

## Survey and Prevalence of Lice Infestation the Pigeons (*Columba livia domestica*) in Kurdistan Region-Iraq

Mohammed A. Al-badrani

Shamal A. Al-Muffti

Department of Biology/ College of Science/ University of Duhok/ Kurdistan Region

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corresponding author:

Mohammed A. Al-badrani

mohammed.ibrahim@uod.ac

Shamal A. Al-Muffti

shamal.al-muffti@uod.ac

### ABSTRACT

Many parasite species may damage domestic pigeons, which are from the most essential birds for human populations in every corner of the world. Ectoparasites can be found in almost every bird. Birds can be impacted by a number of health problems, but parasitic illnesses play a crucial role influence. They are a significant source of disease infection and transmission. Although domestic pigeon lice are not known to spread any avian infections, they are hazardous to young birds in particular and typically accompany poor poultry health that is due to other factors. where a lot of lice could keep you up at night. They consume their bodily fluids, such as blood, and feathers. Since lice have a chewing mouthpart and feed on dry skin scales, scab tissues, and feather parts in addition to irritating the host's skin and sucking blood, the effects of louse parasitism on birds are frequently severe and include stunted growth and susceptibility to other infections. From October 2017 to July 2018, 200 domestic pigeons were checked for pigeons chewing lice. Three urban locations were chosen at random for each of the three main governorates in the study area—Duhok, Erbil, and Sulaymaniyah. Hands were picked clean of lice; Samples were kept in 96 percent ethanol-filled tubes before being examined and identified under a dissecting microscope. In the current study, 48% (96/200) of domestic pigeons were infected with one or more lice and three species of lice were recorded and identified by morphological characteristics: *Companulatus compare*, *Columbicola columbae*, and *Hohorostilla lata*.

**Keywords:** *Columba livia domestica*, Lice infestation, Pigeons, Kurdistan Region/Iraq.

## INTRODUCTION

The order of the pigeons one of the first creatures that man domesticated was a Columbiformes, which he employed for thousands of years for a variety of things, including conveying messages and participating in games (aviary specimens, laboratory animals), cultural and religious symbols (Alemu *et al.*, 2015). Pigeons (*Columba livia domestica*) are considered the most important poultry species (Mutinelli *et al.*, 2008). Pigeon and quail meat will eventually be available to poultry farmers as a substitute for chicken meat, which will help the livestock industry's contribution to the growth of the gross domestic product (GDP). Pigeon farming's expansion is hampered by a variety of diseases and high death rates. They do, however, have a variety of parasitic illnesses, both endo and ectoparasites. Specific lice can infest most birds and mammals (Clayton and Johanson, 2003). Parasitic infection in birds can result in stunted growth, reduced egg production, and susceptibility to other illnesses (Saikia *et al.*, 2017). The order Phthirapteran is currently divided into four suborders: Amblycera, Ischnocera, Rhyncophthirina, and Anopluran (Ebrahimi *et al.*, 2016). The lice are divided into two groups: sucking lice (Anoplura) and chewing lice (Anoplura) (Mallophaga). Birds with lice infestations suffer from ill health as a result of their skin sores, which lead to bacterial illnesses and weight loss (AL-Saed and Albadrani, 2014). Lice are easily passed from one bird to the next. Chewing lice are wingless obligate ectoparasites that live on the host. Overcrowding and inadequate cleanliness are common causes of lice (Ebrahimi *et al.*, 2016). The purpose of this study is to identify different species of lice-infested pigeons in the Kurdistan Region of Iraq and determine their prevalence.

### Morphology of chewing lice

Lice have a segmented body with a head, thorax, and abdomen, making them easily identifiable as insects. There are three sets of jointed legs and a few tiny receiving organs. make up this creature. All lice have flattened dorsoventral surfaces and lack wings, with poorly developed sensory organs and vestigial or missing eyes. Mallophagan (Amblycera and Ischnocera) adults are typically 2-3 mm long. Their heads are broad and rounded. with reduced or absent eyes; Amblycera's four segmented antennae are shielded by antennal grooves, so only the final segment is visible; the antennae of Ischnocera are three to five segmented and do not have grooves; the thorax normally has at least the first two segments visible (Soulsby, 1982). And, besides the impact on their hosts, inflicting damage to feathers (Pape and Rozsa, 2005).

