

**ECTOPARASITES OF PIGEON TAMED LOCALLY IN WEST AND  
NORTH ZONE OF QUETTA CITY, PAKISTAN**

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**ABSTRACT**

*In the present study ectoparasites prevalence on domestic pigeon, Columba livia domestica (Linnaeus, 1789) in Quetta (GPS coordinates of 30° 10' 59.7720" N and 66° 59' 47.2272" E) was evaluated. Two main regions of the city (Nawa Killi and Wahdat colony) were selected for this study. Two hundred forty-eight pigeons including sixty-eight squabs were examined externally for the presence of ectoparasites during the winter and summer month of 2019. Two ectoparasites species were recorded including the shaft louse, Menopon gallinae (Phthiraptera: Menoponidae), the brown poultry louse, Goniodes dissimilis (Psocodea: Philopterae), with 65%, 32.55% (adult pigeons and squabs), and 47.5% prevalence compared to 100%, 78%, and 76.32% respectively. It was observed that the infestation rate in the summer season was higher compared to the winter season. Female pigeons were observed to be more infested than male individuals and squabs. It was also found that adult birds are more sensitized to the infestation than young birds while birds with poor body condition were highly sensitized to the infestation which shows a clear correlation with food and lice infestation hence may pose a threat to racing pigeons in the Quetta region. To the best of our knowledge, this is the first study on the ectoparasites of pigeons in Quetta (Balochistan), Pakistan.*

**KEYWORDS:** Ectoparasites, Menoponidae, Pigeons, Correlation and Region

**1. INTRODUCTION**

Forgiveness The ectoparasite is considered an important component of the parasite communities in the wild and domestic animals (Mey, 2003; Johnson et al., 2005; Clayton et al., 2008). The bird or chewing lice (Mallophaga: Amblycera) feeds on the feathers and skin scales of the host (Pilgrim, 1976; Price et al., 2003; Adam et al., 2005; Dick, 2010). During infestation with ectoparasites, birds start to pick and scratch to counter the irritation caused by these ectoparasites. The domestic pigeons, Columba Livia domestica, are reared



by humans for since long as a source of food, hobbies, symbols, and scientific research (Sari et al., 2008; Naz et al., 2010; Mansur et al., 2019). Ecto-parasites can cause severe growth retardation, low egg production, and exposure to further infections in pigeons in addition to driving distress, allergies, and occasionally transmit infectious diseases (Dranzoa, 1999; Marques et al., 2007; Sivajothi and Reddy, 2016; Arijo et al., 2018). Pigeons can also act as a potential carrier of zoonotic parasites (Cooper, 1990, 1997; Begum and Sehrin, 2011; Karatepe et al., 2011).

Ectoparasites of pigeons that can attack humans; these include pigeon fleas, *Ceratophyllus columbae* (Haag-Wackernagel and Spiewak, 2004); ticks, *Argas reflexus*; as well as bed bugs, *Cimex lectularius*; and red mite, *Dermanyssus gallinae* (Haag-Wackernagel and Bircher, 2010; Boxler et al., 2016). Despite this socio-economic importance, the ectoparasitic diversity focus on the prevalence and ratio of ectoparasite plague in birds has not been widely evaluated in the Balochistan province of south-western Pakistan. This is the first study to explore the diversity and abundance of ectoparasites of *C. l. domestica* (Columbiformes:

Columbidae) in Quetta.

## **2. BACKGROUND OF THE STUDY**

### **2.1. Study Area**

The study was carried out in a private pigeon farm located in the north (Nawa Killi) and west (Wahdat colony) zones of Quetta city from December to February and June to August 2019. The climate is arid with an average high-temperature of 10.8°C (51.4°F) and an average lowtemperature of -3.4°C (25.9°F). Overall, annual precipitation ranges from 200 to 350 millimeters (mm), whereas, average annual rainfall is 212.9 mm (8.38 inches) ([https://en.wikipedia.org/wiki/Climate\\_of\\_Quetta](https://en.wikipedia.org/wiki/Climate_of_Quetta)).

### **2.2. Identification of Adult and Juvenile Pigeons**

Adult pigeons were distinguished by morphological features; pale or dark grey orbital skin, while the juveniles by their grey or reddish legs and feet and grey or dull brown ochre and yellow iris (Hakkinen et al., 1973; Hetmanski and Wolk, 2005).

