



# Monitoring of human ascariasis as a threat to public health and habitat in the southern regions of the Russian Federation

Bittirov IA<sup>1</sup>, Gazaeva AA<sup>2</sup> and Bittirov AM<sup>3\*</sup>

<sup>1</sup>Kabardino-Balkarian State Agrarian University, Russia

<sup>2</sup>Gazaeva Asiyat Anatolyevna, Kabardino-Balkarian State Agrarian University, Russia

<sup>3</sup>Anatoly Murashevich Bittirov, Doctor of Biological Sciences, of Veterinary Medicine, Kabardino-Balkarian State Agrarian University, Russia

**\*Corresponding author:** Federal State Budgetary Educational Institution of Higher Education "Kabardino-Balkarian State Agrarian University, Nalchik, Russia.

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## Annotation

The goal is to monitor human ascariasis as an epidemic and sanitary and hygienic threat to the population of the southern subject of the Russian Federation. When analyzing materials on the incidence of ascariasis in the population of Karachay-Cherkessia, it showed that in 10 districts and 2 cities the index of occurrence of ascariasis in the population varied from 5.60 to 15.87%. The gradation of the abundance index of eggs *Ascaris lumbricoides* in human feces ranged from  $2.9 \pm 0.5$  to  $7.0 \pm 0.8$  ind. per 1 g of feces, on average  $4.94 \pm 0.65$  ind., which can provide a high level of soil contamination with eggs. In general, the epidemic situation of ascariasis in the subject can be attributed to relatively favorable. In the region, the incidence of people with ascariasis is low due to the planned anti-epidemic work. At the same time, the subject can be attributed to risk regions, since the number of sick children, adults and migrants does not tend to decrease, but there is an increase in invasion during the year. The growth of the index of occurrence of ascariasis among children and migrants is alarming. Indices of ascariasis occurrence in the child population and migrants increases during the year by 2.78 times. Soils in 10 districts and 2 cities are contaminated with eggs of *Ascaris lumbricoides* by 14.00-30.67% (average, 21.72%), which may threaten the possible infection of the population with ascariasis.

**Keywords:** Kabardino-Balkarian Republic; Human; Monitoring; Ascariasis; Egg; Soil; Invasion; Occurrence index; Abundance index

## Introduction

Many authors consider helminthiases of animals and humans to be a large-scale sanitary threat to the urbanized territories of Russia, the eggs and larvae of which are contaminated soils and wastewater [1-20]. Nematodes of the species *Ascaris lumbricoides* (Linnaeus, 1758) are one of the global epidemic risks for the population of the planet and the Russian Federation [1,2]. WHO considers that human ascariasis is one of the massive zoonotic invasions in the

world with a registration rate of up to 1.2 billion cases per year [1-13]. In the Russian Federation, ascariasis affects up to 3-3.5 million people and exceeds similar indicators in European countries by 3 times [14-20]. In this regard, the question arises of regional monitoring of the spread of ascariasis among the population and the degree of sanitary contamination of soils of human life support infrastructure with eggs of the pathogen [1-20]. The aim is to study

the nematodes *Ascaris lumbricoides* as an epidemic and sanitary and hygienic threat to humans in the southern region of the Russian Federation.

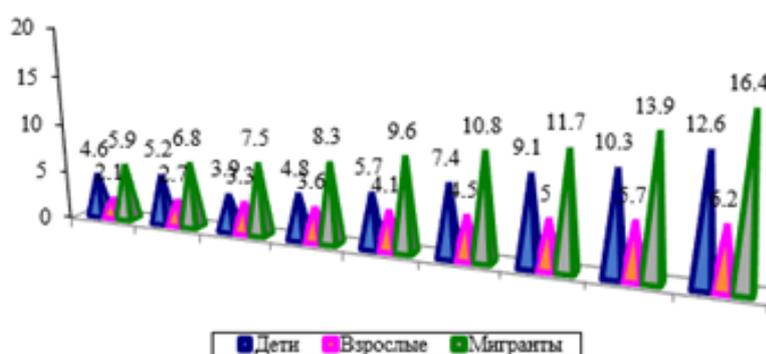
## Materials and methods

Based on the analysis of materials from the reports of the structural divisions of the Rospotrebnadzor of the Russian Federation for Kabardino-Balkarian Republic for 2021 and other medical documentation and our own research, we calculated the incidence of ascariasis in 10 districts and 2 cities of Kabardino-Balkarian Republic and sanitary contamination of soils with eggs of the species *Ascaris lumbricoides*. The main epidemiological indicators of ascariasis in the population of Kabardino-Balkarian were studied by analyzing feces for 9.0 thousand people. and 3600 soil samples for sanitary contamination with eggs *Ascaris*

*lumbricoides*. Statistical processing of the material was carried out using the Biometrics program.