## MATERIAL AND METHOD

### Study area

Two hundred domestic pigeons were chosen at random and had their bodies checked for the presence of lice. All samples were taken between October 2017 to July 2018 from the outside area. The three governorates' urban areas were included in the study Duhok lies 416 km northwest of Baghdad, (Zakho lies 524 km northwest, and Akre lies 498 km north of Baghdad). Erbil lies 388 km north of Baghdad, including (Shaqlawah lies 408 km north, Koya lies 356 km north of Baghdad.), and Sulaymaniyah lies 375 km northeast of Baghdad, including (Rania lies 401 km northeast, and Dokan lies 406 km northeast of Baghdad) Fig. (1).



**Fig. 1: The map of Kurdistan Region-Iraq. (<https://thekurdishproject.org/kurdistan-map/iraqi-kurdistan/>).**

**Collection and preservation of samples**

To collect lice, pigeons' bodies, including wings, feathers, ventral and femoral portions (body), were examined with naked, eyes and hand lenses (Clayton and Johanson, 2003). Lice were hand-picked without the use of a hairbrush or toothed thumb forceps, then transferred to a water-filled petri plate, then preserved in tubes containing ethanol 96 percent.

**Identification of samples**

The samples (lice) were delivered to the Department of Biology lab at the University of Duhok's College of Science, to be studied using a dissecting microscope (type Lambomed produced in the United States) to determine their morphological characteristics according to modern criteria (Soulsby, 1982).

**RESULTS AND DISCUSSION**

A total of 200 pigeons were tested. The presence of infection was detected in 48 percent of all samples between October 2017 to July 2018, 96 of which were infected (Table 1). The ventral and femoral regions of the pigeons' bodies, as well as their wings and feathers, were examined (body). There were 133, 152, and 50 individual lice in total for each body area, respectively (Table 2). In the event of a single infestation of lice in pigeons, the governorates of Kurdistan (Duhok, Erbil, Sulaymaniyah) differed by 23, 25, and 15 percent, respectively (Table 3). There were 13, 11, and 9 infected pigeons in the mixed infestations of lice on domestic pigeons in Duhok, Erbil, and Sulaymaniyah, respectively; for more information, see (Table 4). The percentage of infected pigeons was 19%, 18.5%, and 10.5% in Duhok, Erbil, and Sulaymaniyah respectively Fig. (2). In this investigation, from 200 pigeons included 335 individual lice, where distributed in to 193,103 and 93 in Duhok, Erbil, and Sulaymaniyah respectively Fig. (3). Three species of lice were recorded on the pigeons as the following: *Companulates compare*, Fig. (4), *Columbicola columbae* Fig. (5), and *Hohorostilla lata* Fig. (6). Stunted growth and hatchability, pain, decreased egg production, loss of plumage, irritation, and increased feed costs, and anemia are some of the symptoms noticed in these birds.

**Table 1: The percentage of infected of pigeon’s test period in Kurdistan region Iraq**

| Host    | # Examined pigeons | # Infected pigeons | %  |
|---------|--------------------|--------------------|----|
| Pigeons | 200                | 96                 | 48 |

**Table 2: The isolation of lice species from the pigeon's body**

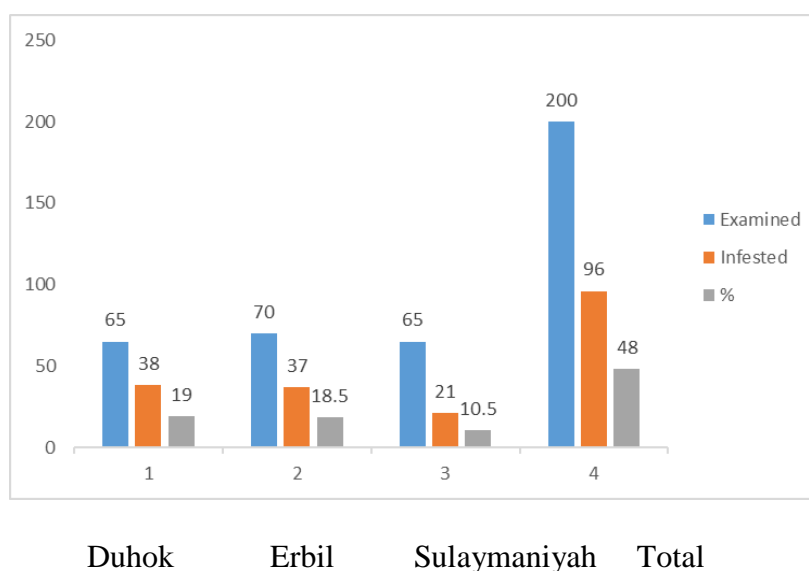
| Host    | Lice species                | Site  |      |          |
|---------|-----------------------------|-------|------|----------|
|         |                             | Wings | Body | Feathers |
| Pigeons | <i>Columbicola columbae</i> | +     |      | +        |
|         | <i>Campanulotes compar</i>  |       | +    |          |
|         | <i>Hohorostilla lata</i>    |       | +    |          |
|         | Total                       | 133   | 152  | 50       |

