

# Arachnoentomoses of domestic carnivores and effectiveness of insacar total in dogs otodectosis

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**Abstract.** The research analyzes the epizootological features of arachnomyioses of domestic carnivores of different species on the territory of cities in the Middle Volga region. With varying degrees of extensive invasion, this group of diseases consisted of sarcoptic mange of dogs, ear mange of dogs and cats, demodectosis of dogs, notoedric mange of cats and aphanipterosis of animals. The authors studied the seasonal, age and breed dynamics of sarcoptic mange of dogs, notoedric mange of cats, demodectic mange of dogs and aphanipterosis of cats. The authors established the peaks of invasion in arachnomyioses of various species of domestic carnivores, identified the most vulnerable age groups of animals to diseases. The analysis of the breed predisposition of animals to this group of diseases and the distribution of sick animals by sex was carried out. It is established that arachnomyioses are characterized by regional epizootological features. A new drug Insakar Total C, developed by the staff of FGBNU FNC VIEV RAS (Moscow) for ear mange of dogs, was tested. The research was carried out on dogs of the shelter for homeless animals "Paw of Help" at the Ulyanovsk SAU. During the test, it was found that Insakar Total C shows 100% therapeutic effectiveness in ear mange of dogs of moderate severity. The use of the drug, according to the instructions and instructions, completely frees sick animals from ticks- ear mange. The research was carried out with the grant support of the Ministry of Agriculture of the Russian Federation.

## 1 Introduction

Currently, there is a tendency to increase the number of small domestic animals. Small domestic animals are susceptible to various diseases, including parasitic genesis. The increase in the population of domestic and uncared dogs and cats creates a tense epizootological situation for invasive diseases, both in urbanized territories and in rural areas [1].

Arachnomyioses occupy one of the dominant positions in the nosological profile of parasitoses. This is a group of diseases caused by parasitic arachnids and insects. The causative agents of these diseases are common in various climatic and geographical zones, and therefore, arachnomyiosis are widespread.

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The most common diseases from this group are sarcoptic mange of dogs, notoedric mange of cats, demodectic mange of dogs, ear mange of animals, flea dermatitis [2, 3].

According to Doronin M. V., the source of invasion in sarcoptic mange of dogs is mostly representatives of wild fauna-foxes, wolves. Wild foxes are most often invaded.

For a number of years, enzootic outbreaks of sarcoptic mange in the population of foxes, arctic foxes have been registered in Sweden, Germany, Poland, Czechoslovakia, Finland, Norway [4, 5].

Research aim: to study the epizootological features of arachnomyiasis of domestic carnivores in the territory of the Middle Volga region, to assess the therapeutic effectiveness of antiparasitic drug Insakar Total C in ear mange in dogs.

To achieve this aim, the following research tasks were formulated:

1. To analyze the nosological profile of arachnomyiasis of domestic carnivores in the territory of the Middle Volga region.
2. To study the epizootological features of the dominant invasions from the group of arachnomyiasis.
3. To assess the therapeutic effectiveness of Insakar Total K in ear mange of dogs.

## **2 Materials and methods**

The diagnosis of animal acaroses was carried out taking into account the clinical picture of the disease, followed by microscopy of scrapings from the affected areas of animal skin using the method of D. A. Priselkova.

Scraping in sick animals was taken from several areas of the affected skin, mainly on the border of the affected and healthy tissue. Then the contents of the scraping were placed on the watch glass, a double amount of kerosene was added by volume. The scraping crusts were thoroughly stirred with a dissecting needle. Crushed droplets were prepared from the obtained material, which were viewed under a small magnification of the "MIKMED-5" microscope. The diagnosis was considered established when ticks were detected in the contents of the scrape.

The sex-age, seasonal and breed dynamics of arachnomyiasis were studied by statistical analysis of data from outpatient journals of clinics for two years (2017-2020).

The main factors contributing to the occurrence of the disease are determined: the conditions of keeping animals that do not meet zoohygienic and veterinary requirements; nutritionally inferior animal feeding rations and their quality, free range.

