribution of the number of recorded specimens of the red deer (*Cervus elaphus*) in Ukraine by administrative oblasts according to data from state statistics for 2017. Data for Crimea after Smagol *et al.* 2017.

Рис. 3. Розподіл кількості облікованих особин оленя шляхетного (*Cervus elaphus*) за адміністративними областями за даними державної статистики за 2017 рік. Дані для Криму за (Smagol *et al.* 2017).

Modern distribution and abundance

The red deer population is highly fragmented; there are three zones of continuous distribution: the Carpathians, Polissia, and the Crimea. Within the former range, there are many local areas where red deer are present as part of the game fauna, as mainly introduced small populations with very local distribution. And the third group is large local populations within game farms in seaside areas, mainly of insular type (e.g. the Dzharylhach Peninsula or Byriuchyi Island).

This former continuous distribution was destroyed not only by the extirpation of red deer during the wars of the 20th century, but also by numerous local introductions of the sika deer and interspecific hybrids (so-called 'Askanian maral'). For comparison, the *Cervus nippon* population consists of 4.2 thousand specimens (state statistics '2tp') and this alien species inhabits many places (forestry), where the red deer could live, especially in the steppe zone and southern forest-steppe.

Areas of continuous distribution

There are only three areas of continuous distribution of the red deer in Ukraine, shown as green areas in Fig. 4:

a) Ukrainian Carpathians (four administrative oblasts of Ukraine), a range of up to 50% of overall population number in Ukraine. There are many special publications, including on the abundance and population structure of the red deer in the Carpathian Biosphere Reserve (Dovhanych 1995) and population dynamics of the red deer in Bukovyna (Tashchuk *et al*. 2014).

b) Central Polissia (mainly Chornobyl Exclusive Zone), nearly 3–4 thousand specimens as of 2021 (S. Zhyla, pers. comm.). In other areas of Polissia (east and west), the total number is high due to the network of game farms. There are several special publications, among them on ungulate abundance in the Chernobyl Exclusive Zone (Vishnevskiy & Kotlyarov 2008).

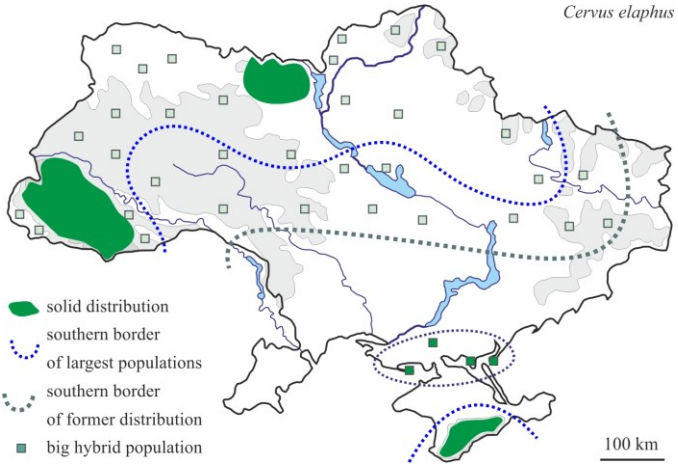

Fig. 4. Geographical distribution of the red deer (*Cervus elaphus*) in Ukraine according to data from various publications and other sources.

Рис. 4. Географічне поширення оленя шляхетного (*Cervus elaphus*) в Україні за даними з різних публікацій та інших джерел.

c) Crimean Mountains is the distribution range of the endemic subspecies *Cervus elaphus brauneri* Charlemagne, 1920, which had long been an object of hunting economy for 'royal hunting' in the Crimean Reserve (Kormilitsyn 1970). Now, the population comprises more than 3000 specimens (Smagol *et al.* 2017). There is a risk to its gene pool posed by hybrid 'Askanian deer' (Dulitsky 2008).

Local 'spot' populations

a) Aborigine forms. Local populations in game farms are very abundant, most of them have a status of 'pen farms' (e.g. Kratiuk 2018). There are many such local populations, in most cases without control of origin (there are many hybrids). Points were placed on the map relatively occasionally (Fig. 4), and special review of such data will be required in the future. There are many sources about spot findings and about game farms (e.g. Polzyk 2020).

b) 'Askanian deer' and related hybrid forms. There are many hybrid populations, located mainly in coastal parts of different seaside forestry districts, mainly marked on the map by dark green squares (Fig. 4). All of them are in the south, outside of the former natural range of the red deer. The main and most known population inhabits seaside 'islands' (peninsulas and spits), such as Dzharylhach, Byriuchyi Island, and so on (Volokh 2006; Domnich *et al.* 2007).

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References

Domnich, V. I., V. Yu. Vovchenko, S. V. Ishchenko. 2007. Ecological features and population structure of Askanian deer on the island of Dzharylhach. *Scientific Bulletin of the Volyn State University. Biological Sciences*, **6**: 98–103.

