

## Common Ectoparasite Species of Domestic Dogs in Western Iran

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**Abstract:** The present study aimed to investigate the intensity and distribution of natural infestation of ectoparasites in domestic dogs (shepherd, stray, house, hunting) throughout different seasonal variation between January 2006 and 2007 in Ilam province western Iran. Overall, 802 dogs in rural areas were examined for ectoparasites including fleas, ticks, lice and mite. Dog hairs were combed and their skin were rubbed with a piece of cotton soaked in ether to remove the ectoparasites. A total number of 1048 ectoparasites were collected. *C. canis* was the most predominant (29.5%), followed by *R. sanguineus* (27.5%), *L. setosus* (19.5%), *C. felis* (6.1%) and *O. cynotis* (1.7%). A seasonal pattern was observed for ectoparasites prevalence in which gradually increased from April to July and then dropped with an onset in winter. The most frequent clinical symptoms were scratching (13.8%), flea allergic dermatitis (13.2%) and alopecia (7.9%). Dogs with dark or black hair had more ectoparasites than those with white/light hair. The ectoparasite activities were observed to be higher during nights compared to day light. Ectoparasites were significantly higher in dogs that were kept in soil or grass compared to those kept in cement or bricks. Ectoparasites were more observed in dog's neck (31.6%). *C. canis* should be carefully considered in all veterinary controlling and preventive programs.

**Key words:** Ectoparasites · Dogs · Domestic

### INTRODUCTION

Domestic animals living in different geographical regions, are threatened by several arthropods including fleas, ticks, lice and mite [1-3]. These ectoparasites are used to be vectors for verity of clinical disorders in humans and domestic animals such as borreliosis, rickettsiosis and allergic dermatitis [1, 4]. Fleas are known to transmit the etiologic agent of bubonic plague and *Yersinia* and *Yersinia pestis* from dogs to humans [5], The main etiologic agent of cat scratch zoonosis [6, 7], several species of rickettsia [1, 4, 6, 7] and many trypanosomatids [3, 8]. The involvement of ectoparasites in some human and animal diseases reveals an urgent need for recognizing these ectoparasites as well as their biology and epidemiology. There are many published reports regarding distribution and prevalence of fleas, ticks, lice and mite in dogs worldwide [2, 9-12].

The present work was conducted for the first time in this area to determine prevalence and intensity of infestation of flea, tick, lice and mite in rural dogs as well

as to assess seasonal variations. In addition to the geographical importance of study setting, which was the borderline between Iran and Iraq, the sociological aspect was also considerable as majority of people living in this area are running animal husbandry (sheep and goats).

### MATERIALS AND METHODS

This research was conducted between January 2006 and 2007, across four different seasons on 802 shepherd, stray, house and hunting dogs living in rural areas in Ilam province western Iran across private and governmental veterinary clinics (Figure 1). Dogs were checked for flea, tick, lice and mite infestation. A check list was designed to record required data related to age, sex, breed, colour, weight, number of dogs kept together, geographical origin hair length, type of housing, holding or chaining dogs. Clinical symptoms related to flea allergic dermatitis, pruritus, alopecia and general appearances was recorded for each single dog.



Fig. 1: Map of study setting in bordering regions between Iran and Iraq

Temperature (°C) was monthly recorded. For collection of ectoparasites: A white slippery tray with a hole in the middle was used and a jar class was fixed on that hole. Dogs then moved and held over the tray and combed. The dog's skin was rubbed with a piece of cotton soaked in ether. The ectoparasites were separated and stored in 75% ethanol proceed, to conform identification slide- mounted in Canada balsam and then examine under a binocular or were observed using a high power microscope (400x) until they were identified (male or female).

The Statistical Analyses System (SAS, Cory, NC, USA) was used for all parametric and non-parametric analyses. All data were rested for Gaussian distribution and submitted to one-way ANOVA.

The Local Ethical Committee in Veterinary Researches as well as the Research Department in Ilam University approved the proposal of the present study.

**RESULTS**

Out of 802 tested dogs 355 were positive for ectoparasites (fleas, ticks, lice and mite). The dominant ectoparasites were fleas, ticks lice and mite respectively. Out of 355 positive dogs, 308 (86.8%) were positive for fleas. The intensity of infestation showed that 184 dogs (51.8%) were infested by less than 3 fleas, followed by 3-7 fleas (27.9%, n=99) and more(7.0%, n= 25). A greater abundant of fleas on was observed in shepherd dogs (n=252, 71.0%), followed by starry dogs (n=41, 11.5%) and house dogs (n=15, 4.2%). *C. canis* was the predominant species, which found in 284 dogs

Table 1: Ectoparasite frequency by gender and male/female sex ratio

Ectoparasite species	Males and females % (n)	Sex ratio
<b>Fleas</b>		
<i>Ctenocephalides canis</i>	29.48 (309)	1: 1.75 (111/198)
<i>Ctenocephalides felis</i>	6.10 (64)	1: 1.56 (25/39)
<b>Ticks</b>		
<i>Rhipicephalus Sanguineus</i>	27.5 (289)	1: 1.77(104/185)
<i>Heamaphysalis Flava</i>	5.72 (60)	1: 3.0(15/45)
<b>Lice</b>		
<i>Heterodoxus Spindera</i>	9.92 (104)	1: 1.47(42/62)
<i>Linognathus Setosus</i>	19.46 (204)	1: 1.147(95/109)
<b>Mite</b>		
<i>Otodectes Cynotiscanis</i>	1.71 (18)	1: 2.0(6/12)
<b>Total</b>	<b>100.0 (1048)</b>	<b>(398/650)</b>

(92.2%) followed by *C. felies* which found in 24 dogs (7.8%), (Table 1).

