

Peculiarities of dog infestation with pathogens of otodectosis and sarcoptic mange across different breeds

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Article info

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Sarcoptic mange and otodectosis are ectoparasitic diseases caused by mites of the genus *Otodectes* and *Sarcoptes*, which are characterized by skin lesions and can infest domestic dogs. Sarcoptic mange and otodectosis are accompanied by itching at the place of mites' localization, the appearance of alopecia, erythema, papules, pustules and crusts on the skin. The pathogens can parasitize in humans, and the most common manifestation is temporary dermatitis. Therefore, monitoring studies on otodectosis and sarcoptic mange are important for both animal and human health. The aim of the study was to determine the peculiarities of infesting dogs of different breeds with the pathogens of otodectosis and sarcoptic mange. The research was conducted in the laboratory of the Department of Parasitology and Veterinary and Sanitary Expert Examination of Poltava State Agrarian University and in private clinics of veterinary medicine (city of Poltava). By the conducted studies it has been found that the average prevalence of otodectosis invasion in dogs makes 17.6 %. The highest values of the prevalence of infection and percentage of diseased dogs from the total number of infested animals were found in English cocker spaniels (EI – 32.0 %, 30.9 % – of the diseased dogs) and dachshunds (29.4 and 19.2 %). Mixed breeds and non-pedigree dogs (12.1 and 30.8 %), German shepherd dogs (9.5 and 7.7 %), French bulldogs (7.1 and 3.8 %), Labradors (4.8 and 3.8 %) and golden retrievers (8.3 and 3.8 %) were less infested with otodectes. The average prevalence of sarcoptic infection in dogs makes 9.6 %. The highest values of animal infestation were found in German shepherd dogs (EI – 19.1 %, 21.0 % – of the diseased dogs), Dobermans (16.7 and 5.3 %), Rottweilers (12.5 and 5.3 %), golden retrievers (16.7 and 10.5 %), as well as mixed breeds and non-pedigree animals (15.5 and 47.3 %). French bulldogs (EI – 12.5 %, 5.3 % – of the diseased dogs) and dachshunds (5.9 and 5.3 %) were less infested with sarcoptes. The obtained results will allow us to take into account the peculiarities of infecting dogs of different breeds with the pathogens of otodectosis and sarcoptic mange during conducting diagnostic and preventive measures.

Keywords: parasitology, otodectosis, sarcoptic mange, dogs, breed susceptibility, infestation rates.

Особливості інвазування собак різних порід збудниками отодектозу та саркоптозу

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Саркоптоз та отодектоз – це ектопаразитарні захворювання спричинені кліщами роду *Otodectes* та *Sarcoptes*, які характеризуються ураженням шкіри і можуть інвазувати домашніх собак. Саркоптоз та отодектоз супроводжуються свербіжем у місці локалізації кліщів, появи алопецій, еритеми, папул, пустул та кірочок на шкірі. Збудники можуть паразитувати у людей, причому найпоширенішим проявом є тимчасовий дерматит. Тому, проведення моніторингових досліджень щодо отодектозу та саркоптозу має важливе значення як для здоров'я тварин, так і для людей. Метою досліджень було встановити особливості інвазування собак різних порід збудниками отодектозу та саркоптозу. Дослідження проводили на базі лабораторії кафедри паразитології та ветеринарно-санітарної експертизи Полтавського державного аграрного університету та в умовах приватних клінік ветеринарної медицини (м. Полтава). Проведеними дослідженнями встановлено, що середня екстенсивність отодектозної інвазії у собак становить 17,6 %. Найбільші значення екстенсивності інвазії та відсотка хворих собак від загальної кількості інвазованих тварин виявлено у англійських кокер-спанієлів (EI – 32,0 %, 30,9 % – від хворих собак) та такс (29,4 та 19,2 %). Менш інвазованими отодектесами були метиси та безпородні собаки (12,1 та 30,8 %), німецькі вівчарки (9,5 та 7,7 %), французькі бульдоги (7,1 та 3,8 %), лабрадори (4,8 та 3,8 %) та золотисті ретривери (8,3 та 3,8 %). Середня екстенсивність саркоптозної інвазії у собак становить 9,6 %. Найбільші значення інвазованості тварин виявлено у німецьких вівчарок (EI – 19,1 %, 21,0 % – від хворих собак), доbermanів (16,7 та 5,3 %), ротвейлерів (12,5 та 5,3 %), золотистих ретриверів (16,7 та 10,5 %) та метисів і безпородних тварин (15,5 та 47,3 %). Менш інвазованими саркоптесами були собаки порід французький бульдог (EI – 12,5 %, 5,3 % – від хворих собак) та такса (5,9 та 5,3 %). Отримані результати дозволять враховувати особливості зараження собак різних порід збудниками отодектозу та саркоптозу під час проведення діагностичних та профілактичних заходів.