Domnich, V. I., I. A. Smirnova, A. V. Domnich, A. N. Shadura, I. V. Delehan. 2010. Change of number and anthropogenic loading on Cervidae and Canidae in Ukraine. *Scientific Bulletin of National Forestry University of Ukraine*, **20** (5): 8–19.

Dovhanych, Ya. O. 1995. Number and population structure of deer and roe deer population of the Carpathian Biosphere Reserve. *Nature Protection in Ukraine*, **1**: 15–23. [In Ukrainian]

Dulitsky, A. 2008. About conception of «rarity» from the viewpoint of the Crimean red deer status. *Proceedings of the Theriological School*, **9**: 44–48. [In Ukrainian] https://bit.ly/3PEizYJ

Khoyetskyy, P. 2017. Game fauna census in the "2-tp – hunting" statistical report: features, advantages, disadvantages. *Novitates Theriologicae*, **10**: 206–216. [In Ukrainian]

Kormilitsyn, A. A. 1970. To the ecology of the Crimean red deer (Cervus elaphus brauneri Charlemagne, 1920). *Vestnik zoologii*, No 5: 15–19. [In Russian]

Kratiuk, O. L. 2018. Species composition and dynamics of the number of Artiodactyla in aviaries in the Zhytomyr region. *Scientific Bulletin of National Forestry University of Ukraine*, **28** (3): 34–37.

Polzyk, M. 2020. Large herbivores in restricted ecosystems: assessment of water sources value by high-usage movement pathways at Byriuchyi Island spit. *Theriologia Ukrainica*, **20**: 39–45. CrossRef

Rizun, E., V. Bondarenko. 2016. Trends in population dynamics of the Ukrainian game mammal fauna and propositions on improvement of its census. *Proceedings of the Theriological School*, **14**: 34–40. [In Ukrainian] CrossRef

Sheihas, I. M. 2021. Characteristics of limiting factors affecting the state of hunting resources of Ukraine. *Theriologia Ukrainica*, **21**: 141–151. [In Ukrainian] CrossRef

Smagol, V. N., V. L. Yarysh, S. P. Ivanov, V. Maltsev. 2017. Long-term population dynamics of the red deer and European roe deer at the protected and not-protected areas in Mountain Crimea Ukrainian. *Ukrainian Journal of Ecology*, **7** (4): 65–72. CrossRef

Sokur, I. T. 1961. *Historical Changes and Use of Fauna of Mammals in Ukraine.* Publishing House of the Academy of Sciences of the Ukr. RSR, Kyiv, 1–84. [In Ukrainian] https://bit.ly/3GocJGA

Tashchuk, M. V., I. V. Skilsky, L. I. Meleshchuk, M. D. Popyuk. 2014. Dynamics of the number of red deer (Cervus elaphus) in Bukovyna. *Regional Aspects of Floristic and Faunistic Researches. Issue 1*. Ed. by I. V. Skilsky. Druk Art, Chernivtsi, 121–127. [In Ukrainian] https://bit.ly/3wPEgxm

Terletsky, V. 2020. Vernacular names of mammals in the village of Libukhova, Lviv Oblast, Ukraine. *Novitates Theriologicae*, **11**: 29–32. [In Ukrainian] CrossRef

Vishnevskiy, D., O. Kotlyarov. 2008. Estimations of large mammal species abundance in the Chernobyl Exclusion Zone: an analysis of different sources of data. *Proceedings of the Theriological School*, **9**: 21–27. [In Ukrainian] https://bit.ly/3PP6vEa

Volokh, A. 2006. Characteristics of Askanian red deer as an object of breeding on the farm. *Farmer. Lviv,* № 5-6: 7–9. [In Ukrainian] https://bit.ly/3PKe7HT

Zagorodniuk, I. V. 1999. Changes in ungulate fauna of Ukraine during the historical time. *Vestnik zoologii. Supplement*, No. 11: 91–97. [In Ukrainian] https://bit.ly/3LVWPnY

Резюме

Загороднюк, І. **Олень шляхетний (*Cervus elaphus*) в Україні: популяційні тренди та сучасне поширення.** — Підготовлено стислий огляд відомостей про стан і динаміку чисельності й поширення оленя шляхетного на території України. Наведено відомості про абсолютну кількість оленів за останні 30 років (1991–2020), порічно, на підставі даних з державної статистичної звітності (форма 2тп-мисливство). За тим самим джерелом проаналізовано останній відомий розподіл виду за адміністративними областями (дані на 2017 р.). Показано, що зони високої чисельності та щільності популяцій охоплюють три регіони: Карпати і прилеглі області, Крим і прилеглі області, Центральне Полісся і прилеглі області. Сучасні зони високої чисельності (дані на 2017 р.) незмінні порівняно з даними за 1991–2001 роки. Поширення виду по суті є фрагментарним і визначається розподілом у просторі потужних мисливських господарств, трьома природними осередками високої чисельності та щільності популяцій є Карпати, Центральне Полісся та Гірський Крим.