UTTAR PRADESH JOURNAL OF ZOOLOGY

43(20): 70-75, 2022
ISSN: 0256-971X (P)

HELMINTOFAUNA OF SOUTHERN ARALSEA DOMESTIC CATS (*Felis domestica*)

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.56557/UPJOZ/2022/v43i203200

Editor(s):
(1) Dr. Belisario Dominguez-Mancera, University Veracruz, Mexico.
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Reviewers:
(1) Mubashir Ali Rather, SKUAST, India.
(2) Marcia Raquel Pegoraro de Macedo, Italy.

Received: 17 August 2022
Accepted: 24 October 2022
Published: 01 November 2022

Original Research Article

ABSTRACT

Helminthological studies were conducted in domestic and stray cats in the northern districts of Karakalpakstan and as a result of research, 25 types of helminths were recorded in 36 domestic and stray cats examined helminthologically, and it was found that they belong to 3 types, 4 classes, 10 genera, 18 families, and 22 genera.Among them, 7 types of cestodes, 1 type of trematodes, 2 types of acanthocephala and 15 types of nematodes were found.According to the development cycle, 18 types of biohelminths and 7 types of geohelminths belong to the species recorded in domestic and stray cats.Domestic cats differ from stray cats in that they have more helminth infections and a greater diversity of helminth species.

Keywords: Acanthocephala; trematode; cestode; nematode; zoonosis.

1. INTRODUCTION

Domestic cats (*Felis Domestica*) - live together with people, and stray cats live in cities, districts and villages in areas close to people and in garbage dumps [1,2].

Compared to domestic cats, stray cats are one of the main causes of helminth infestation. In turn, the study of helminth fauna of cats helps in the spread of helminthic diseases among people and economically useful animals and their prevention, in this regard, their study is of great scientific and practical importance.

In recent years, there has been a sharp increase in the number of cats in urban and rural settlements [3,1].

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Because domestic cats live alongside with humans, are becoming a source of dangerous zoonotic invasions and a major means of soil contamination.

The cats also source are infection to humans in particular to infants, individuals with suppressed immunity, like persons suffering from acquired immunodeficiency syndrome (AIDS), people undergoing cancer chemotherapy or receiving other drugs that may suppress their immune systems and the elderly [4,5,1]. Cats are the main hosts of many helminths which parasitize humans and domestic animals as well as birds [6].

Domestic and stray cats are one of the main hosts of many helminth species that parasitize humans and animals. The present study was, therefore, undertaken to study the study of helminth fauna in domestic and stray cats of Karakalpakstan.

1.1 The Aim of the Research

The aim is to study the helminth fauna of domestic and stray cats in the northern regions of Karakalpakstan, the species composition of helminths, and their importance in veterinary and medicine.

2. RESEARCH MATERIAL AND METHODS

The research work was carried out during 2017-2022 in the northern districts of Karakalpakstan. (42°51'51.10"C 58°42'38.14"B, 42°53'44.38"C 59°16'3.71"B, 42°49'48.61"C 59°35'53.48"B, 42°44'1.83"C 59°14'1.54"B, 43°37'11.95"C 58°56'36.01"B, 43°30'15.47"C 59°40'21.05"B, 40°58'16.50"C 59°33'7.87"B, 42°29'27.93"C 59°28'32.53"B, 42°39'16.02"C 59°29'0.55"B, 42°35'56.29"C 59°16'40.24"B, 43°41'30.26"C 59° 3'12.14"B, 42°35'56.29"C 59°16'40.24"B, 43°35'44.72"C 59°14'52.00"B, 43° 2'10.56"C 59°20'20.88"B). In the study of domestic cats, cat owners voluntarily gave permission for helminthological examinations.We used the method of complete and incomplete helminthological examination after the death of the cat to identify helminths [7].

The collected helminth materials were divided into classes and helminth species belonging to trematoda, cestode and acanthocephala class were fixed in 70% and 96% alcohol, and helminth species belonging to nematode class were fixed in Barbagallo fluid and labeled.

Detection of helminth species was carried out in the General Laboratory of Parasitology of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan, helminth species were identified using the established methods and literature [3,8]. All numerical data were processed mathematically and statistically [9]. Excell program and OriginPro 7.5 software (OriginLab Corporation, USA) were used for some statistical analyses.

