Original Article

Ectoparasites of Stray Dogs in Mazandaran, Gilan and Qazvin Provinces, North and Center of Iran

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Abstract

Background: The aim of the present study was to determine the prevalence of ectoparasite infestations in stray dogs in Mazandaran, Gilan and Qazvin Provinces in fall and winter in 2013(December to March).

Methods: Seventy dogs in 2013, from these Provinces were examined for ectoparasite infestation and diagnosis of them based on parasitological methods and identification keys was done.

Results: The rate of infestation in these areas was 100%, 68.5% and 93.3% respectively. Fleas were the most common ectoparasites on dogs in this study followed by lice, ticks, flies and mites respectively. The isolated arthropods were fleas in 77.5%, lice in 50%, ticks in 8.6%, flies in 6.8% and mites in 5.1% of infested dogs. The ectoparasite of the dogs included 4 flea species: *Ctenocephalides canis* (29.8%), *C. felis* (19.9%), *Pulex iritans* (2.9%) and *Xenopsiella cheopis* (0.7%), 1 louse species: *Trichodectes canis* (41.3%), 1 tick species: *Rhipicephalus sanguinus* (0.7%), 1 fly species: *Hippobosca* sp. (1.1%) and 1 mite species: *Sarcoptes scabiei* (3.6%).

Conclusion: Fleas and lice were the most common ectoparasites in stray dogs of the studied area. Some ectoparasites transmit important human disease, therefore regular monitoring of them is a major concern to control the arthropods and arthropods-borne diseases.

Keywords: Ectoparasite, Stray dogs, Mazandaran, Iran

Introduction

Ectoparasites are important cause of pruritic and non-pruritic skin disorders in dogs and can cause hypersensitivity or death depending on the host nutritional and immunological condition and intensity of parasitic infestation. Ectoparasites play an important role not only as pests but also as vectors of various infectious diseases of humans, livestock, pets and wild animals. They can transmit different pathogens like viruses, bacteria, protozoa or act as intermediate hosts for filarids and cestodes (Fuehrer et al. 2012).

Ticks, after mosquitoes, are the second most important arthropods that may transmit pathogens to animals and human beings. Moreover, fleas can transmit pathogens, such as the agent of flea-born rickettsioses, murine typhus and bubonic plague. They can also serve as intermediate hosts for some species of cestodes (Xhaxhiu et al. 2009).

Chewing lice are active arthropods that can produce intense irritation with secondary bacterial infections (Wall et al. 1997, Jafari shoorijeh et al. 2008). *Trichodectes canis* are highly host specific, but they can act as an intermediate host for *Dipylidium caninum* that may affect humans, especially children (Scott et al. 2001, Mosallanejad et al. 2011).

Some studies regarding etoparasites on dogs have been done in Iran (Shoorijeh et al. 2008, Mosallanejad et al. 2011, Jamshidi et al. 2012, Bahrami et al. 2012) but information about ectoparasites on stray dogs is still lacking.

The aim of this study was to determine the prevalence of ectoparasite infestations in

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stray dogs in Mazandaran, Gilan and Qazvin Provinces, Iran.

Materials and Methods

Seventy stray dogs were inspected from December to March 2013, for the presence of ectoparasites in Mazandaran, Gilan and Qazvin Provinces, Iran.

Their sex and age were recorded. The age was estimated by dental formulary. The studied animals were divided into three groups based on the age (<3, 3–5 and >5 years old). The body of the dogs was completely examined and the ectoparasites were removed by using forceps, combing or brushing from the animals and stored in 70% ethanol.

Areas of the skin with dermatologic lesions were scraped deeply with an oily scalpel blade until capillary bleeding was visible. Deep otic swab specimens were obtained from all dogs for detection of ear mite. Skin scrapings and ears swabs were placed in 10% potassium hydroxide and gently heated for 30 min. Then, the material was centrifuged, and the sediment was microscopically examined for mites.

The ectoparasite species were identified under a stereomicroscope, according to the identification keys (Hopkins and Rothschild 1953, Smit. 1958, Benton 1980, Wall and Shearer 2001).

Data analysis

A chi-square test was used to determine any significant associations between rate of infestation and age and sex. Analyses were conducted using SPSS software version 16 (Chicago, IL, USA) with a probability (P) value of <0.05 as statistically significant.

