Prevalence of external parasites of pigeon in Zabol, southeast of Iran

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Received: 7 July 2015 / Accepted: 5 September 2015 / Published online: 24 September 2015
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Abstract External parasites or ectoparasites, are arthropods that live on or in the skin or feathers, using the host as both shelter and food source. Ectoparasites can have significant impacts on animal health and productivity. The aim of this research was to estimate the prevalence and ectoparasites diversity in pigeons of Zabol, southeast of Iran. A total of 264 pigeons were selected randomly (175 males and 89 females) to evaluate the presence of different ectoparasites. Ectoparasites were collected from different parts of the body and from walls and seams of cubbyholes, using hand lens, forceps, and flashlights to increasing the see sight. The samples were preserved in 70 % alcohol and cleared in lactophenol. The overall prevalence of external parasites in pigeon was 78.40 % [female (33.3 %) and male (66.7 %)]. There was no significant difference of infestation of ectoparasites between male and female ($P > 0.05$). Prevalence was higher in adult pigeons (84.11 %) than pipers (54.0 %). Two species of ectoparasites were identified: *Argas reflexus* and *Columbicola columbae*.

Keywords External parasites · Ectoparasite · Zabol · Iran

Introduction

Ectoparasites come under the classification of arthropods in animal kingdom. These parasites live in skin and body of living organisms. They also multiply in walls, fecal droppings and dead carcasses. Some of these arthropods are nocturnal in habit. Body of ectoparasites is divided into three parts as head, neck and abdominal region. Some of them contain wings (Thyagarajan 2011). Pigeons are usually kept as pet bird in many houses (Macrae 1969). They are reared for source of income and they are providing a source of food in the form of meat to the people in some countries. Several species of ectoparasites (e.g. flies, lice, mites, ticks) can infest pigeon (Winter and Funk 1996). Pigeon is also a potential carrier of zoonotic parasites (Aleya and Sabrina 2011).

During the time of infestation of ectoparasite, birds start picking and scratching to avoid the irritation caused by the ectoparasites. Sudden drop in production and higher feed expenditure could be the reason for ectoparasites. Good light and vision are necessary to identify the presence of ectoparasites in strain (Thyagarajan 2011).

Ectoparasites may cause some other problems such as decreasing feed intake caused by initiating excessive preening which interrupts feeding, as the birds spend much time preening rather than being involved in other essential life activities (De Vaney 1979; Clayton et al. 1999). They also lead to discomfort, irritation, loss of plumage, stunted growth, reduced egg production and hatchability, anemia, elevated mortality and susceptibility to other infections

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(Aleya and Sabrina 2011; Campbell 1995; Edgar et al. 1958; Sturkie 1976). Ectoparasites may appear clinical problems, transmit several infectious diseases, and play a role as transport or intermediate hosts for different helminth parasites (Arends 2003). Moreover, bacterial, viral, or protozoan diseases can be transmitted from one bird to another by ectoparasites (Margaret 1969). Furthermore, some of the species of ectoparasites can circumfuse some of birds' diseases such as Pasteurellosis, Newcastle disease, especially tick and mites (Nnadi and George 2010). Complex infestation of ectoparasites can be controlled by using good management, control, and treatment against the ectoparasites. The prevalence and intensity of parasitic infestations may change with some epidemiological factors including host factors (age, sex and breed) and environmental factors (climatic conditions) (Nadeem et al. 2007).

Present study was conducted to determine the prevalence and species diversity of ectoparasites in pigeons of Zabol, southeast of Iran. Results of this study can be useful for controlling measures against the pigeons' infestation with ectoparasite and subsequently improving the health condition and growth rate.

Materials and methods

Sampling size and technique

During the term of the research at spring of 2015, a total of 264 pigeons (175 males and 89 females) under traditional rearing were randomly selected from the cubbyholes in Zabol. One of these cubbyholes was located in outdoor which contains 106 pigeons (73 males and 33 females). The pigeons were feed with wheat, grass and waste products. Generally 50 cases of pigeons were piper.

Parasitological examinations

To collecting the lice; head, neck, wings, body surface, and cloaca were thoroughly investigated with a magnifying glass to detect infestation. Finally, the ectoparasites were counted and preserved in labeled tubes containing 70 % alcohol (Soulsby 1982; Loomis 1984) and transferred to the

laboratory of parasitology of Zabol University. They were cleared in lactophenol and the parasites were identified on the basis of their apparent characteristics (Fabiya 1980; Soulsby (1982).

Data analysis

The terms prevalence and mean intensity were determined as defined by Margolis et al. (1982). Chi square analysis was used to compare the intensity of parasite infestation between male and female pigeons and between pipers and adults using the SPSS® (version 16.0) computer software. Differences were considered to be statistically significant at $P < 0.05$.

Results

In this study a total of 264 pigeons were examined that 207 birds were infested by parasites. Generally, 78.40 % of pigeons were found to be infested with *Columbicola columbae* and they were almost adult. Among the 214 adult pigeons which were examined 180 birds (84.11 %) and among the 50 pipers, 27 cases (54.0 %) were infested with *C. columbae* (Table 1).

The mean intensity of infestation was significantly higher in pigeons which were reared in indoor than pigeons which were reared in outdoors ($P < 0.05$) (Table 2). No significant differences between sex of pigeons and ectoparasites infestation were observed ($P > 0.05$). However, the infestation was higher in male birds (66.7 %) than females (33.3 %) (Table 3).