### **2.3. Collection of Ectoparasites**

Two hundred forty-eight pigeons including sixty-eight squabs were examined for ectoparasites in private pigeon farms. The feather of all pigeons and squabs was carefully brushed onto white paper for the collection of ectoparasites. For each bird, the feathers of the wings, tail, and regions around the cloaca and underneath the wings and legs were thoroughly examined with a hand lens for any attached ectoparasites. Ectoparasites were



collected and preserved in 70% alcohol. The materials were then transported to the laboratory of the Zoology Department, Sardar Bahadur Khan (SBK) women's university, Quetta for mounting of temporary slides. Slides of specimens were prepared under Stereo-microscope. For each adult pigeon and squab, the number of ectoparasites was recorded, and the prevalence of infestation and intensity were calculated. Ectoparasites were identified according to Hutson (1984), Price et al. (2003), and Mansur et al. (2019).

### 3. RESULTS

Two ectoparasite species of the two lice genera isolated from domestic pigeons' variety (*C. Livia domestica*) and squabs were examined in two municipal areas. The lice infestation prevalence was higher in summer than observed in winters (Table I and 2). Among ectoparasites, *Menopon gallinae* was the most abundant parasite, it infested mostly the adult female pigeons and their squabs. One hundred ninety-four *M. gallinae* were detached. *M. gallinae* infested all examined female and squabs' pigeons and the prevalence was 100%, 67.32% respectively (Table 2). On the other hand, *Goniodes dissimilis* infested only male pigeons. The data presented in Tables 1 and 2 revealed prevalence of *G. dissimilis* reached 47.5% in the cold season while it reached 78.0% in warm months of the year. One hundred and twelve *G. dissimilis* infested the fifty-eight examined pigeons. The result showed that there is a wide variation in the prevalence of lice infestation in the different domestic regions of district Quetta.

**Table.1. Ectoparasite Prevalence and Their Mean Intensity in Pigeons Examined in Wahdat Colony (Quetta) During December, January, February 2019.**

No. of Pigeons examined	Ectoparasite	No. of pigeons infested	Prevalence (%)	Total No. of ectoparasite	Intensity	Mean intensity $\pm$ SEM
Female 40	<i>Menopon gallinae</i>	26	65.00	47	9–16	12.25 $\pm$ 2.60
Male 40	<i>Goniodes dissimilis</i>	19	47.5	26	4–7	2.75 $\pm$ 1.28
Squabs 30	<i>M. gallinae</i>	13	32.5	15	1–5	5.3 $\pm$ 2.94

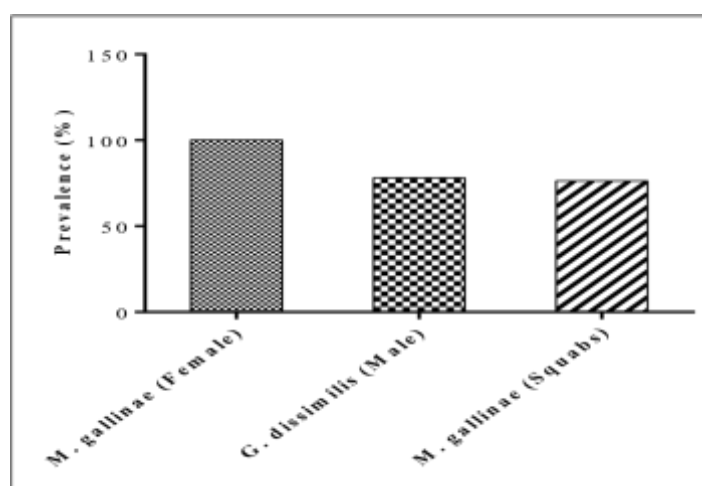
SEM: standard error of the mean



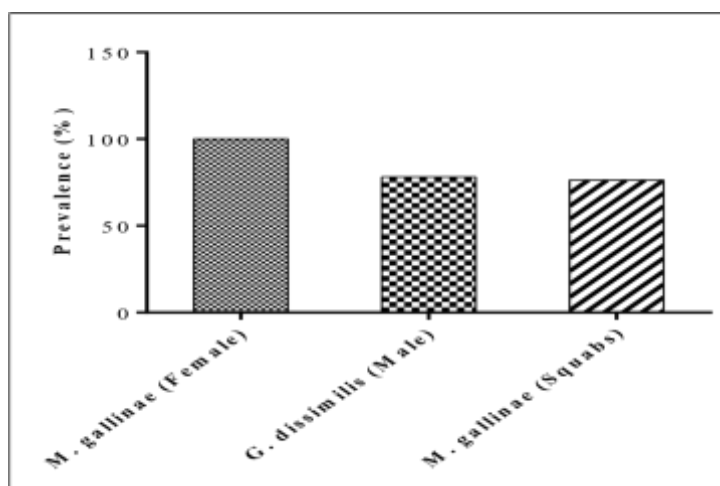
**Table.2. Ectoparasite Prevalence and Their Mean Intensity in Pigeons Examined In Nawa Killi (Quetta) During June, July, August 2019.**