Results

Fifty-eight out of 70 examined dogs (82.8%) were positive for ectoparasites. The rate of infestation in Qazvin, Gilan and Mazandaran Provinces were 100%, 68.5% and 93.3% respectively. Fleas were the most common ectoparasites on dogs in this study. The isolated arthropods were fleas in 45 (77.5%), lice in 29 (50%), ticks in 5 (8.6%), flies in 4 (6.8%) and mites in 3 (5.1%) infested dogs (Table 1). In this survey, 4 species of flea consist of *Ctenocephalides canis* (29.8%), *C. felis* (19.9%), *Pulex iritans* (2.9%) and *Xenopsiella cheopis* (0.7%), one species of louse, tick, fly and mite including: *Trichodectes canis* (41.3%), *Rhipicephalus sanguinus* (0.7%), *Hippobosca* sp. (1.1%) and *Sarcoptes scabei* (3.6%) were found, respectively (Table 2).

Triple infestation was observed in 8.6% of the infested dogs (40% of these with Flea+lice+tick, 40% with Flea+lice+fly and 20% with Tick+lice+mite). 39.6% of dogs exhibited double infestation (73.9% of these with lice+fleas, 8.7% with ticks+lice, 8.7% with fleas+flies and 8.7% with fleas+mites). 51.8% presented single infestations with lice or fleas. The analysis of different infestation types showed that the most of these hosts had single infestation, followed by double and triple infestation.

The mean number of fleas, lice, ticks, flies and mites on each infested dogs was 9.9, 11.9, 1.2, 2.5 and 10, respectively.

According to the host age, the highest prevalence of infestation was observed in <3 years old (88%) followed by 3-5 (77.7%) and >5 years old (70.5%), however no significant differences were observed between infestation rate and age groups of dogs (P= 0.267).

Ectoparasitic infestations were recorded on 33 male dogs (89.1%) and 25 female dogs (75.7%). No statistically significant difference was observed between ectoparasite infestation and host gender (P= 0.137) (Table 2).

Ectoparasites distribution of the studied dogs was 36% around the neck, 20% on backside portion, 25% on abdomen and 19% on other body sites.

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Table 1. The number of stray dogs infested by different ectoparasites based on each studied areas

Area	Examined	Infested	Flea	Lice	Tick	Fly	Mite
Qazvin	20	20	15	13	2	4	0
Gilan	35	24	20	9	1	0	1
Mazandaran	15	14	10	7	2	0	2
Total	70	58	45	29	5	4	3

Table 2. Number and percent of ectoparasite species on infested dogs in the studied areas

Ectoparasite	Male	Female	Total N (%)
Ctenocephalides canis	106	145	251 (29.8)
C. felis	70	98	168 (19.9)
Trichodectes canis	126	221	347 (41.3)
Pulex irritans	8	16	24 (2.9)
Xenosylla cheopis	3	3	6 (0.7)
Rh. sanguinus	6	0	6 (0.7)
***Hippobosca* sp.**	4	6	10 (1.1)
Sarcoptes scabei	12	18	30 (3.6)

Discussion

In the present study, eight species of ectoparasite were isolated from stray dogs. The total prevalence of ectoparasites in this survey was 82.8%. This finding is almost similar with the findings of Tesfaye et al. (2011) have recorded a prevalence of 88.6% in dogs in Ethiopia and identified 8 species of ectoparasites in their study.

Different studies have been done to detect ectoparasites on dogs in various parts of the world. Xhaxhiu et al. (2009) determined nine species of arthropods with a prevalence of 79% in dogs in Albania. Kumsa and Mekonnen (2011) identified six species of ectoparasites with a prevalence of 99.5% in dogs in Ethiopia.

Bahrami et al. (2012) have reported seven species of ectoparasites in 44.26% of the dogs from Ilam province. Mosallanejad et al. (2011) found eight species of ectoparasites in companion dogs in Ahvaz District, 36 out of 126 dogs (28.57%) were positive for ectoparasites. Nine and seven species of arthropods have been reported in pet dogs in Tehran and Shiraz Province, with a prevalence of 36.4% and almost 25%, respectively (Shoorijeh et al. 2008, Jamshidi et al. 2012).

Fleas were the most common ectoparasites in this survey and *C. canis* was the most common flea, followed by *C. felis*, *P. irritans* and *X. cheopis*. These fleas have been reported in Iran by many investigators (Shoorijeh et al. 2008, Mosallanejad et al. 2011, Bahrami et al. 2012, Jamshidi et al. 2012).