According to the classification of K.P.Fedorov [10], taking into account the indicators of invasiveness and quantity index of helminths, they were divided into two groups: primary and secondary species. Primary species include dominants, subdominants, and adjacent intermediate species groups; secondary species may include rare, random, and related species [11,10].

3. RESULTS AND DISCUSSION

As a result of the conducted research, 25 types of helminths were recorded in 36 specimens of domestic and stray cats, which were helminthologically examined in different regions of Karakalpakstan. Among them, 7 types of cestodes, 1 type of trematodes, 2 types of acanthocephala and 15 types of nematodes were found [4].

According to the developmental cycle of the species recorded in domestic and stray cats, 18 species belong to biohelminths and 7 species to geohelminths. In the developmental cycles of biohelminths, the intermediate host functions are cyclops, various blood-sucking mosquitoes, various representatives of arthropods, ringworms, aquatic and terrestrial mollusks, amphibians, reptiles, fish, various representatives of mammals [4]. Studies have shown that 36 specimens examined were infected with 25 species of helminths in domestic and stray cats [3,7] (Table 1).

It has been found that stray cats have a higher rate of helminth (*Joyeuxiella rossicum*8.3%, *Moniliformis moniliformis* 8.3%, *Macracanthorhynchuscatulinus* 11.1%, *Ancylostoma caninum* 13.8%, *Hydatigera krepkogorski* 13.8%, *Dipylidium caninum* 13.8%, *Spirometra erinacei-europei* 13.8%, *Diplopylidium nőlleri* 16.6%, *Vigisospirura potekhini* 16.6%, *Dirofilaria immitis* 16.6%, *Thominxaerophilus* 19.4%, *Alaria alata* 19.4%, *Mesocestoides lineatus* 22.2%, *Physaloptera sibirica* 22.2%, *Rictularia cahirensis* 25.0%, *Physaloptera praeputiale* 25.0%, *Troglostrongylus bodanini* 25.0%, *Dioctophyma renale* 25.0%, *Uncinaria stenocephala* 27.7%, *Oxynema numidica* 30.5%, *Rictularia affinis* 30.5%, *Toxocara mystax* 36.1%, *Taenia macrocystis* 38.8%, *Toxascaris leonina* 38.8%, *Toxocara canis* 58.3%)

Table 1. Infection of domestic cats with helminths in the territory of Karakalpakstan

(N = 36)

№	The name of helminth	Location in body	Extensive Invasion		Intensive Invasion		
			N	%	min	max	M±m
1	*Alaria alata*	small intestine	7/36	19.4%	1	8	5.6±0.4
2	*Spirometra erinacei-europei*	small intestine	5/36	13.8%	2	7	4.2±0.3
3	*Dipylidium caninum*	smallintestine	5/36	13.8%	3	13	9.5±0.7
4	*Diplopylidium nőlleri*	small intestine	6/36	16.6%	2	9	4.1±0.3
5	*Joyeuxiella rossicum*	small intestine	3/36	8.3%	1	15	11.5±1.1
6	*Taenia macrocystis*	small intestine	14/36	38.8%	4	18	13.4±1.3
7	*Hydatigera krepkogorski*	small intestine	5/36	13.8%	3	11	8.7±0.6
8	*Mesocestoides lineatus*	small intestine	8/36	22.2%	3	19	14.1±1.3
9	*Macracanthorhynchuscatulinus*	small intestine	4/36	11.1%	1	6	4.1±0.3
10	*Moniliformis moniliformis*	small intestine	3/36	8.3%	2	7	3.7±0.2
11	*Thominxaerophilus*	trachea and bronchi	7/36	19.4%	2	8	4.6±0.3
12	*Dioctophyma renale*	abdomen and kidneys	9/36	25.0%	1	15	11.4±1.1
13	*Ancylostoma caninum*	small and thick intestine	5/36	13.8%	3	11	5.3±0.3
14	*Uncinaria stenocephala*	small and thick intestine	10/36	27.7%	3	17	12.4±1.2
15	*Troglostrongylus bodanini*	bronchi	9/36	25.0%	1	19	13.4±1.3
16	*Toxascaris leonina*	stomach, small intestine	14/36	38.8%	3	39	26.7±2.0
17	*Toxocara canis*	stomach, abdominal cavity, small and thick intestine	21/36	58.3%	6	53	36.5±2.4
18	*Toxocara mystax*	small intestine, stomach and abdominal cavity	13/36	36.1%	3	37	19.7±1.8
19	*Oxynema numidica*	small intestine	11/36	30.5%	1	19	15.6±1.5
20	*Vigisospirura potekhini*	stomach and esophagus	6/36	16.6%	3	21	17.6±1.5
21	*Physaloptera praeputiale*	stomach and esophagus	9/36	25.0%	2	17	12.5±1.2
22	*Physaloptera sibirica*	stomach and esophagus	8/36	22.2%	5	22	13.3±1.3
23	*Rictularia affinis*	small and thick intestine	11/36	30.5%	2	15	11.3±1.1
24	*Rictularia cahirensis*	small and thick intestine	9/36	25.0%	2	16	11.4±1.1
25	*Dirofilaria immitis*	right ventricle of the heart, pulmonary artery	6/36	16.6%	2	9	4.8±0.3