The research was carried out on the basis of the Department of biology, ecology, parasitology, aquatic bioresources and aquaculture, the shelter for homeless animals "Paw of Help" of Ulyanovsk SAU and large veterinary clinics in a number of cities of the Middle Volga region – "Docto Zoo" (Ulyanovsk), "Pink Elephant" (Syzran), " ZooMir "(Saransk, Republic of Mordovia)," Zoo-paradise " Togliatti, veterinary clinic named after Popovs (Kazan, Republic of Tatarstan).

## **3 Results**

We analyzed the nosological profile of arachnomyiasis on the territory of the Middle Volga region. With varying degrees of extensive invasion, it was composed of the following diseases – sarcoptic mange, ear mange, demodectic mange, notoedric mange and aphanipterosis (table. 1).

At the next stage of our work, we studied the epizootological features of the dominant invasions on the territory of a number of cities in the Middle Volga region.

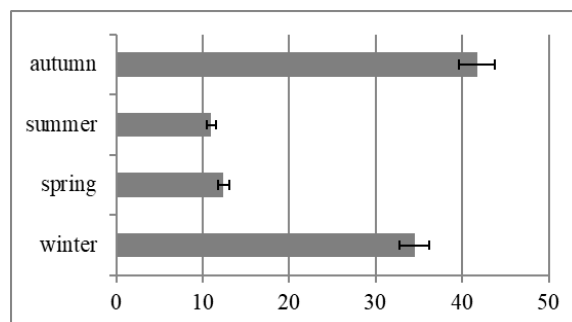
**Table 1.** Nosological profile of arachno myiosis of domestic carnivores.

№ п/п	Disease	Extensive invasion, %				
		Ulyanovsk	Syzran	Saransk	Toliatti	Kazan
1	Sarcoptic mange	43	7.4	20.7	9.8	4.3
2	Ear mange	18.75	14.8	43.3	27.8	9.8
3	Demodectic mange	12.5	22.2	7.5	10.7	35.2
4	Notoedric mange	18.7	12.6	37.3	12.3	11.3
5	Aphanipterosis	7.1	13.5	12.5	57.2	7.6

### 3.1 Epizootological features of sarcoptic mange of dogs in Ulyanovsk

Sarcoptic mange is characterized by seasonality. According to the literature data, in most cases, the autumn-winter peak of invasion is recorded. In the spring period, unfavorable abiotic environmental factors are formed for the development of sarcoptes ticks, as a result of which the number of sick animals is minimized [6, 7].

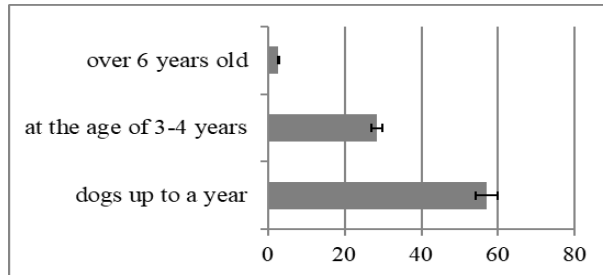
In order to study the epizootological features of sarcoptic mange of dogs in the territory of Ulyanovsk, we analyzed the data of outpatient journals of the clinic "Docto Zoo". We obtained the following results, the maximum extent of invasion of dogs by sarcoptes ticks was observed in the autumn-winter period. In autumn, the extent of invasion was 41.7% (figure 1). Obviously, this is due to changes in environmental conditions, the air temperature decreases, as a result of which, direct contact of animals with each other increases. In addition, as a rule, in the autumn-winter period, there is a decrease in the natural resistance of the animal body. It is also conditioned by the physiological characteristics of the dog's body. In winter, rut occurs in animals, the number of direct contacts between animals increases, which can also be one of the reasons for over-infection. In winter, the extent of invasion was 34.5%. In spring, the infestation of dogs with sarcoptes decreases to 12.4%. In the summer period, minimal indicators of the extent of invasion were noted (11%). This is due to the fact that the skin of animals is exposed to insolation, which has a detrimental effect on sarcoptes ticks.

