

**THE PHENOMENON OF HIGH DENSITY OF UNGULATES AT THE
KARADAG NATURE RESERVE IN CRIMEA. REPORT I. PECULIARITIES OF
POPULATION ESTIMATIONS AND DATA INTERPRETATION**

Yarysh V. I.¹, Ivanov S. P.²

*¹Federal State Budget Institution of Science «T.I. Vyasemsky Karadag Scientific Station –
Nature reserve of the RAS», Feodosia, Russian Federation*

*²V. I. Vernadsky Crimean Federal University, Simferopol, Russian Federation
E-mail: galina.yarish65@gmail.com*

The high number of European Roe Deer (*Capreolus capreolus* L.) and wild boar (*Sus scrofa* Heude) at the Karadag Nature Reserve recorded over the past 15 years. From the founding of the reserve in 1984 since 2005 the number of roe deer has increased exponentially ranging from 20-50 individuals up to 300 or more. During following years the number of roe deer stabilized at 340 individuals, varying from 264 to 438 individuals.

During the last 10 years of observation the average density of roe deer in the nature reserve is 205 individuals per 1 thousand ha, which is 12 times higher than normal, based on a bonitet of plots of occurrence of this species in the reserve. The average number of wild boar in the reserve both during the initial period of its existence (from 1984 to 2005), and following years remained unchanged. With an average value of about 46 individuals strong fluctuations of the numbers from 5 to 100 individuals for individual years of observations is recognized. The average density of wild boar in the reserve exceeds the optimal 23 times. Ultra-high number of ungulates in the Karadag nature reserve registered during long time is a wonderful phenomenon and requires the most careful study. In this regard, the report provides information about the natural habitat of ungulates in the Karadag nature reserve, the characteristic habitats of stay of the ungulates in the reserve, exhaustively reviewed the specifics of the census of the population, processing and interpretation of the data.

At the modern stage Karadag vegetation is represented mainly by forests, sibljaks (shrub-like plants of ahead oak, Oriental hornbeam, and shrubs), prairie (steppe) areas, tomillares (sparse vegetation, with shrubs, subshrubs, and shrubs in the form of stunted vegetation), savannoides. In fact, two zonal vegetation such as Submedi terranean forests ($\approx 40\%$) and steppes (grasslands) ($\approx 20\%$) dominated at the reserve. Variety and mosaic of biotopes are typical here.

The total area of land suitable for living of roe deer and wild boar at the Karadag Nature Reserve that is the subject for bonitet is 1715 hectares (17.15 sq. km). Account sites is selected based on middle-class bonitet of the mentioned animals. Extrapolation of the data obtained on estimation plots were carried out on the area that is subject for bonitet – of 17.15 sq. km. Territorial account platforms are located so that there is no possibility for animals to move from one site to another during the inventory that avoid double counting of animals. Form of account sites identified by the borders of the quarterly network, which are natural boundaries (watersheds, mountain ranges, roads). Total area of account sites is 198 hectares, which represents 12 % of the total area of habitat of ungulates in the reserve. Accountings at the Karadag Reserve since 2015 are conducted by the noise and drive. At each selected site using a satellite Navigator, the designated coordinates of the corner points of the perimeter; area of sites were also defined. The description of these sites according to the valuation of the quarters where accounts took place had been provided. To account by the method of noise and drive a team of at least 30 participants is divided into groups of beaters and fieldworkers. Each participant of the account obtained the card for primary account, which contains the following data: the number of the area, animal species, the total number of recorded animals, sex and age of recorded animals. Also the date and the name of account participant is written down. In advance all participants received detailed instructions. Data obtained during accounts are written down to the record paper of account of animals at each site as well as to the consolidated statement of monitoring at sites. On the basis of data of the consolidated statement the density and number of each animal species as well as statistical inaccuracy of counting are calculated.

Keywords: roe deer, wild boar, abundance, density, dynamics of number, methodic of number accounts, Karadag Nature Reserve, Crimea.

