

## Flea Infestation in Farm Animals and its Zoonotic Importance in East-Azerbaijan Province

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**Abstract: Problem statement:** Most fleas infest their host temporarily then pass to another of the same kind, while others move from one to a different host species. Although the comprehensive list of fleas reported from Iran, but there still exists considerable gap in our knowledge of zoonotic aspect of flea infestation. The present study was undertaken to determine correlation between domestic animals and man as host of fleas. **Approach:** The questionnaires on the base of flea infestation of animals flock and animal care-man were prepared and distributed to veterinary stations of all townships of East-Azerbaijan province. A total of 297 questionnaires sheets and 156 flea samples were collected from 10 township of East-Azerbaijan province. **Results:** One hundred forty nine specimens of *Pulex irritans* were collected from sheep, goats, cattle, chicken and human, which consisted of 91.2% of all recovered fleas. Chickens infested by three species of fleas including *Pulex irritans* (81.7%), *Ctenocephalides canis* (11.2%) and *Ceratophilus gallinae* (2.1%). Three hundred and twenty five cases of animal and 239 cases of human infestation were recorded among the suspicious populations, the most prevalence of infestation was found in sheep and goat herds whilst chicken flocks infested with the lowest rate and cattle were infested moderately. The major health problem was occurred in farmers, animal care-men and their relatives. The observations showed they had different skin reactions to flea's bites. **Conclusion:** The results showed that fleas are approximately a widespread parasite of farm animals and it seems that they may play an important role in occurring of zoonotic infestation in Iran.

**Key words:** Flea, farm animal, human, East-Azerbaijan province

### INTRODUCTION

Fleas transmit pathogens of numerous diseases that affect man and domestic animals. Most fleas infest their host temporarily then pass to another of the same kind, while others move from one to a different host species. Flea infestations and associated hypersensitivity responses have normally been described as a major parasitic and clinical problem of companion animals (Rust and Dryden, 1997). In some locations, they represent over half of all the dermatological cases presented to small animal clinics, they are normally limited to hosts with nests or lairs as this can provide conditions for the completion of their life cycle (Traub, 1985). Consequently, they are not usually thought to be significant pests of large domesticated animals. Nevertheless, there are reports of flea infestations on livestock including horses (Yeruham *et al.*, 1996), goats (Kusiluka *et al.*, 1995; McCrindle *et al.*, 1999), sheep (Kusiluka *et al.*, 1995; Dipelu and Ayoade, 1982), cattle (Araujo *et al.*, 1998) and wild ruminants (Yeruham *et al.*, 1999; Khayatnouri *et al.*, 2011). *Ctenocephalides felis*, *C. canis* and *C. felis strongylus* are frequently recognized

in small ruminants (Yeruham *et al.*, 1997; Jain, 1993; Fagbemi, 1982). In cattle, reports of fleas are less frequent and *C. felis* has been reported from the USA, Japan and Brazil (Araujo *et al.*, 1998; Dryden *et al.*, 1993; Otake *et al.*, 1997). Although the comprehensive list of fleas reported from Iran (Klein *et al.*, 1963; Farhang-Azad, 1970; 1973), but there still exists considerable gap in our knowledge of zoonotic aspect of flea infestation. The present study was undertaken to determine correlation between domestic animals and man as host of fleas.

### MATERIALS AND METHODS

This study was carried out in 10 townships of East-Azerbaijan province of Iran, the questionnaires on the base of flea infestation of animals flock and animal careman prepared and distributed to veterinary stations. Under these circumstances, suspicious flocks and their care-men were inspected to flea infestation. Infested animals were restrained and flea samples were collected using metal combs (12 teeth per cm). Dead chickens were placed in closed plastic bag containing immersed

cotton with formalin. Men were examined for flea's bites. Collected fleas were placed in labeled jars containing 70% ethanol; fleas were subsequently examined by stereoscopic microscope (Zeiss) according to the identification keys (Furman and Catts, 1982; Segerman, 1995; Asmar *et al.*, 1979).

**RESULTS AND DISCUSSION**

A total of 297 questionnaires sheets and 156 flea samples were collected from 10 townships of east-Azerbaijan province in Iran; data were analyzed according to the hosts and the geographical distribution. Three hundred and twenty five cases of animal and 239 cases of human infestation were recorded among the suspicious populations. All cases from Tabriz, Ahar, Marand, Bonab, Azarshahr and Osku townships were highly infested but Miyaneh, Sarab, showed the lowest rate of infestation. Interestingly, wherever the animal infestation rate was high the fleas easily transmitted to human (Table 1). The most prevalence of infestation was found in sheep and goat herds whilst chicken flocks infested with the lowest rate and cattle were infested moderately (Table 2).