**Fig. 1.** Seasonal dynamics of sarcoptic mange of dogs in Ulyanovsk.

An important component of the epizootology of sarcoptic mange of dogs is the age dynamics. This predetermined our further research.

We analyzed the age dynamics in sarcoptic mange of dogs. Conventionally, the animals were divided into three age groups. The first group consisted of dogs up to a year old, the second group included animals aged 3-4 years, the third group consisted of dogs older than

6 years. According to the results obtained, the maximum number of infected animals was registered in the first age group. The indicator of the extensiveness of the invasion was 57% (figure 2). The minimum number of sick animals was found in the age group older than six years – 2.7%. In animals of 3-4 years of age, the extent of invasion was 28.42%.



**Fig. 2.** Age dynamics of sarcoptic mange of dogs in Ulyanovsk.

During the analysis of the breed predisposition to sarcoptic mange in dogs, it was revealed that dogs of different breeds are equally susceptible to the pathogen. Males are invaded by sarcoptes ticks 1.5 times more often than females.

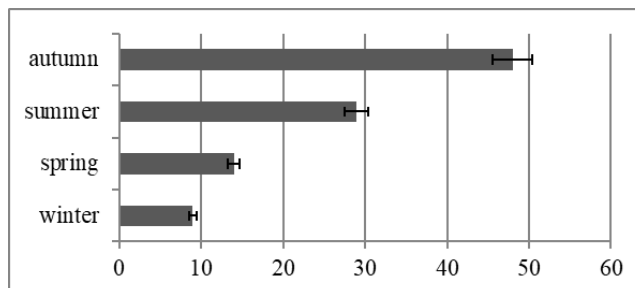
### 3.2 Epizootological features of aphanipterosis of cats in Togliatti

According to the research of a number of authors, the extensiveness of flea infestation in the winter season of the year is minimized. For the most part, dogs and cats are affected by fleas in the spring-summer season of the year [7, 8].

The results obtained by us when analyzing the seasonal dynamics of aphanipterosis in cats in the territory of Togliatti are consistent with the data of literary sources. The extensiveness of flea infestation reached a maximum in the spring-summer period.

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In winter, there was a minimal infection of cats with aphanipterosis. The indicator of the extensiveness of the invasion was 9%. By the spring, the indicator of the extensiveness of the invasion increased to 14% (figure 3).



**Fig. 3.** Seasonal dynamics of cat aphanipterosis in Togliatti.

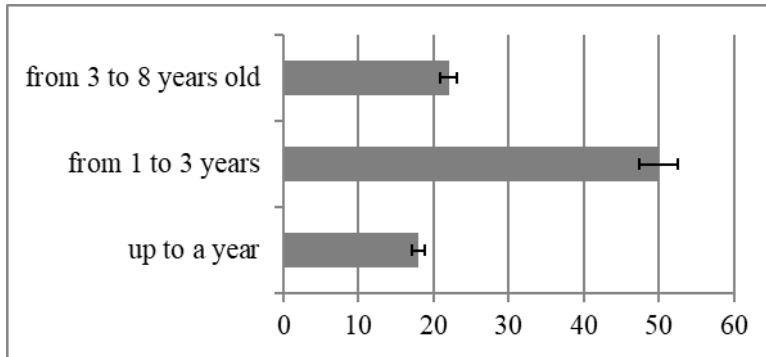
In order to analyze the age dynamics, we conducted a conditional division of cats into three age groups. The first group consisted of cats from birth to one year, the second group consisted of animals from 1 to 3 years old and the third group included cats from 3 to 8 years old.

According to the results obtained by us, the maximum invasion of fleas was observed in cats of the second age group. The indicator of the extensiveness of invasion was 50%. As a rule, during this period, animals are most active. Also, during puberty, a greater number of contacts with other animals, including neglected ones, are registered.

Minimal invasiveness was registered in kittens from birth to a year (18%).

The indicator of invasion extent in the age group from 3 to 8 years was 32%.

The results obtained by us on the age dynamics of aphanipterosis agree with the data obtained by Zhemchueva G. V. (figure 4).



