



Research Program of Musk Deer Ecology in the Sikhote-Alin Region

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ABSTRACT

Since 2010, a comprehensive program of studying musk deer has been conducted in the Sikhote-Alin region. This musk deer study program has employed the methods of radio telemetry, visual observation, life activity traces survey and photo-video traps. New data on the use of space by musk deer, as well as their daily activity, nutrition, labeling and distribution activities, have been obtained. The research herein demonstrates the necessity for the application of scientific knowledge on the ecology of musk deer for conservation and sustainability.

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Introduction

In Russia, musk deer (*Moschus moschiferus*) dwell in Siberia and in the Far East and are mostly known to be a hunting species. Identification of the actual number of musk deer in Russia faces a number of technical difficulties (Zaitsev, 2006). In the late 1990s, the musk deer population was estimated to be approximately 150,000. In 2000, population decline was observed over most of the area (Morgunova et al., 2011), including the territory of the Amur region, where hunting of these animals had been banned for a long period of time, and in the Sakhalin region, where the musk deer subspecies listed in the Red List of Russia dwell.

According to the authorities in the Far Eastern Federal District, the musk deer population has stabilized after its decline in the 1990s. For the period of 2008–2010, the musk deer population was estimated to be roughly 50,000–55,000 (Morgunova et al., 2011). In Primorsky Krai, the musk deer population is unstable. According to the Central Hunting Control, after a substantial population decline during the 1980s (Zaitsev, 2006), the musk deer population maximum was registered in 2003 as 17,430 individuals, and the minimum in 2008 was 11,810 individuals. Only during recent years has there been stabilization of the population (Morgunova et al., 2011).

The musk deer population decrease of the 1970s–80s is currently being addressed with controversial protection measures. However, in areas outside of Russia, unfavorable conditions to sustain musk deer abundance have developed. All of the musk deer subspecies that are distinguished according to the classification adopted in Russia (Tsalkin, 1947; Prikhodko, 2003), including those living in Russia, are included in the IUCN Red List. Far Eastern musk deer (*M. moschiferus turovi*) is a subspecies that is listed in the Red Book

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of the Russian Federation Annex III (2001), including taxons of the animals that require special attention to their state in the natural environment. Musk deer derivative trade is controlled by the Convention on International Trade in Endangered Species of Flora and Fauna (CITES).

Musk deer species survival is in jeopardy in some regions of Russia. The downsizing of the musk deer population is caused by unregulated hunting in most places, and this practice has been increasing since the late 1980s because of the illegal export of musk deer and the destruction of their habitats. The highest population density of musk deer in the Russian forests is confined to dark coniferous wooded areas. Extensive fires that have occurred within the past decades as well as intensive logging of coniferous forests both contribute to the destruction and transformation of habitats, significantly affecting the number of musk deer. The number of musk deer species is used as an indicator of the stability of ecosystem relations that are common for large arrays of pine forests. The naturally occurring reasons for the decline in the period of unstable dynamics of climatic factors are less significant (Zaitsev, 2006).

The Program for the Study and Conservation of the Far Eastern musk deer was implemented in 2010 on the territory of the Sikhote-Alin state reserve and its surrounding areas (Terneisky district of Primorsky Krai). Research has been extended from studies conducted in the 1940s (Salmin, 1972) and carried out in 1975–2009 (Zaitsev, 1975, 1991, 2006, etc.). This research is a joint program of the reserve, the Pacific Institute of Geography FEB RAS and the A.N. Severtsov Institute of Ecology and Evolution RAS.

The aim of the research program is to study the versatile ecology of musk deer. The tasks include the survey of the distribution of animal habitats, population structure, behavior and adaptive abilities of the musk deer, ecosystem relationships in the current period, the characteristics and rates of reproduction and other aspects of the ecology of the species using complex methodology. The obtained knowledge will be used to promote the preservation of this unique species and its habitat as well as for the prevention of further population decline and habitat reduction and will likely serve as one of the foundations for change and development of forest legislation.

The objectives of this paper include the analysis of the comprehensive methodological approach for the research of animal ecology and characterization of the main research methods with a brief analysis of the obtained data, the understanding of which is important for musk deer population management in current and future periods.

Material and Methods

Research was conducted in the northeastern part of Sikhote-Alin reserve (Tayozhnaya river basin). This study of musk deer ecology has applied various methods including radio tracking, winter tracking, the study of life activity traces, visual observations, video recording and data analysis of the automatic photo and video recorders.

Trapping with the purpose of radio labeling. In 2012–2014, with the purpose of radiolabeling live trapping of musk deer, two methods of capture were applied: (1) stationary trapping; and (2) remote tracking method with subsequent immobilization. For trapping, the previously used method of Prikhodko (2008) was applied with some modifications. In particular, two falling doors at both ends of the trap were installed and the side poles were replaced by a twine net (Fig. 1).



Fig. 1. Trap for musk deer capturing.

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