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Prevalence of Demodicosis of Dogs in Some Districts of Yerevan

L.G. Grigoryan, A.R. Hakobyan, H.S. Balasanyan, V.V. Grigoryan

Research Center of Veterinary Medicine and Veterinary Sanitary Examination, ANAU

lianagrigoryan7878@mail.ru, akobian.anush@yandex.ru, nanar.balasanyan.s@gmail.com, grigoryanvgv@mail.ru

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ABSTRACT

In recent years, the successful development of dog breeding in Armenia has been hindered by various diseases, the most common of which is demodicosis. The spread of the demodicosis invasion in Yerevan is mainly due to the uncontrolled breeding of dogs, violation of sanitary and hygiene rules for dog rearing, and unauthorized sale and purchase of dogs. Lack of information about the disease among the dog owner and breeders is another important reason for the spread of the disease.

Demodicosis in dogs proceeds with certain variations. The extent of invasion in autumn was 51.7 %, in spring – 34 %, in winter – (32.2 %), and in summer it was 18.5 %. The relatively low temperature of the external environment and the high relative humidity of the air are probably favorable conditions for the reproduction, growth, and development of causative agents of demodicosis in dogs.

Studies have shown that the highest degree of demodicosis was observed among maternal livestock, and animals older than three months. The lowest degree of disease damage was observed in puppies up to three months old.

Introduction

Dog invasive diseases of, both worldwide and in the Republic of Armenia, demodicosis is characterized by high prevalence. The first information about pathogenic mites – the causative agents of demodicosis, is found in Homer works (800 BC). Drawings with images of mites were found on the walls of Egyptian tombs. This indicates that a person has been familiar with pathogenic animal mites and the peculiarities of their structure since ancient times. In his book “The History of Animals” Aristotle described the mites that lived on dogs, suggesting using sulfur to destroy the latter (Naghashyan, 2003).

According to Dabry and Wolff (1899), mites of the genus Acarus were known to the Chinese 400 years ago. In the 20th century, comparative and evolutionary arachnology was studied by Balashov, Lange, and many other scientists (Naghashyan, 2003).

The causative agents of demodicosis of dogs and humans belong to the order Acariformes, which, in turn, is divided into subtypes Sarcoptiformes, Trombidiformes, and Oribatida. The Trombidiformes subtype includes many free-living and parasitic mites and the causative agent of demodicosis in dogs Demodex canis (Naghashyan, 2003).

In the city of Tyumen of the Russian Federation, according to the data of surveys conducted at different times of the year, demodicosis of dogs was recorded in the following percentage: in winter – 16.2 %, in spring – 23.7 %, in summer – 38.6 %, and in autumn it was 21.5 %. Infected dogs mainly have lesions of the skin of the eyelids, cheeks, lips, lower jaw, head, neck, chest, front, and hind limbs (Korotaeva, 2005). The results of epizootological studies of demodicosis of dogs conducted in 2011 in Moscow indicate a high degree of infection – 37.1 %. (Yarovaya, 2011). The high degree of infection in March-April and October-November is a consequence of a decrease in the general nonspecific resistance of animals in transitional seasons (Kataeva and Kostyleva, 2008). Outside the host body at a temperature of 18-20 ºC and relative humidity of 90 %, the mites remain viable for 9 days (Krasev, et al., 2004).

Animals infected with demodicosis have itching, which is why they rub the affected parts of the body against various objects, scratch themselves with their limbs, and bite the affected areas of the body, thereby contributing to the appearance of wounds seeded with a second pathogenic microflora. Studies have shown that milk production decreases by 12-20 % in cows affected with demodicosis. In heifers and bulls affected with demodecosis, there is poor growth, weight loss, and even death (Akbaev, et al., 2016). Also, in the blood picture of sick animals, there is a decrease in the hemoglobin content and the number of red blood cells (Romensky, 2001).

The causative agent Demodex canis occurs mainly in dogs, but in some cases, it is transmitted to humans through contact with a sick animal. In puppies infected by mothers during feeding, the mouth area, eyes, and forelimbs are affected (Romanina, 2014).

For the diagnosis of demodectic disease, deep skin scrapings are necessary, and in rare cases, a skin biopsy is performed. Immune suppression caused by endoparasitism or malnutrition in young dogs and endocrine diseases, neoplasms, and chemotherapy in older dogs are considered predisposing factors and should be diagnosed and treated to optimize therapeutic outcomes (Mueller, et al., 2012).

Based on various studies it can be inferred that demodicosis is widespread all over the world but data on scabies is still scanty and more detailed studies are required. The work aims to find out the prevalence of dog demodicosis in some communities of Yerevan, taking into account the seasonality, age group of animals, conditions of care, and behavior.

Materials and methods

The study was conducted in 2021-2022 at the Veterinary Medicine and Veterinary Sanitary Examination Research Center laboratory of the Armenian National Agrarian University.

The diagnosis of demodicosis in dogs was made based on epizootological data, clinical signs, and results of generally accepted methods of laboratory examination of scrapings taken from the affected areas of the skin which are used in the diagnosis of demodicosis in dogs (Naghashyan, et al., 2016). The prevalence of demodicosis of dogs was studied within the city of Yerevan, taking into account factors such as animal habitats, time of year, and age of dogs.