Ключові слова: паразитологія, отодектоз, саркоптоз, собаки, породна сприйнятливості, показники інвазованості.



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Introduction

The *Otodectes cynotis* mite species is widespread throughout the world, and highly contagious among dogs, it is especially spread among young animals, as older ones can develop immunity against this parasite. The cat is the natural reservoir of the mite and functions as a source of infestation for dogs and other animals. This parasite feeds on epithelial residues and tissue fluids on the surface of the external auditory canal and the skin near it, causing severe irritation and, as a result – external otitis [1–5].

Scientific literature indicates a considerable spread of otodectosis among dogs in different countries of the world [6]. For example, in Brazil, a significant spread of *O. cynotis* invasion among dogs was found, where the prevalence of infection makes 33.3 % [7]. Acarological and coproovoscopic studies of dogs were conducted in the clinic of Cairo University. Mono-specific invasion of *O. cynotis* was detected in 7.17 %, and mixed invasions caused by simultaneous parasitizing of otodectes and mites of the genera *Sarcoptes*, *Demodex*, *Dermatophytes* fleas, toxascarises, toxocarises, cestodes of the genus *Dipylidium* and protozoa of the genus *Isospora* were detected in 4.48%. Moreover, the highest level of invasion was found in young dogs, and the lowest one in adult dogs [8].

In a study of scholars in Greece, 25 (4.3 %) of 581 examined dogs were positive to *O. cynotis*, of which 18 (4.65 %) were ≤3 months of age and 7 (3.61 %) were between 3 and 6 months of age. The mean *O. cynotis* infestation intensity made 22.12 mites/dog. A significantly higher overall spread of *O. cynotis* infection (8.40 %) was found in puppies from kennels/shelters than in puppies owned by clients (0.94 %) [9].

The mites of the species *Sarcoptes scabiei* var *canis* are the causative agents of sarcoptic mange, which can infect humans and animals. The parasite penetrates deep into the epidermis, causing intensive itching, inflammation, and in some cases the upsetting of the skin barrier, and in weakened young animals – lethality. Sarcoptic mange has been identified in at least 12 orders, 39 families, and 148 species of domestic and wild mammals, making it one of the most important ectoparasites in the recent decades [10–14].

The scientific literature indicates a significant spread of sarcoptic mange among dogs in various countries of the world [6]. A study was conducted to determine the status of ectoparasites infecting dogs in Shimoga region of India. A total of 120 dogs with skin pathology were examined for the presence of ectoparasites. Among 59 infected domestic dogs, 7 (11.8 %) were positive to sarcoptic mange and 3 (5.0 %) to demodicosis. The species of mites infecting dogs were identified as *S. scabiei* and *Demodex canis* based on morphological characteristics. The spread of ectoparasites was higher in free roaming and adult dogs compared to domestic dogs and puppies, respectively [15].

On the territory of Iran, dogs were infested with *S. scabiei* var. *canis* and *O. cynotis*, with prevalence rates of 42 (29.4 %) and 37 (25.9 %), respectively. Mixed invasions with two or more ectoparasites were

detected in eight dogs (5.6 %). Moreover, *S. scabiei* var. *canis* mites (33.3 %) predominated in winter [16].