A total of 156 fleas were obtained from the study area, a total of 149 specimens of *Pulex irritans* were collected from sheep and goats, cattle, chicken and human, which consisted 91.2% of all recovered fleas. Chickens infested by three species of fleas including *Pulex irritans* (81.7%), *Ctenocephalides canis* (11.2%) and *Ceratophilus gallinae* (2.1%).

Table 1: The geographical distribution of fleas' infestation in human and animal

Townships	No. of samples	Animals infestation		Human infestation	
		No.	(%)	No.	(%)
Tabriz	36	36	100.0	21	58.30
Sarab	16	12	75.0	10	75.00
Ahar	30	30	100.0	29	96.70
Marand	8	8	100.0	8	100.00
Bonab	5	5	100.0	5	100.00
Azarshahr	12	12	100.0	12	100.00
Osku	31	31	100.0	31	100.00
Bostanabad	53	49	92.4	42	79.24
Maragheh	97	96	98.9	78	88.40
Miyaneh	9	4	44	-	-

Table 2: The prevalence of fleas' Infestation of farm animals and human in sample area

Hosts	Infested cases	Fleas infestation			
		No. of (%)	<i>Ctenocephalides canis</i>	<i>Pulex irritans</i>	<i>Ceratophilus gallina</i>
Sheep and goat	198	33	-	+	-
Cattle	118	19	-	+	-
Chicken	9	1	+	+	+
Human	239	40	+	+	+

The clinical signs were observed mainly in goat and sheep with restlessness and weakness, which accompanied with patchy alopecia and skin hardness in limbs. The major health problem was occurred in animal care-men and their relatives, the observations showed they had different skin reactions to flea's bites, some were highly sensitized and others none sensitized to flea's bites. The legs and ankles were most often bitten; characteristically, two or three bites in a row. A small red spot with a light-colored center was appeared where the mouthparts entered the skin; there were multi foci of swollen and erythematous skin with intense itching.

**CONCLUSION**

The results showed that the main flea infesting farm animals was *P. irritans*, this finding is not in argument with other reports from Nigeria (Opasina, 1983), Tanzania (Kilonzo and Khama, 1989) and Lybia (Kaal *et al.*, 2006). The results showed that the most prevalence of infestation was found in sheep and goat herds whilst chicken flocks infested with the lowest rate. The highest degree of flea infestation was seen in farms practicing an intensive management system. Housing plays an important role in the development of fleas since it enables eggs to develop in litter containing organic matter with many hosts available on emergence. The condition allows manure to accumulate in animal houses results in increased warmth and humidity, with favors the proliferation of fleas (Dipelu and Ayoade, 1982; Obasaju and Otesile, 1980) and the abundance of organic matter provides nutrition and protraction for the developing larvae. This was confirmed by the finding of eggs and larvae at a depth of up to 3 cm in the litter of intensive farms (Kaal *et al.*, 2006). The clinical signs have been occasionally seen in infested farm animals, emaciation, pallor of the mucous membranes and edema of the lower limbs have been seen in animals showing intense itching and self-excoriation., these observations were similar to those reported by Kaal *et al.* (2006). In a flea-infested household, one or two individuals may show severe irritation from the bites; whereas others may not even realize fleas are present (Palmer *et al.*, 1998). The results showed that some people were attractive to fleas and most often, their legs and ankles had been bitten. Characteristically, they suffered from irritation, itching and rash. Palmer *et al.* (1998) believed that the first bite stimulates little response because this is the first exposure to saliva, which contains low molecular weight anticoagulant that will be responsible for latter reaction. A moderate urticaria is the usual sign of flea activity once the initial wheal have subsided (Palmer *et al.*, 1998). Some

investigators recommended animal dipping or spraying with pyrethroids should be accompanied with application of insect growth regulator in animal house (Garedaghi, 2011; Rahbari *et al.*, 2008; Rajapakse *et al.*, 2002). In conclusion, fleas are approximately a widespread parasite of farm animals in Iran. In addition to *P. irritans* infestation, *C. canis* and *C. gallinae* are zoonotic flea infestation.

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