In the study that was carried out by Xhaxhiu et al. (2009) on dogs in Albania, the most common ectoparasites were fleas. They identified three species of fleas consist of *C. canis*, *C. felis* and *P. irritans*. In addition, *C. canis* was more predominant than *C. felis* and *P. irritans*. Examination of dogs in Greece revealed the presences of four species of fleas consisting of *C. canis*, *C. felis*, *P. irritans* and *X. cheopis*, the first species was the most frequent that was found on the dogs (Koutinas et al. 1995). *C. canis* was the only species found on dogs in rural areas (González et al. 2004, Fuehrer et al. 2012). In other studies *C. canis* was not observed on dogs (Alberto Ca˜ nón-Franco et al. 2010,

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Slapeta et al. 2011). Beresford-Jones (1981), Dryden and Rust (1994, USA) and Alca´ıno et al. (2002) noted that within flea species, *C. canis* is the most predominant species on dogs in rural areas, whereas *C. felis* is the most common in urban areas. Since our study was done on stray dogs in rural and urban areas, this could explain the presence of both these two flea species. In our study, female fleas were more abundant than males, which is in agreement with other findings. One reason of this matter could be related to greater ability of females to evade capture during host grooming (Durden et al. 2005, Gracia et al. 2008, Tavassoli et al. 2010).

In this survey, Lice were ranked in the second frequency of ectoparasites. The overall prevalence of lice was 50% in infested dogs. Mosallanejad et al. (2011) determined only one louse species, *Heterodoxus spinigera* and that was the most common ectoparasites on dogs in their study in Ahvaz Province. In the present study, only one louse species was observed, including *Trichodectes canis*. This finding is agreement with Xhaxhiu et al. (2009) in Albania, Jafari Shoorijeh et al. (2008) in Shiraz Province Iran. In the study carried out by Jamshidi et al. (2012) 5.6% and 4% of ectoparasites were *T. canis* and *Linognathus setosus* respectively. Bahrami et al. (2012) observed lice species including *Heterodoxus spinigera* and *L. setosus* on dogs from Ilam Province.

Ticks were as the third prevalent (8.4%) species in this study. We collected six ticks from infested dogs that all of them were *Rh. sanguineus*. This specie has been reported on dogs in different parts of Iran. (Shoorijeh et al. 2008, Mosallanejad et al. 2011, Jamshidi et al. 2012, Bahrami et al. 2012). In Nigeria, Adamu et al. (2012) identified ticks as the main species of ectoparasites in dogs, with a prevalence of 47% and *Rh. sanguineus* was predominant (24.3%). In this survey, the mean number of ticks was very low, almost one tick on each infested dogs. The reason can be related to sampling season, ticks are abundant in the warm and humid weather (Adamu et al. 2012). Moreover, ticks are vectors of serious pathogens. *Rhipicephalus sanguineus* can transmit the etiological agents of canine babesiosis and canine monocytic ehrlichiosis (Dantas-Torres 2008, Rene et al. 2012).

One species of fly (*Hippobosca*) and mites (*Sarcoptes scabiei*) were detected. These species also observed by Mosallanejad et al. (2011) in Khuzestan Province. *S. scabiei* was also reported by (Jamshidiet al. 2012) in Tehran Province. Xhaxhiu et al. (2009) in Albania and Shoorijeh et al. (2008) identified *Hippobosca sp.* on dogs in Shiraz Province.

Thompson et al. (1993) have assessed the prevalence of ectoparasites from Aboriginal communities in Australia. They have presented *Rh. sqanguineous* and *T. canis* as ectoparasite of dogs. There was no evidence of flea infestation in their study (Thompson et al. 1993).

Ectoparasites from dogs belonging to people in resource-poor communities in South Africa has studied that harbored hard ticks belonging to 6 species (*Haemaphysalis leachi*, *Rh. sanguineus*, *Amblyomma hebraeum*, *Rh. appendiculatus*, *Rh. evertsi evertsi* and *Rh. simus*), fleas (*C. felis*, *Echidnophaga gallinacea*) and lice (*H. spiniger*) and Myiasis, caused by the larvae of *Cordylobia anthropophaga* (Brysona et al. 2000).

Conclusion

High infestation with different arthropods were observed on stray dogs in center and north of Iran. Ectoparasites play an important role not only as pests but also as vectors of various infectious diseases of humans, livestock, pets, and wild animals, then regular monitoring of them is an important concern to control the arthropods and arthropods-borne diseases**.**

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