The aim of the study

Therefore, the purpose of the study was to establish the peculiarities of infesting dogs of different breeds with the pathogens of otodectosis and sarcoptic mange.

Materials and methods

The research was conducted during 2023–2025 in the laboratory of the Department of Parasitology and Veterinary and Sanitary Expert Examination of Poltava State Agrarian University and in the private veterinary clinic “Vet Help” (city of Poltava).

The study of the spread of otodectosis and sarcoptic mange was carried out based on the results of acarological studies of dogs of different breed groups (utility, hunting, decorative) groups, as well as mixed breed and non-pedigree animals. Acarological studies of skin scrapings were conducted by a well-known method (the method of using a bischofite-glycerin mixture) [17]. According to this method, the scrapings were placed in a laboratory cup or on a glass slide and a drop of a diluted mixture of bischofite and glycerin (ratio 1 : 1) was added. Using a dissecting needle, the crusts or scrapings were crushed and left for 1–2 min. After that, the obtained material was examined under a microscope.

The acariasis infestation rates (EI, %) and the percentage of the total number of infected animals were determined. A total of 198 dogs were examined.

Results and discussion

By the conducted studies it has been determined that the average prevalence of otodectosis invasion in dogs makes 17.6 %. Moreover, concerning the breeds, it was found that the highest values of the prevalence of the infection and the indicators of the number of the diseased dogs from the total number of infected animals were found in English cocker spaniels (EI – 32.0 %, 30.9 % – of the diseased dogs) and dachshunds (29.4 and 19.2 %, respectively) (**Table 1**, **Fig. 1**).

Table 1
Infestation rates of dogs of different breeds with *Otodectes cynotis*

Breed of dogs	Studied animals, <i>n</i>	Infested animals, <i>n</i>	EI, %
German shepherd	21	2	9.5
English cocker spaniel	25	8	32.0
French bulldog	14	1	7.1
Dachshund	17	5	29.4
Labrador	21	1	4.8
Doberman	6	0	0.0
Rottweiler	8	0	0.0
Dalmatian	16	0	0.0
Golden retriever	12	1	8.3
Mixed breed and non-pedigree	58	8	12.1
Total	198	26	17.6

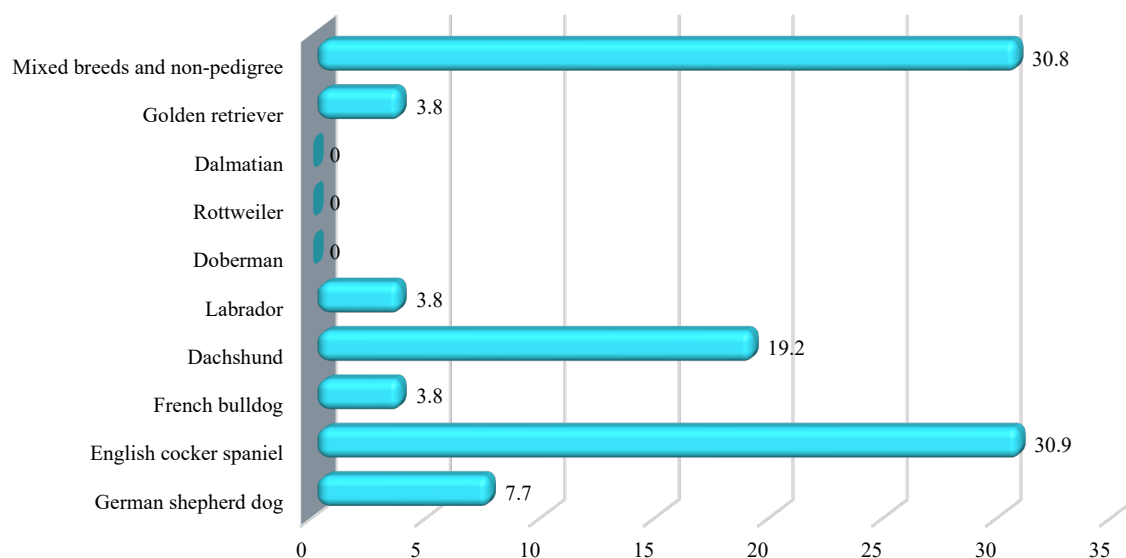


Fig. 1. Indicators of infesting dogs of different breeds with the pathogen of otodectosis, % (N = 26)