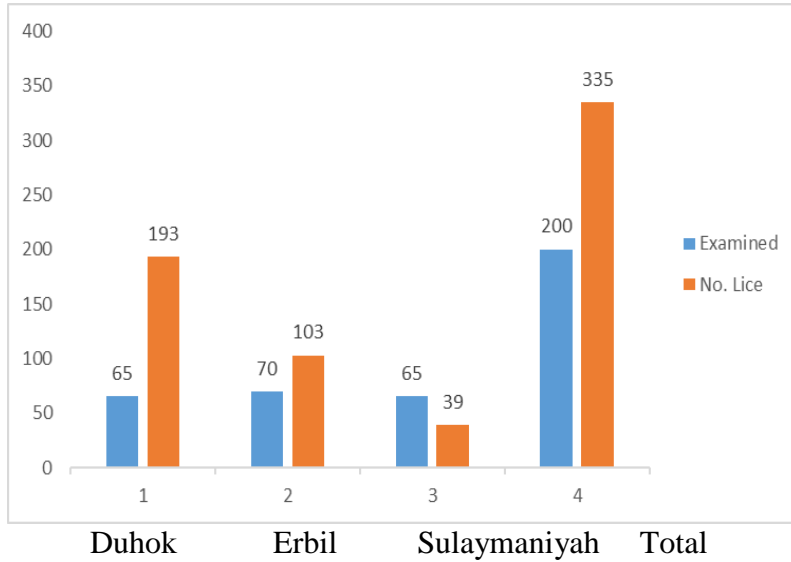
**Table 3: Lice infestation (single infestations) in domestic pigeons**

| Host    | Parasitic infestation | Governorates | # of pigeons affected |
|---------|-----------------------|--------------|-----------------------|
| Pigeons | single infestations   | Duhok        | 23                    |
|         |                       | Erbil        | 25                    |
|         |                       | Sulaymaniyah | 15                    |

**Table 4: Lice infestation (mixed infestations) in domestic pigeons**

| Host    | Parasitic infestation | Governorates | Tow genera | Three genera | # of pigeons affected |
|---------|-----------------------|--------------|------------|--------------|-----------------------|
| Pigeons | mixed infestations    | Duhok        | 10         | 3            | 13                    |
|         |                       | Erbil        | 9          | 2            | 11                    |
|         |                       | Sulaymaniyah | 5          | 4            | 9                     |