Table 2. Distribution of domestic cat helminths in Karakalpakstan by degree of dominance

№	Category of helminths	Types of helminths	Indications of damage	
			Invasive extensiveness,%	**Quantity index,copy**
1	Dominant species	*Toxocara canis*	58.3%	11.9±1.1
2	Subdominant species	*Toxascaris leonina*	38.8%	4.2±0.5
3		*Taenia macrocystis*	38.8%	6.4 ±0.4
4		*Toxocara mystax*	36.1%	4.6±0.6
5		*Rictularia affinis*	30.5%	3.5±0.4
6		*Oxynema numidica*	30.5%	3.0±0.3
7		*Uncinaria stenocephala*	27.7%	2.6±0.2
8		*Dioctophyma renale*	25.0%	1.5±0.1
9		*Troglostrongylus bodanini*	25.0%	1.6±0.1
10		*Physaloptera praeputiale*	25.0%	1.7±0.1
11		*Rictularia cahirensis*	25.0%	1.4±0.08
12		*Physaloptera sibirica*	22.2%	1.3±0.09
13		*Mesocestoides lineatus*	22.2%	1.0±0.08
14	Adjacent intermediate species	*Alaria alata*	19.4%	1.9±0.1
15		*Thominxaerophilus*	19.4%	1.2±0.09
16		*Dirofilaria immitis*	16.6%	2.0±0.1
17		*Vigisospirura potekhini*	16.6%	1.7±0.1
18		*Diplopylidium nőlleri*	16.6%	0.9±0.05
19		*Spirometra erinacei-europei*	13.8%	0.8±0.05
20		*Dipylidium caninum*	13.8%	1.1±0.08
21		*Hydatigera krepkogorski*	13.8%	1.7±0.1
22		*Ancylostoma caninum*	13.8%	1.0±0.08
23		*Macracanthorhynchuscatulinus*	11.1%	0.9±0.05
24	Few species	*Moniliformis moniliformis*	8.3%	0,4±0,002
25		*Joyeuxiella rossicum*	8.3%	0.5±0.002

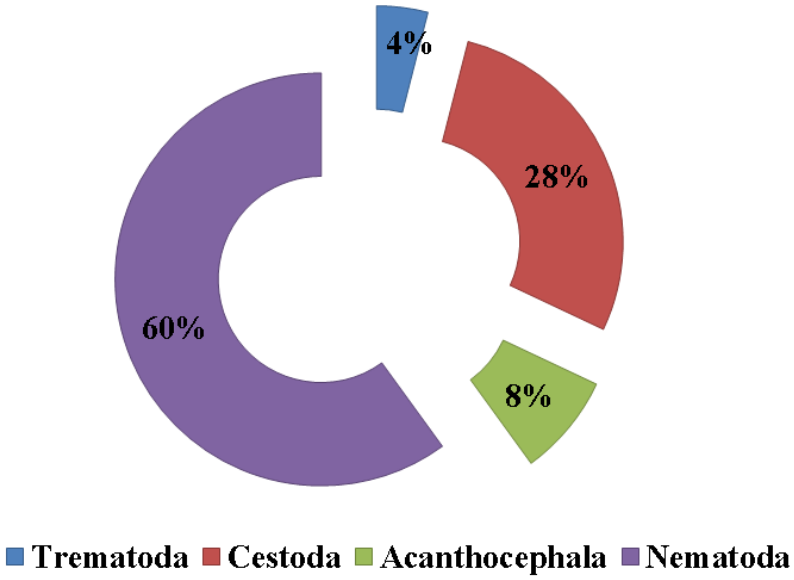

Fig. 1. Distribution of helminths of domestic cats by class in the territory of Karakalpakstan

infestation than domestic cats. The main reason for this may be the diversity of nutrition. Domestic cats can feed mainly on food provided by humans, in some cases rodents, insects, birds and their eggs, birds can also feed on their chicks and sometimes fruits. Homeless cats can feed on litter near settlements, as well as various rodents, insects, birds and their eggs, their chicks and sometimes fruits.