No. of pigeons examined	Ectoparasite	No. of pigeons infested	Prevalence (%)	Total No. of ectoparasite	Intensity	Mean intensity $\pm$ SEM
Female 50	<i>Menopon gallinae</i>	50	100	147	35–72	13.65 $\pm$ 2.59
Male 50	<i>Goniodes dissimilis</i>	39	78.00	86	29–54	7.75 $\pm$ 2.36
Squabs 38	<i>M. gallinae</i>	29	76.32	65	14–37	5.3 $\pm$ 2.28

SEM: standard error of the mean



**Figure 1: Ectoparasite Prevalence in Pigeons Examined in Wahdat Colony (Quetta) During December, January, February 2019.**



**Figure 2. Ectoparasite prevalence in pigeons examined in Nawa Killi (Quetta) during June, July, August 2019.**

#### 4. DISCUSSION

Data regarding pigeons' parasitic infestation in Quetta is meager, the present study was aimed at determining the prevalence of ectoparasites of domestic pigeons. A total of 184 adult pigeons (90 males and 90 females) and 68 squabs were examined. Out of the total examined individuals, 176 were found infested with two species of ectoparasites were lice of the genera *Menopon gallinae* and *Goniodes dissimilis*. *M. gallinae* was the most abundant ectoparasite of the examined pigeons than *G. dissimilis*, the former one infested female and squabs and the latter lice species infested only male pigeons. Seasonal trend showed the highest prevalence of both the ectoparasite species during the months of summer seasons 100% ( $13.65 \pm 2.59$ ), 78.00% ( $7.75 \pm 2.36$ ) and 76.32% ( $5.3 \pm 2.28$ ) compare to winter seasons 65.00% ( $12.25 \pm 2.60$ ), 47.5% ( $2.75 \pm 1.28$ ), 32.5% ( $5.3 \pm 2.94$ ) respectively (Table 1 and 2, Fig. 1 and 2).

Female pigeons were found more susceptible with the highest infestation rate compared to males and squabs which could be attributed to their behavioral and environmental characteristics. Begum and Sehrin (2011) observed an increase in the ectoparasite intensity in summer and attributed it to the occurrence of optimum temperature for parasite development and decreased resistance of pigeons to the parasites at high temperatures, resulting in severe infections. This interpretation is in accord with the present results, as the infection rates of the pigeons ranged from 50 to 100% at  $36 \pm 2$  C. Similar data were recorded by Dranzoa *et al.* (1999), Adang *et al.* (2008), and Abdullah *et al.* (2018), who reported a high prevalence of *Columbicola columbae* of up to 94.1%. Ali *et al.* (2020) also reported a high prevalence of *Menopon gallinae* and *Goniodes dissimilis* reaching 100% respectively.

In another study (Arijo *et al.* 2018) recorded two lice species i.e. *Columbicola columbae* and *Menopon gallinae* from Sindh province Pakistan infested pigeons. Results revealed 80% (80/100) as overall lice infestation prevalence. Female pigeons were found more susceptible with the highest infestation rate of 86% (42/49) as compared to 74% in males. Adult birds showed high infestation than young birds indicating a clear correlation with nutrition and lice infestation. These results are in line with the findings of our study but in contrast with those of da Cunha Amaral *et al.* (2013), Alkharigy *et al.* (2018) where they recorded several ectoparasites, among which *M. gallinae* infected only 3% of pigeons. In the present study infection rate with *M. gallinae* and *G. dissimilis* was much higher than those recorded by Ghosh *et al.* (2014), Aljoburi *et al.* (2019) in Salah Al-Deen Province, Iraq was 9.4% caused by *M. gallinae* in pigeons. This difference in prevalence may be



because of geographical and temperature variations. Reports of similar ectoparasites of pigeons have been documented from Bangladesh (Begum and Sehrin, 2011) and Iran (Radfar *et al.*, 2011), were relatively higher infection rates of pigeons with *M. gallinae* (60 and 44.11%, respectively) and *P. canariensis* (63.33 and 63.72%, respectively) have been reported. Comparison of the infection rates of both *M. gallinae* and *P. canariensis* showed that they were lower than those obtained in the present study.

## 5 CONCLUSIONS

The present study indicates that domestic pigeons of Quetta are infested with ectoparasites. Ectoparasites (*M. gallinae* and *G. dissimilis*) plagued the majority of pigeons examined in the current work. Adult females' pigeons and squabs were infested with *M. gallinae* while *G. dissimilis* infested only adult male pigeons. This study concluded that more studies associated with pigeon infestation will help authorities to employ needful and preventive control strategies against pigeon-associated parasitic diseases and afterward better the health conditions of the community.

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