Beiträge zur
JAGD
&WILD
forschung · 44

Boris V. Romashov, Natalia B. Romashova, Stanislav A. Breslavtsev, Voronezh / Russia

The helminth fauna of the wolf (*Canis lupus* L.) in the Voronezh State Reserve and in the surrounding Areas

Key words: Wolf, *Canis lupus*, helminth fauna, Voronezh State Reserve, Russland

1. Introduction

Wolves have always inhabited the Voronezh State Reserve and surrounding areas. However, their number was highly regulated as a result of the biotechnical measures aimed towards red deer. Due to this regulation, wolves stopped breeding on the territory of the reserve, and there was only one incident of a wolf entering the territory after 1950. The reserve being free of wolves until the early 1970's, the population of red deer reached its maximum. Wolves started inhabiting the reserve and breeding regularly in 1975. The appearance of wolves coincided with the increased number of red deer, having reached its maximum (1544 specimens) in 1973. Later, wolf predation became one of the major factors leading to a decrease in red deer population by more than 10 times [2].

Wolves have a close trophic relationship with wild ungulates and other animals, which determines their present-day helminth fauna formation. Heretofore, we presented data on the Voronezh State Reserve predatory mammal helminth fauna, also providing an overview of predator helminth biodiversity [1].

The aim of current research is to examine fauna and certain aspects of the ecology of the helminths that parasitize wolves in the Voronezh State Reserve and surrounding areas as well as estimating present-day situation with zoonotic helminths.

2. Materials and methods

Helminthological wolf materials had been collected in the Voronezh Nature Reserve and surrounding areas during 37 years (1981–2018). By using helminthological autopsy technique, more than 40 specimens were examined (13 of them were fully autopsied and the other 30 were fragmentally autopsied). Helminthological materials collected from wolves during the regulation of their numbers and from dead animals. We also conducted coprological studies.

The taxonomic analysis was conducted, following the latest manuals, monographs and other studies on predatory mammal helminths. Special techniques for apical and cross helminth section were employed in difficult cases to define the taxonomic status of a specimen. Compressorium trichinelloscopy was used to diagnose and detect Trichinella larvae in soft tissues. The number of larvae per 1 g of muscular tissue was estimated to define relative helminth intensity invasion. Temporary and whole mount were prepared according to accepted standards. The microscopes MBS-10, Motic-

SMZ161 and Biomed-6 were employed **for** morphological and taxonomic analysis, with digital camera being used for visualisation. The quantitative measures of helminth invasion and distribution in harbour bodies were estimated according to the following criteria: invasion intensity, invasion extensity and abundance index. The taxonomic status of a nematode was differentiated according to the presently accepted classification (Fauna Europaea site, http://www.fauna-eu.org/).

3. Results

The collected materials were analyzed as follows. Firstly, present-day wolf helminth fauna was examined; secondly, the data on quantitative measures of helminth invasion of this harbour in the Voronezh State Reserve and surrounding areas was obtained. According to the research, 16 types of wolf helminth have been registered (Table 1).

The main helminth taxa (trematoda, cestoda, nematoda) are represented unequally. The largest number of species, i.e.12, was registered among nematodes, 3 species were registered among cestodes and 1 species was registered among trematodes, which is substantially less than nematode species (fig. 1).

The results of the study show that in the Voronezh State Reserve and surrounding areas among the registered species of helminth wolves, the most common are nematodes. However, A. alata dominated and had the highest measures of occurrence (prevalence of infection) and population (intensity of infection and index of abundance (fig. 2 a, b, c, d).

Table 1 Fauna and wolf helminth distribution in the Voronezh State Reserve and surrounding areas

Helminth species	Infection measures		
	prevalence of infection, %	intensity of infection	index of abundance
Trematoda			
Alaria alata	92.3	149.7	138.2
Cestoda			
Dypilidium caninum	7.7	1.0	0.1
Taenia hydatigena	23.3	27.0	6.2
T. krabbei	23.1	4.7	1.1
Nematoda			
Aonchotheca putorii	7.7	2.0	0.2
Eucoleus aerophilus	38.5	2.1	0.9
E. boehmi	69.2	12.0	8.3
Pearsonema plica	46.2	2.3	1.1
Calodium hepaticum	15.4	1.5	0.2
Trichinella nativa	27.9	6,3 (per 1 g of muscular tissue)	1,8 (per 1 g of muscular tissue)
Toxocara canis	7.7	2.0	0.2
Toxaskaris leonina	7.7	15.1	1.2
Uncinaria stenocephala	23.1	9.3	2.2
Crenosoma vulpis	23.1	2.3	0.5
Molineus patens	23.1	3.3	0.8
Dirofilaria repens	7.7	2.0	0.2

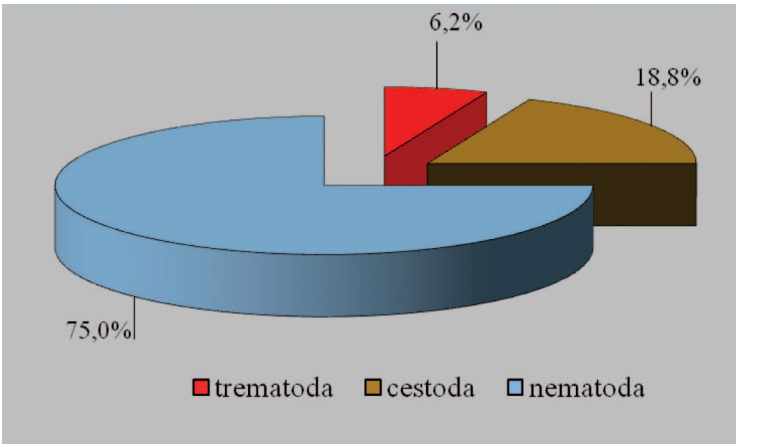

Fig. 1 The proportion (%) of trematodes, cestodes and nematodes in the composition of the fauna helminth of the wolf