Mixed breeds and non-pedigree dogs were less infected with otodectes (EI – 12.1 %, 30.8 % – of the diseased dogs). Otodectosis was diagnosed less frequently in the dogs of German shepherd breed (9.5 and 7.7 %, respectively), French bulldog (7.1 and 3.8 %, respectively), Labrador (4.8 and 3.8 %, respectively) and golden retriever (8.3 and 3.8 %, respectively). Otodectosis invasion was not detected in the dogs of Rottweiler, Doberman and Dalmatian breeds.

At the same time, the average prevalence of sarcoptic invasion in dogs makes 9.6%. Concerning the breeds, it was found that the highest values of animal infestation were found in German shepherds (EI – 19.1 %, 21.0 % – of the diseased dogs), Dobermans (16.7 and 5.3 %, respectively), Rottweilers (12.5 and 5.3 %, respectively), golden retrievers (16.7 and 10.5 %, respectively) as well as in mixed breed and non-pedigree animals (15.5 and 47.3 %, respectively) (**Table 2**, **Fig. 2**).

Table 2

Infestation rates of dogs of different breeds with *Sarcoptes scabiei* var. *canis*

Breed of dogs	Studied animals, n	Infested animals, n	EI, %
German shepherd	21	4	19.1
English cocker spaniel	25	0	0.0
French bulldog	14	1	7.1
Dachshund	17	1	5.9
Labrador	21	0	0.0
Doberman	6	1	16.7
Rottweiler	8	1	12.5
Dalmatian	16	0	0.0
Golden retriever	12	2	16.7
Mixed breed and non-pedigree	58	9	15.5
Total	198	19	9.6

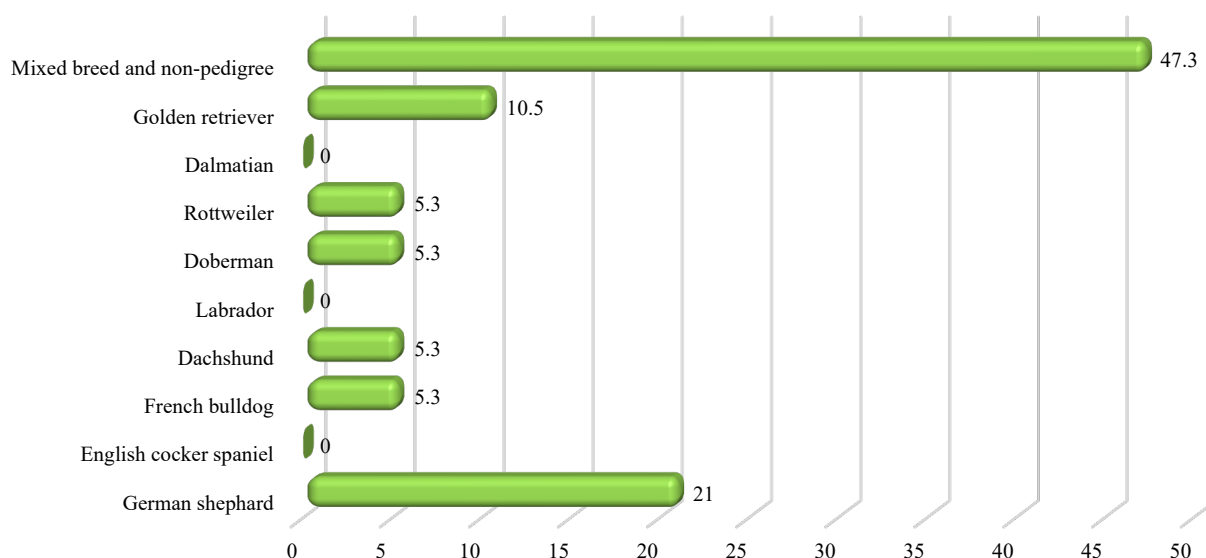


Fig. 2. Indicators of infecting dogs of different breeds with the causative agent of sarcoptic mange, % (N = 19)