References

1. Dinesman L. G., *The influence of wild mammals on the forming of tree stands*, 165 p. (Publishing House of the Academy of Sciences of the USSR, Moscow, 1961).
2. Khodasheva K. S. and Eliseeva V. I., Participation of vertebrate animals that feed by twig forage in the circulation of substances in forest-steppe oak forests, *Structure and functional-biogeocenotic role of the animal population of the land*, 81 (Moscow, 1967).
3. Abaturov B. D., Mammals in the biogeocenosis, *Nature*, **10**, 59 (1973).
4. Abaturov B. D., Reaction of vegetation on grazing by ungulates, *Ungulates of the fauna of the USSR (ecology, morphology, use, protection)*, 156 (Nauka, Moscow, 1973).
5. Abaturov V. D. *Bioproduction process in terrestrial ecosystems*, 128 p. (Nauka, Moscow, 1979).
6. Abaturov V. G. On the functional role of wild vertebrates in biogeocenoses of natural territories, *Structural and functional organization of biogeocenoses*, 250 (1980).
7. Zlotin R. I., Khodasheva K. S., *The role of animals in the biological cycle of forest ecosystems* 200 p. (Nauka, Moscow, 1974).
8. Krasnitskiy A. M., *Problems of the reserve management*, 192 p. (Lesnaya promyshlennost, Moscow, 1983).
9. Krut` M. V., Zabelin M. M., *Essays on vision on the history of interaction of nature and society*, 406 p. (Nauka, Moscow, 1988).
10. Kozlo P. G., *A wild boar*, 223 p. (Urozhay, Minsk, 1975).
11. Kozlo P. G., Stavrovskaya L. A., Influence of burrowing activity of wild boar (*Sus scrofa* L.) on grass vegetation, *Belovezhskaya Pushcha: research*, **3**, 91 (1979).
12. Mishnev V. G., Reproduction of beech forests of Crimea, 130 p. (Vyshcha shkola, Kiev – Odessa, 1986).
13. Mishnev V. G., Reserve beech forests of Crimea, their condition and prospects, *Lesovedenie*, **1**, 24 1971.
14. Mishnev V. G., Reserves - biodiversity reservat, Reserves of the Crimea. Biodiversity at Priority Territories: 5 years after Gurzuf: Proceedings of the II Scientific Conference (Simferopol, April 25-26, 2002), 166 (2002).
15. Mishnev V. G. Reserves and principle of hard reservation of territories, *Botan. Journal*, **69**, **8**, 1106 (1984).
16. Prokhorova L. G., Influence of grazing on the soil invertebrates of a grass-cerial birch tree forest, *Proceedings of the Central Laboratory for Nature Conservation of the Ministry of Agriculture of the USSR*, **2**, 70 (1973).
17. Tolkach V. N., Dvorak L. E., A change in the above-ground phytomass of a live ground cover under the influence of wild ungulates, *The Reserves of Belarus: Studies*, **41**, 29 (1980).
18. Shapovalova S. I., Poryadina N. M., Sokolova A. V., Influence of burrowing activity of wild boar (*Sus scrofa*) on soil mesofauna, *Selection-genetic and ecological problems of eukaryotes*, 28 (1995).
19. Kozul`ko G. A., Influence of wild ungulates on soil invertebrates in the oak forests of the Belovezhskaya Pushcha, *Vestn. Zool*, **34**, **14**, 136 (2000).
20. Mironova L. P., Kurochkina O. G., Influence of vital activity of *Sus scrofa* L. on the soil and vegetation cover of the Karadag Nature Reserve, *Structure and functional role of the animal population in natural and transformed ecosystems: Abstracts of the I International Scientific Conference (Dnepropetrovsk, September 17-20, 2001)*, 174 (2001).
21. Antonets N. V., Yarysh V. L., Dendroactivity of the European roe deer (*Capreolus capreolus* L.), *Tobolsk Scientific - 2012: IX All-Russian Scientific and Practical Conference (with international participation)*, 78 (2012).
22. Ivanov S. P., Parshintsev A. V., Evstaf`yev A. I., Tovpinets N. N., Yarysh V. L., Problem of excess of wild ungulates at protected areas, *Karadag. History, geology, botany, zoology: Collection of scientific papers dedicated to the 90th anniversary of the T.I. Vyazemsky Karadag scientific station and the 25th anniversary of the Karadag nature reserve*, **1**, 445 (2004).
23. Yarysh V. L., Antonets N. V., Balalayev A. K., Ivanov S. P., Dynamics of the European roe deer, European hare and predation of the mountain-Crimean fox in the Karadag Nature Reserve, *Ecosystems, Their Optimization and Protection*, **11**, 144 (2014).
24. Yarysh V. L., Ivanov S. P., Population dynamics of ungulates in the Karadag Nature Reserve, *100 years of the T. I. Vyazemsky Karadag scientific station: Issue of scientific papers*, 372 (2015).

25. Lakin G. F., Biometrics, 186 p. (Visshaya Shkola, Moscow, 1968).
26. Design of organization of the territory and protection of natural complexes of the Karadag Nature Reserve of the National Academy of Sciences of Ukraine, 210 p. (Irpen, 2005).
27. Crimea – media portal. Maps of Crimea, <http://crimea-media.ru/Map.html>
28. Karadag reserved: popular science essays, 288 p. (N. Orianda, Simferopol, 2011).
29. *Methodical instructions for the registration of hunting animals at the sites by the method of expelling (approved by the Scientific and Technical Council of the Ministry of Agriculture of Russia on September 18, 2008, Protocol No. 53)*, (Moscow, 2009).