Domestic and stray cats are infected with many helminth elements, causing the spread of various helminthic diseases and their origin, for example, dipilidisosis, toxacarosis, toxascariosis, ankylostomosis, uncinariasis, dirofilariosis, etc., domestic cats are affected by these diseases, farm animals and even humans. This, in turn, has a negative impact on medicine, veterinary medicine and the economy[5].

In cats, 15 types of nematodes and 7 types of cestodes were predominant, followed by trematodes and acanthocephalus. The gastrointestinal tract was studied as the main parasitic site. *Toxocaracanis* 58.3%, *Toxascarisleonina* 38.8%, *Taeniamacrocystis* 38.8% predominated in cats, while *Toxocaracanis*, *Toxascarisleonina* and *Toxocaramystax* were the most invasive.

Trematoda class combines 1 species and accounts for 4% of the total number of species; The class Cestoda combines 7 species and accounts for 28% of the total number of species; The class Acanthocephala combines 2 species and accounts for 8% of the total number of species; The nematode class combines 15 species and accounts for 60% of the total number of species (Fig. 1).

In the analysis of quantitative parameters in the composition of helminth fauna of domestic cats, non-uniform norms of individual species of helminths were noted (Table 2).

The most important of these worms from a medical and veterinary point of view are the following generations: *Toxocara*, *Toxascaris* and *Dirofilaria*. Of the 25 species of helminths recorded in domestic cats, 60 percent are nematodes. There are also highly pathogenic species among nematodes, which can cause serious changes in the organism of domestic and wild predators.

4. CONCLUSION

More than 88% of helminthologically examined cats were infected with at least one type of helminth.In the northern districts of Karakalpakstan, helminthological examinations of domestic cats were carried out for the first time.Compared to domestic cats, stray cats are one of the main causes of many helminth infestations.

Thus, we think that the population should fully follow sanitary and hygienic rules.Every household that keeps a domestic cat should have their cats examined by a veterinarian in time, so that people and pets are prevented from being infected with helminth infections.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Fataliev GG, Ibragimov R.Sh. Comparative analysis of helminth fauna of cats (Felidae) in Azerbaijan. Russian Parasitological Journal. 2016;36(2):135-140.
2. Shernazarov E Sh., Vashetko EV, Kreitsberg EA, Bikova EA, Khurshut EE. Vertebrates of Uzbekistan. (Reference book of vertebrate names. In Latin, Uzbek, Russian, English). Publishing house "Fan" of the Academy of Sciences of the Republic of Uzbekistan; 2006.
3. Kozlov DP. Key to helminths of predatory mammals of the USSR. M.: Science; 1977.
4. Berdibaev A.S. Worms of Karakalpak Wild Mammals (Mammalia: Carnivora) .: Diss. … Bio. Fan. Philosophy. doct. (PhD) - Nukus, 2021;156.
5. Palvaniyazov M. Predatory animals of the deserts of Central Asia. – Nukus. 1974;317.
6. Kotelnikov G.A. Helminthological studies of animals and the environment. - M.: "Kolos". 1984;3-4.
7. Skryabin KI. Methods of complete helminthological dissections of vertebrates, including humans. M.: MGU. 1928;45.
8. Koshchanov E.K. Helminths of wild mammals of Uzbekistan., Diss. can. biol. Sciences. T.1971;146-147.
9. Lakin G.F. Biometrics. – Moscow. 1990;352.
10. Fedorov K.P. Patterns of spatial distribution of parasitic worms. - Novosibirsk: Nauka. 1986; 256.
11. Romashova EN, Rogov MV, Romashov BV, Nikulin PI. Helminths of wild carnivores of the Voronezh region: ecological and faunistic analysis. Russian Journal of Parasitology. Moscow. 2014;1:23-33.