The dogs of the following breeds were less infected with sarcoptic mange: French bulldog (EI – 12.5 %, 5.3 % – of the diseased dogs) and dachshund (5.9 and 5.3 %, respectively). Sarcoptic invasion was not detected in Dalmatian, Labrador and English cocker spaniel breed dogs.

Acariases such as sarcoptic mange and otodectosis are among the most spread skin diseases in dogs caused by acariform mites. These are zoonotic diseases of dogs caused by mites of the genus *Sarcoptes* and *Otodectes* [1, 3, 5, and 18]. Scientists note that in order to achieve a better understanding of the epizootic process of acariases caused by acariform mites, it is necessary to know the factors that can contribute to the transmission of parasitic pathogens, their reproduction and preservation in the biotope [19, 20]. Therefore, we conducted the study of the peculiarities of infesting dogs of different breeds with the pathogens of otodectosis and sarcoptic mange.

By the conducted research it has been found that the average prevalence of otodectose invasion in dogs makes 17.6 %. The highest values of the prevalence of infection were found in English cocker spaniels (32.0 %) and dachshunds (29.4 %). The least infested dogs with otodectes were mixed breeds and non-pedigree dogs (12.1 %), German shepherds (9.5 %), French bulldogs (7.1 %), Labradors (4.8 %) and golden retrievers (8.3 %). The average prevalence of sarcoptic invasion in dogs makes 9.6 %. The highest values of the prevalence of infection were found in German shepherds (19.1 %), Dobermans (16.7 %), Rottweilers (12.5 %), golden retrievers (16.7 %) as well as mixed breeds and non-pedigree animals (15.5 %). The dogs less infested with sarcoptes were of the French bulldog (12.5 %) and dachshund breeds (5.9 %) [8].

Ukrainian scholars also note a certain breed susceptibility of dogs to acariasis pathogens. In particular, according to the results of their studies, mixed breed dogs are most of all infected with otodectes (30.3 %), less often – decorative breed dogs (16.8 %), namely: French bulldogs (26.23 %), poodles (22.95 %), shih tzu (22.22 %), chow chow (20 %), as well as non-pedigree animals (12.1 %). Dogs of hunting (13.1 %) and utility (10 %) breeds were most often infected with sarcoptic mange, namely: Jack Russell terrier, Basset hound, cocker spaniel (31.25–33.33 %) and Siberian husky, and Alaskan malamute (50 %) [21].

The obtained results will allow us to take into account the peculiarities of infecting dogs of different breeds with the pathogens of otodectosis and sarcoptic mange when conducting diagnostic and preventive measures.

Conclusions

By the conducted studies, it has been found that the average prevalence of otodectose and sarcoptic invasions in domestic dogs is 17.6% and 9.6 %, respectively. The most infested breeds with otodectosis were English cocker spaniels (EI – 32.0 %) and dachshunds (29.4 %). The most infested breeds with sarcoptic mange were German shepherds (EI – 19.1 %), Dobermans (16.7 %), Rottweilers (12.5 %), golden retrievers (16.7 %), as well as mixed-breed and non-pedigree dogs (15.5 %).

DECLARATIONS

Ethical Statement

The authors declare that all manipulations and diagnostic procedures on animals were conducted in strict accordance with the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes (Strasbourg, 1986), national ethical standards, and international guidelines for animal welfare.

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Conflict of interest

The authors state that there is no conflict of interest.

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Declaration of AI and AI-assisted technologies

The authors declare that no artificial intelligence or AI-assisted technologies were used in the preparation of this manuscript.

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