Studied samples were routinely checked for clinical symptoms. Overall, 231 positive dogs had itching (65.1%), 49 dogs (13.8%) had scratch (prurits), 28 dogs (7.9%) were deficient for the hair or wool coat (alopecia), presented flea allergic dermatitis and 47 dogs (13.2%) had no any clinical symptoms. Altogether 31 dogs (8.7%) were found positive for having a mixed infestation (fleas, ticks, lice), 12 dogs (3.4%) were positive for two types of infestation (fleas and lice) and 4 dogs (1.1%) were found positive only for one type of ectoparasite (mite).

The association between ectoparasites prevalence and the dog's colour was also investigated. Results showed that more than half of dark-coloured

Table 2: A monthly bases of ectoparasite incidence by different ranges of temperature

Month	Positive dogs (n)	Temperature °C	
		Maximum	Minimum
January	3	17	3
February	5	19	6
March	9	20	8
April	14	23	12
May	21	26	14
Jun	51	34	19
July	81	38	27
August	71	35	26
September	44	32	21
October	31	30	18
November	17	24	11
December	8	19	6

dogs (n=179, 50.4%), more than one fourth of colourful dogs (n= 101, 28.4%) and more than one fifth of white coloured dogs (n=75, 21.1%) were infested with at least one type of ectoparasites. Overall, 43 dogs (12.1%) were found to carry multi-infestations, out of them in 29 dogs (67.5%) were dark or colourful and 14 dogs (32.6%) were white (Table 1).

Analysis of data related to the housing of dogs showed that out of 355 dogs infested with ectoparasites, 248 (69.6%) tested positive dogs were kept in places covered by either soil or grass and 107 (30.2%) and 107 (30.2%) were kept in places covered by either cement or bricks. Results also demonstrated that those dogs who were kept in soil or grass ground were more at risk for ectoparasite infection than those kept on solid ground carpets.

Data on distribution of the ectoparasites in the body of the dogs showed that 112 (31.6%) around the neck, 86 (24.0%) on abdomen, 75 (21.2%) on back side 62 (17.5%) around head and ear, 11 (3.1%) on chest and 8 (2.3%) on hands and legs cases at least one type of ectoparasites infestation.

The ectoparasites movements were also controlled during both day and night times. The activity of fleas, ticks, lice and mite were seen to be more in night than the daytime.

The seasonal assessment of ectoparasites showed a significant variation in which gradually rose from April to July and then dropped steadily with an onset in winter (Table 2).

## DISCUSSION

The present study showed that fleas were the most abundant ectoparasites. There are two species of fleas including *Ctenocephalides canis* (*C. canis*) and

*Ctenocephalides felis* (*C. felis*). These fleas have been found to be the predominant species parasitizing dogs in the United Kingdom [13, 14] and Greece [15]. The *C. canis* dominant fleas reported in the present study is consistent with those who already reported in the recent reports from Austria [16], Ireland [17] and New Zealand [18]. Some studies have found the *C. felis* as the most prevalent species, with abundant values up to 92% in Florida /USA [19], Virginia/USA [20], Wisconsin/USA [21], Egypt [22] and Lima/Peru [23]. The *C. felis* recorded in this study was the second most abundant flea.

The present study found that female ectoparasite was predominant than male, the reason for this discrepancy is unclear but may be in part related to the fact that females have longer life than males. Males also spend more time off the host or more prone to predation or grooming by the host, or due to starvation [24, 25]. Female abundant infestation has also been reported by other researchers [13, 26, 27]. In the present study, after fleas, ticks (*R. sanguineus* dominant and *H. flava* predominant), lice (*Heterodoxus spindera* dominant and *Linognathus setosus* predominant) and mites with one species *Otodectes cynotis* were more frequent respectively (Table 1). Similar results have been found in Lima/ Peru with greatest prevalence of fleas (89.0%), followed by ticks (30.0%), [23] and in Pretoria/ South Africa with *R. sanguineus* dominant ectoparasites [28].

The Clinical symptoms such as deficiency of the hair or wool coat (alopecia), itching, scratches (pruritus) and flea allergic dermatitis found in this study are also consistent with a recent report from Greece [15]. However, dogs' fleas can also cause many disorders such as flea-bite dermatitis and other allergic reactions [25, 29, 30].

The seasonal pattern found in Ilam province western Iran with a long borderline with Iraq country is similar to the latest reports from southern Italy [2] and Germany, where the highest prevalence of ectoparasites in dogs were detected between June and August [11] and from Italy [2] where the peak prevalence was recorded between June and October. In Dublin/Ireland, *C. canis* was the most predominant species in dogs from September to March with a peak in October [31]. In Mexico, no significant seasonality association was observed for *C. canis* or *C. felis*, but infestations of both species were higher in spring, summer and autumn than winter [32]. This differences could be due to geographical inequalities.

In the present study, the most ectoparasites were found on neck of the dogs, which is consistent with a recent report [2].

As conclusions, fleas, ticks, lice and mites were the widespread ectoparasites of dog in western. Iran with infestation found in 355 of 802 dogs investigated. The major flea species was *C. canis*. Dogs with dark or colourful hair were more exposed to ectoparasites and dogs that were kept, hold or housed in soil or grass places were more at risk to fleas, ticks, lice or mites. The infestation appears to be associated with geographical region or could be duo to interrelation of rural dogs being used as shepherd dogs in this area.

*C. canis* should be carefully considered in terms of controlling and preventive programs.

#### ACKNOWLEDGMENT

The Iranian Ministry of Higher Education financially supported the present study through a research grant awarded to Dr A.M. Bahrami. The assistance of Mr Mostafa Delpisheh is appreciated.

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