The clinical expression of canine demodicosis was studied in dogs belonging to different age groups infected with demodectic ticks. A total of 161 clinical experiments were performed on domestic, yard, and stray dogs. The study of clinical signs of demodicosis was carried out by observation and palpation methods of skin and hair. During the experiment, attention was paid to clinical signs, such as the absence of hair, tousled hair, lack of hair luster, lack of skin elasticity, flaking of the skin, thickness, and presence of lumps and bumps.

The diagnosis of demodicosis was confirmed when eggs, larvae, pupae, as well as mature mites or their body parts, were detected by microscopy of preparations prepared from skin scrapings taken from the affected areas of the body. However, the absence of mites in the preparations in the presence of specific clinical signs of the disease does not exclude the possibility of their presence in the animal's skin. Therefore, repeated sampling of clinically ill animals under control was carried out after 5-10 or 15-20 days (Naghashyan, et al., 2016).

Results and discussions

The result shows that in Malatia-Sebastia, Shengavit, and Ajapnyak communities, the infection rate in autumn was 51.75 %, in spring – 34 %, in winter – 32.2 %, and in summer it was 18.5 %. It can be concluded that demodicosis in dogs showed certain fluctuations. Demodex canis penetrates hair follicles of the skin, and the ducts of the sebaceous and sweat glands, multiplies rapidly, and stay protected from the influence of environmental factors.

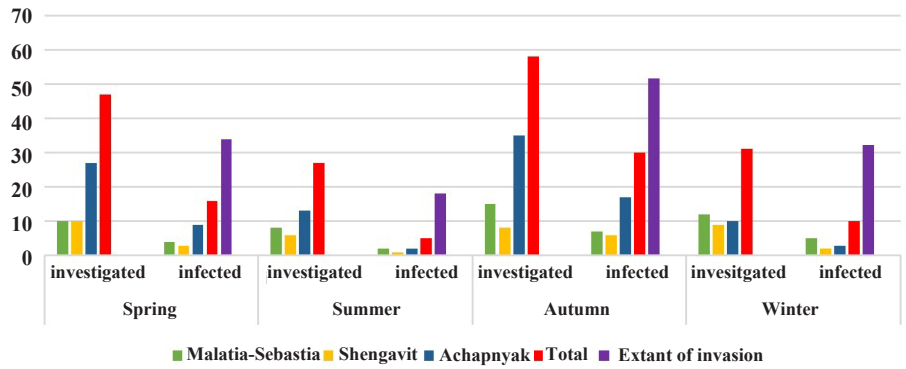

Figure. Summarized data on the prevalence of demodicosis of dogs according to the time of the year in different administrative districts of Yerevan *(composed by the authors)*.

Table. The prevalence of demodicosis of dogs in some administrative districts of Yerevan, according to the age of the animals*

Communities	Maternal livestock		Up to three months		Older than three months	
	Investigated (head)	Infected (head)	Investigated (head)	Infected (head)	Investigated (head)	Infected (head)
Malatia-Sebastia	15	7	10	2	20	8
Shengavit	10	4	7	1	14	3
Ajapnyak	30	14	12	3	43	15
Total	55	25	29	6	77	26
The extent of the invasion (%)	-	45.5	-	20.7	-	33.8

*Composed by the authors.

Picture. Dog with demodicosis.

The data on the extensiveness of dogs' infection level with demodicosis in some communities of Yerevan, according to the age of the animals are shown in Table.

The degree of demodicosis manifestation in dogs of different age groups had the following percentage ratio: in the communities of Malatia-Sebastia, Shengavit, and Ajapnyak, the extensiveness of the disease in maternal livestock was 45.5 %, in under three months old puppies 20.7 %, and in older than three months old puppies it was 33.8 %. The intensity of demodectic infestation was highest in the maternal population, lowest in pups under three months old, and relatively lower in animals over three months old. This prevalence of demodicosis, depending on the age of infected animals, is obviously due to the

frequent movement of maternal livestock, males, and dogs older than three months, contributing to numerous contacts between healthy and sick animals.

Puppies up to three months old are infected by their mothers during the period of milk nutrition by contact with the mother's breast. For this reason, puppies of this age initially have lesions in the mouth area then spread to other parts of the body.

Conclusion

1. Demodicosis in dogs proceeds with certain variations. The invasion intensity was in autumn – 51.7 %, in spring – 34 %, in winter – 32.2 %, and in summer – 18.5 %. The relatively low temperature of the external environment and the high relative humidity of the air are probably favorable conditions for the reproduction, growth, and development of causative agents of demodicosis in dogs.
2. In Yerevan, demodicosis of dogs occurs regardless of the time of year and hygienic conditions of keeping animals. The manifestation of demodicosis according to age groups had the following picture: in Malatia-Sebastia, Shengavit, and Ajapnyak communities, the prevalence of infection in mothers was 45.5 %, in puppies up to three months old – 20.7 %, and in dogs over three months old it was 33.8 %.

Studies have shown that the highest degree of demodicosis was observed among maternal livestock, and animals older than three months. The lowest degree of disease effect was observed in up to three months old puppies.

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