In this study, two species of ectoparasites were identified (tick and lice). The specie of *Argas reflexus* (tick) were found on walls and seams of cubbyholes and *C. columbae* were found on quill feathers of wing and tail.

Discussion

No study has been carried out on the ectoparasites of pigeon in Zabol. So this study provides helpful data on infestation rate to ectoparasites of pigeons in this area. In

Table 1 Prevalence of ectoparasite infestation in pigeons

Pigeon	Total number of pigeons	Prevalence in total pigeons (%)	Total number of adults	Prevalence in adults (%)	Total number of pipers	Prevalence in pipers (%)
Infested pigeon	207	78.40	180	84.11	27	54
Not infested pigeon	57	21.60	34	15.89	23	46
Total	264	100	214	100	50	100

Table 2 Mean intensity of ectoparasites infestation in pigeons according to type of rearing

Type of rearing	Total number of parasites collected from pigeons and cubbyholes	Total number of pigeons	Mean intensity
Indoor rearing	700	158	4.43
Outdoor rearing	130	106	1.22
Total	830	264	

Table 3 Prevalence and Mean intensity of infested pigeons according to the sex of bird

Pigeon	Total number of parasites collected	Total number of pigeons	Prevalence of infested pigeons (%)	Mean intensity
Male pigeons infested by <i>Columbicola columbae</i>	482	138	66.7	3.49
Female pigeons infested by <i>Columbicola columbae</i>	258	69	33.3	3.73
Total	740	207	100	

the present study lice and ticks were explored and 207 out of 264 birds (78.40 %) were found to be infested with one type of ectoparasites. The overall prevalence of ectoparasite infestation on the pigeons in Zabol, southeast of Iran (78.40 %) were higher compared to 73.0, 72.0, 50.0 and 30.0 % found in domestic pigeons by Adang et al. (2008), Senlik et al. (2005), Mushi et al. (2000) and Petryszak et al. (2000), respectively.

These kinds of Ectoparasites living mainly on the skin and may lead the affected birds to be restless, weakness, reduced food intake with a consequential loss of weight and retarded growth, resulting in decreased resistance to pathogens, as well as their potential ability to reproduce (Wall and Shearer 2001; Mullen and Durden 2002).

In this study 84 numbers of *A. reflexus* were collected from walls and seams of cubbyholes. Ticks are among the most important vectors of zoonotic diseases in the world (Kaufman 2010). *A. reflexus* belongs to Argasidae family and it is a kind soft tick of pigeon (Kleine-Tebbe et al. 2006). It is a specific bloodsucking parasite of pigeon in some countries of Europe and the Middle East which under certain circumstances invades human houses (Dautel et al. 1994; Haag-Wackernagel and Bircher 2010) and bites people instead of its main host (pigeon) when pigeons are not available (Hilger et al. 2005). These ticks lead not only skin irritations and pathogen transmission (Haag-Wackernagel and Moch 2004), but also a variety of symptoms depending on to an IgE-mediated allergy with increasing severity resulting in death (Trautmann et al. 1995; Spiewak et al. 2006; Weckesser et al. 2010).

In this study 746 numbers of *C. columbae* were collected from quill feathers of wing and tail. Lice can damage the wings and tail feathers. These perforations increase during heavy infestations, with considerable loss of areas of the wing surface and decreased ability of flight (Selim

et al. 1968). In heavy infestations, lice can also be observed inside the feather quills (Naz et al. 2010; Fasungova et al. 2008).

Diversity of ectoparasite in birds infestation may be depend on many factors, which may include home range, behavior, size and roosting habit of the host. Some of the results of this study confirmed the findings of other studies performed in some parts of the world (Aleya and Sabrina 2011; Adang et al. 2008; Senlik et al. 2005; Mushi et al. 2000; Petryszak et al. 2000).

The high prevalence of infestation in pigeons by *C. columbae* compared with other regions' infestation may be related to the fact that these kinds of ectoparasites are prevalent in Zabol. Also this research revealed that the intensity and prevalence of parasite infestation is lower in outdoor cubbyhole than indoor cubbyholes. It is may because of the lower sanitary management in indoors such as high content of moisture and lack of the air circulation and sun light.

No significant differences between sex of pigeons and ectoparasite infestation indicates that both males and females are equally exposed to the acquisition of ectoparasites and their sex related physiognomy may not confer any differences in infestation. This result is in agreement with the observations of Senlik et al. (2005), Adang et al. (2008), and Aleya and Sabrina (2011) which reported no significant difference between male and female pigeons in overall ectoparasite infestation.

Conclusion

This survey reveals that the prevalence of ectoparasites in pigeons is high and it presents that these pigeons were reared in non-hygienic conditions, while there was no any

mix infestation. The major ectoparasites comprised lice and ticks which have been implicated as causative agents of various diseases in other birds. *C. columbae* in pigeons and *A. reflexus* in seams of cubbyholes were the most prevalent ectoparasites of pigeons. These ectoparasites appear pigeons as either the reservoir or transient hosts. The ectoparasites encountered in this study are considered to be of veterinarian and human importance, hence, require more attention in some fields such as controlling and treatment of this infestation.

Compliance with Ethical Standards

Conflict of interest None.

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