**Fig. 2: The percentage of infected pigeons in the Kurdistan Region of Iraq**



**Fig. 3: Prevalence of lice species in domestic pigeons of some areas in Kurdistan region / Iraq.**



**Fig. 4: Lice *Comanulate compare* under dissecting microscope (4X).**



**Fig. 5: Lice *Columbicola columbae* under dissecting microscope (4X).**



**Fig. 6: Lice *Hohorostilla lata* under dissecting microscope (4X).**

Ectoparasites (Lice) of pigeons have few studies in the Kurdistan Region of Iraq. The overall prevalence (96/200) lice were present on at least one body surface on 48% of domestic pigeons. The goal of the study was to see how common different species of lice parasites were in domestic pigeons in Iraq's Kurdistan Region. A total of 200 pigeons were tested. Each of the three major governorates—Duhok, Erbil, and Sulaymaniyah—has three locations were used to collect the samples. According to morphological traits, three species of lice were identified in this study: *Companulatus compare*, *Columbicola columbae*, and *Hohorostilla lata* (Soulsby, 1982). In Turkey by Inci *et al.*, (2010), all birds were examined for ectoparasites, and 29 of the 70 (41.4) percent birds had at least one kind of chewing louse infestation. In India by Saikia *et al.*, (2017), to determine the ectoparasitic infestation of 324 pigeons, prevalence research was carried out. A total of 129 infected birds were discovered, which is a 39.78 percent infestation rate. In Zaria by Adang *et al.*, (2008), The study comprised 177 out of 240 domestic pigeons, or 73.8 percent of them, who had three different types of lice; *Menopon gallinae* was 6.3%, *Columbicola columbae* was 63.8%, *Goniodes spp.* was 10.8%. In Morogoro, Tanzania, by Msoffe *et al.*, (2010), An investigation into the presence of ecto- and endo-parasites in 100 nestlings and 100 adult pigeons was done to assess the prevalence of parasites that afflict domestic pigeons. Of the 124 examined birds, 62 percent (n=124) had one or more ectoparasites. The explanation for the disparity in infestation rates in Kurdistan Region-Iraq is unclear. Many reasons are to blame, including environmental variances, changes in poultry farmer awareness, and cleanliness attention in the Kurdistan area of Iraq year after year. One of the biggest threats to developing nation chicken production systems has been identified as ectoparasitism (Pilgrim and Palma, 1982). According to studies, parasitic illness pigeon's mortality is higher than that of viral infectious illnesses like Newcastle disease and fowl pox disease (Eslami *et al.*, 2009). Because lice are relatively host species that spend their whole life cycle on the host, they are ideal organisms for these research (Zarith *et al.*, 2017). In some circumstances, the host species has host specificity, and consequently, the lice assemblage on the host's body can be used to identify it. The host specificity of several chewing louse species is quite strong (Mata *et al.*, 2018).

## CONCLUSION

In this study, three different genera of lice have been identified, including *Campanulatus compare*, *Columbicola columbae*, and *Hohorstiella lata*, according to morphological characteristics. In the current study, 48 percent (96/200) of the pigeons had lice infestations. The percentage of infected pigeons was 19%, 18.5%, and 10.5% in Duhok, Erbil, and Sulaymaniyah respectively.

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## مسح ودراسة انتشار القمل الذي يصيب الحمام المنزلي في إقليم كردستان العراق

شمال عبد الله المفتي

محمد عدنان البدراني

قسم علوم الحياة / كلية العلوم / جامعة دهوك

### الملخص

الحمام الاليف من اهم الطيور المرتبطة بالإنسان في كل بقاع الارض، قد تؤثر أنواع انواع مختلفة من الطفيليات على الطيور. يمكن تواجد الطفيليات الخارجية فعليا في جميع الطيور. بعض الاعتلالات الصحية التي تصيب الطيور تلعب الاصابة الطفيلية دور كبير فيها، حيث تعتبر المصدر الرئيسي للعدوى وانتقال الامراض. قمل الحمام يصيب الطيور بذاته لكن لم يعرف عنه نقل اي جرثومة او مرض للطيور. غالبًا ما يصاحب وجود القمل ضعف صحة الدواجن، وهو ضار بشكل خاص للطيور الصغيرة حيث قد يتسبب عدد كبير من القمل في اضطراب النوم. يتغذى القمل على مكونات جسم الحمام مثل الريش والدم. غالبًا ما تكون تأثيرات القمل على الطيور شديدة، بما في ذلك انخفاض إنتاج البيض وتأخر النمو وفقر الدم والتعرض للعدوى الأخرى، ويسبب وجود القمل الماضغ، فإنه يتغذى على قشور الجلد الجافة وأنسجة القشرة وأجزاء الريش ويسبب تهيج الجلد وعدم الراحة وفقدان الريش وانخفاض إنتاجية العائل. تسبب الإصابة بالقمل يؤدي الى اعتلال صحة الطيور بسبب سلوك الآفات الجلدية التي تساعد على حدوث عدوى بكتيرية وفقدان الوزن. مائتان حمام منزلي من كلا الجنسين تم جمعها من أكتوبر 2017 إلى يوليو 2018 في الهواء الطلق من ثلاث محافظات رئيسية (دهوك وأربيل والسليمانية) في إقليم كردستان العراق. تم جمع كل القمل المرئي بالعين المجردة والعدسة المكبرة مع حفظها بحول الإيثانول بنسبة 96%. ان عينات القمل فحصت وشخصت باستخدام المجهر التشريحي. في هذه الدراسة كانت نسبة اصابة الحمام المنزلي بالقمل هي 48% (200\96). وبعد التشخيص المظهري تم تسجيل ثلاثة انواع من قمل الحمام في اقليم كردستان/ العراق. *Companulatus compare*, *Columbicola columbae*, *and Hohorostilla lata*.

الكلمات الدالة: الحمام المنزلي، اصابة القمل، الحمام، اقليم كردستان العراق.