## Results and Discussion

When analyzing materials on the incidence of ascariasis in the population of Kabardino-Balkarian Republic, it showed that in 10 districts and 2 cities, the index of occurrence of ascariasis in children and adults varied from 5.60 to 15.87% (table 1). The gradation of the abundance index of *Ascaris lumbricoides* eggs in human feces ranged from  $2.9 \pm 0.5$  ind. in 1 g of feces, on average  $4.94 \pm 0.65$  ind. per 1 g of feces, which can provide a high level of soil contamination with eggs (Table 1). In general, in the Kabardino-Balkarian Republic, the epidemic situation in human ascariasis can be classified as relatively favorable (Figure 1) (Table 1).



**Figure 1:** Indicators of monthly infection of children, adults and migrants with ascariasis in Kabardino-Balkarian Republic in % per 9.0 thousand people. for 2021.

**Table 1:** The results of the analysis of the data of the Kabardino-Balkarian Republic SES on the incidence of ascariasis (*Ascaris lumbricoides*) in the regions of Kabardino-Balkarian Republic (% per 10.0 thousand population).

Districts	Researched, man	Infested, man	Occurrence index, %	Abundance indices of eggs <i>Ascaris lumbricoides</i> in 1g of human feces
Prokhladnensky	750	50	6,67	$2,9 \pm 0,5$
Maysky	750	42	5,60	$3,5 \pm 0,6$
Tersky	750	89	11,87	$4,6 \pm 0,8$
Zolsky	750	64	8,53	$3,2 \pm 0,5$
Baksansky	750	105	14,00	$4,3 \pm 0,6$
Urvansky	750	119	15,87	$5,2 \pm 0,7$
Leskensky	750	80	10,67	$5,8 \pm 0,9$
Chereksky	750	66	8,80	$6,1 \pm 0,7$
Chegemsky	750	93	12,40	$4,8 \pm 0,5$
Elbrussky	750	104	13,87	$7,0 \pm 0,8$
Nalchik	750	75	10,00	$6,6 \pm 0,7$
Chegem	750	83	11,07	$6,0 \pm 0,5$
Total:	9000	970	10,78	$4,94 \pm 0,65$

In Kabardino-Balkarian Republic, the incidence of people with ascariasis is low due to the planned anti-epidemic work (Rice. 1). At the same time, Kabardino-Balkarian can be attributed to risk regions, since the number of children, adults and migrants with ascariasis does not tend to decrease, but there is an increase in invasion during the year (Rice.1). The growth of the index of occurrence of ascariasis among children and migrants is alarming. Indices of ascariasis occurrence in the child population and migrants increased during the year by 2.8 times (Figure 1).

Soils of 12 districts and cities of the Kabardino-Balkarian Republic were also analysed for contamination with eggs of the ascariasis pathogen (*Ascaris lumbricoides*), the results of which are presented in Table 2. As can be seen, the soils of 12 districts and cities of the Kabardino-Balkarian Republic are contaminated by 14.00-30.67% (average, 21.72%) with eggs of the nematode *Ascaris lumbricoides*, which can be a factor in infecting people with ascariasis (Table 2).

**Table 2:** Results of monitoring the sanitary contamination of soils in settlements of the Kabardino-Balkarian Republic with eggs of the causative agent of ascariasis (*Ascaris lumbricoides*) (in absolute numbers and in %).

Districts	Soil samples studied	Number of soil samples with <i>Ascaris lumbricoides</i> eggs, %		<i>Ascaris lumbricoides</i> eggs were found in 1g of soil
Prokhladnensky	300	48	16,00	4,62±0,14
Maysky	300	60	20,00	4,85±0,16
Tersky	300	72	24,00	5,44±0,19
Zolsky	300	54	18,00	3,52±0,13
Baksansky	300	78	26,00	5,96±0,22
Urvansky	300	92	30,67	6,39±0,27
Leskensky	300	64	21,34	4,80±0,16
Chereksky	300	76	25,34	5,48±0,14
Chegemsky	300	54	18,00	4,36±0,12
Elbrussky	300	72	24,00	5,64±0,18
Nalchik	300	42	14,00	3,83±0,16
Chegem	300	70	23,34	5,49±0,18
Total:	3600	782	21,72	5,03±0,17

## Conclusion

When analyzing materials on the incidence of ascariasis in the population of Kabardino-Balkarian Republic, it showed that in 10 districts and 2 cities the index of occurrence of ascariasis in the population varied from 5.60 to 15.87%. The gradation of the abundance index of *Ascaris lumbricoides* eggs in human feces ranged from 2.9±0.5 to 7.0±0.8 ind. per 1 g of feces, on average 4.94±0.65 ind., which can provide a high level of soil contamination with eggs. In general, the epidemic situation of ascariasis in the subject can be attributed to relatively favorable. In the region, the incidence of people with ascariasis is low due to the planned anti-epidemic work. At the same time, the subject can be attributed to risk regions, since the number of sick children, adults and migrants does not tend to decrease, but there is an increase in invasion during the year. The growth of the index of occurrence of ascariasis among children and migrants is alarming. Indices of ascariasis occurrence in the child population and migrants increases during the year by 2.8 times. Soils in 10 districts and 2 cities are contaminated with eggs of *Ascaris lumbricoides* by 14.00-30.67% (average, 21.72%), which may threaten the possible infection of the population with ascariasis.

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## Conflicts of Interest

No Conflicts of Interest.

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