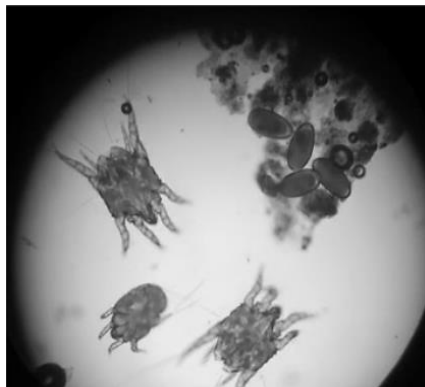
**Fig. 4.** Age dynamics of cat aphanipterosis in Togliatti.

Due to the fact that arachno myiosis of domestic carnivores are quite widespread in the Russian Federation, as well as in cross-border territories, the problem of finding highly effective drugs for their treatment is very relevant [9].

We analyzed the therapeutic efficiency of Insacar Total C in ear mange of dogs.

The preparation Insakar Total C was developed by employees of FGBNU FNC VIEV RAS (Moscow).

In order to study the therapeutic effectiveness of preparation, two groups of dogs were formed – an experimental and a control group of 10 individuals each. For the treatment of dogs of the experimental group, Insacar Total C was used. Dogs of the control group were treated with distilled water.



**Fig. 5.** *Otodectes cynotis* ticks in the field of vision of the microscope

The dogs of experimental group showed the following signs of ear mange– the accumulation of a large number of dark brown crusts in the external auditory canal, itching, scratching in the area of the auricles. The animals showed discomfort.

All sick animals except for clinical examination were subjected to laboratory examination for ear mange by taking a scrape from the affected areas with subsequent microscopy (figure 5).

Before the introduction of the drug, we performed the dressing of the external auditory canal of sick dogs by irrigation with hydrogen peroxide, followed by the removal of crusts and scabs.

After that, 4 drops of the drug were instilled into each ear, then the auricle was massaged. The remnants of drug were applied to skin between the shoulder blades. The treatment of sick dogs was carried out twice with an interval of 10 days.

During the study of therapeutic efficiency of drug Insacar Total C in ear mange of dogs, the following results were obtained. Double application of the drug Insakar Total C allowed to completely free the animals from otodectos ticks. During the control acarological examination of animals of the experimental group of otodectos mites and their eggs, no scraping was found in the biomaterial. Thus, the extensefficiency of the drug with a double application was 100%.

## **4 Discussion**

Sarcoptic mange of dogs is one of the most common diseases from the group of arachno myiosis. Young and old animals with a low immune status are most often affected. The disease is more common among young animals, aged 1-4 months, in autumn and winter [10].

In our case, during the study, young animals with weakened resistance of the body were more often met. The maximum invasion of sarcoptic mange was observed in dogs aged from birth to one year (EI 57,0%).

According to the results, which we have obtained, we have not revealed a breed prepossession to sarcoptic mange in dogs. In terms of sexual prepossession, it should be noted that males are 1.5 times more likely to become infected with sarcoptic mange than females.

According to Eckert, itchy scabies is widespread everywhere in Europe, in particular, it occurs in Poland, Denmark, Yugoslavia, Russia [11]. G. N. Gerasimova with joint authors noted that 3.7% of dogs and 63% of cats (among animals with skin diseases) were affected by itchy scabies in Omsk.

The epizootic state of parasitic diseases of dogs in large cities remains complex and tends to become worse.

Aphanipteroses in cats are a fairly common parasitosis, but, despite this, the epizootological features of this disease have not been sufficiently studied [12].

The deterioration of the epizootic situation for arachno myiosis of domestic carnivores in large cities indicates that favorable conditions for the vital activity of pathogens of these diseases are developing in urbanized territories. In this regard, the study of epizootological features of arachnomyiosis and the search for new means for their treatment has an undoubted practical significance.

## 5 Conclusions

The nosological profile of arachnomyiasis in the territory of the Middle Volga region is represented by the following diseases – sarcoptic mange, ear mange, demodectic mange, notoedric mange and aphanipterosis

Seasonal and age dynamics of arachnomyiasis are characterized by regional features.

The antiparasitic drug Insakar Total C shows 100% effectiveness in ear mange of dogs.

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