Fig. 2 A. alata, host wolf, Voronezh Reserve: a – marita (4x lens); b – metacercarium, localization of the lungs (lens 20x); c – eggs, optical section (c) and the surface of the shell (d) (lens 100x) (original)

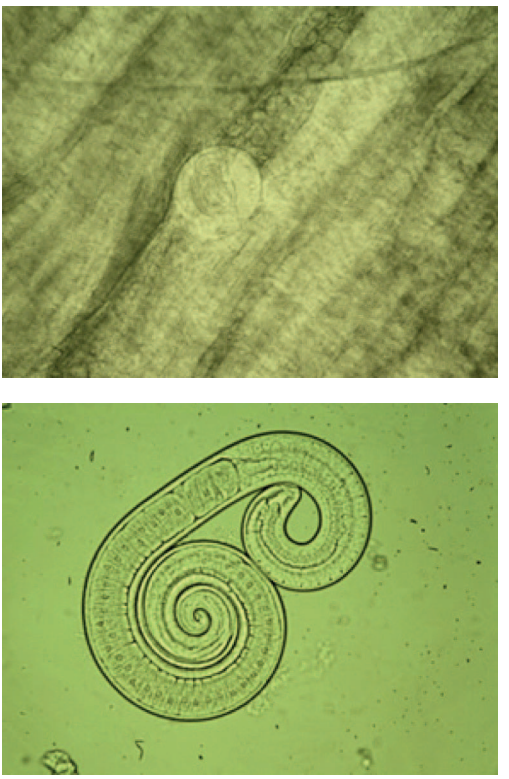

Fig. 3 T. nativa, host wolf, Voronezh Reserve: a – larva in the capsule (10x lens); b – larva in the capsule (lens 20x); c – larva released from the capsule (lens 100x) (original)

The highest infection rates were registered for A. alata, prevalence of infection reaching 92.3 % intensity of infection, reaching 149.7 specimens and index of abundance reaching 138.2 specimens.

Wolves were found to be highly invaded by certain nematode species, such as: E. boehmi – 69.2 % prevalence of infection; P. plica – 46,2 % prevalence of infection; E. aerophilus – 38.5 % prevalence of infection; C. hepaticum – 15,4 % prevalence of infection.

A few species of nematodes such as Capillariidae family and T. native were found to have a high measure of wolf invasion (fig. 4). T. nativa nematode prevalence of infection – 27,9 %.

Two species of Taeniae (cestodes) had a sufficiently high rate of infection, too. Over 10 species had an epidemiological or epizootiological significance: A. alata, D. caninum, T. hydatigena, T. krabbei C. hepaticum, T. nativa, T. canis, T. leonina, U. stenocephala, C. vulpis, D. repens.

Summary

The wolf is considered to be the largest predatory mammal in the Central Black Earth region (Russia). They have a close trophic relationship with wild ungulates, this fact determining their present-day helminth fauna formation. Helminthological wolf materials had been collected in the Voronezh State Reserve and surrounding areas for a long period of time (1981–2018). The findings are that 16 wolf helminth species were registered in the Voronezh State Reserve and surrounding areas, nematodes being the most common. Present-day wolf helminth fauna includes 16 species. The main helminth taxa (trematoda, cestoda, nematoda) are distributed unequally. The largest number of species, 12, are represented by nematodes (Aonchotheca putorii, Eucoleus aerophilus, E. boehmi, Pearsonema plica, Calodium hepaticum, Trichinella nativa, Toxocara canis, Toxaskaris leonina, Uncinaria stenocephala, Crenosoma vulpis, Mo-

lineus patens, Dirofilaria repens). Also, three cestode species (Dypilidium caninum, Taenia hydatigena, T. krabbei) and one trematode species (Alaria alata) are registered as well. Over 10 species were found to have an epidemiological or epizootiological significance for this area.

Literature

Romashov, B.V.; Romashova, N.B.; Rogov, M.V.; Nikulin P.I.; Fofonova, E.N. (2012): Ecologo-faunistic analysis of worms of predatory mammals of Usmansky boron. – Proceedings of the Voronezh State Reserve 27: 143–165.

Mishin, A.S.; Romashov, B.V. (2016): Retrospective analysis of the wolf's impact on the number of wild ungulates in the Voronezhsky reserve. – Beitr. Jagd- u. Wildforsch. 41: 277–283.

Anschrift der Verfasser:

Prof. Dr. Boris V. Romashov
Dr. Natalia B. Romashova
Voronezhsky State Nature Biosphere Reserve
Goszapovednik, Centralnaja usadba, Voronezh
394080, Russia.
E-Mail: bvnrom@rambler.ru

Stanislav A. Breslavtsev, Voronezh State
Agrarian University, Michurina str., 1
394087 Voronezh, Russia

Fotoreport (Sibirische Wildnis)

Unberührte sibirische Wildnis in Tuva (Wälder und Moore in Südsibirien): Lebensraum von Wolf, Bär, Luchs, Vielfraß, Elch, Maral, Sibirischem Reh und Moschustier (Foto: A. & M. Stubbe)

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Beiträge zur Jagd- und Wildforschung

Jahr/Year: 2019

Band/Volume: 44

Autor(en)/Author(s): Romashov Boris V., Romashova Natalia B., Breslavtsev Stanislav A.

Artikel/Article: The helminth fauna of the wolf (Canis lupus L.) in the Voronezh State Reserve and in the surrounding Areas 255-259