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Incidence of *Columbicola columbae* lice in Domestic pigeons and Laughing doves in Babylon governorate

Article Info.

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Abstract

Ectoparasites, particularly lice, are common pathogens in doves and pigeons, with studies showing significantly high prevalence rates. Scientific evidence indicates that severe lice infestations are associated with abnormal behavioral changes, decreased reproductive performance, and a weakened immune response in infected birds. The field survey was conducted from November 2024 to July 2025, and included the examination of 123 samples representing laughing doves (*Streptopelia senegalensis*) and domestic pigeons (*Columba livia*). Samples were collected from various districts and sub-districts of Babil Governorate using a systematic random sampling methodology to ensure comprehensive geographical representation of birds in the studied area. The results of the current study indicated that the prevalence of *Columbicola columbae* lice in domestic pigeons was 31.81%, while in laughing doves it was 29.82%. The density of the parasite under the wing and tail was 78% and 73% higher than its presence on the back and abdomen, which were 22% and 27% in laughing doves and domestic pigeons, respectively. These findings are of great importance given the harm these parasites cause to infected birds, in addition to their potential source of transmission of diseases common to humans and animals. This species of lice was first recorded in the laughing dove (*S. senegalensis*) in Iraq.

Keywords: Lice, *Columbicola columbae*, *Streptopelia senegalensis*, *Columba livia*, Babylon.

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Introduction

Widespread parasite infestations in wild and domestic birds cause significant losses, and external parasites have been shown to cause more damage than internal parasites (1). The prevalence of ectoparasites is influenced by climatic conditions such as humidity, temperature, and geographical location, as well as the rearing system and host-specific factors (2,3).

There are four suborders within the order Phthirapteran: Ischnocera, Amblycera, Anopluran, and Rhyncophthirina. Lice are generally divided into two groups: chewing lice (Mallophaga) and sucking lice (Anoplura). Lice cause health problems in infected birds due to skin ulcers caused by feeding, which can result in weight loss and bacterial infections. (4, 5). Ectoparasites cause other problems, such as decreased feed intake due to the bird's constant grooming of its feathers, which reduces feeding time, this is because birds spend a lot of time grooming their feathers instead of participating in their various life activities (6).

In research conducted worldwide, approximately 4,000 species of lice-infected birds have been recorded. These lice species fall into the suborders Amblycera and Ischnocera, and these parasites rely on the skin tissue and feathers of their hosts for their nutrition. These species are also known as "chewing lice" due to their unique feeding mechanism. Most chewing lice species tend to have a high degree of host specialization, making them prime examples of coevolutionary patterns between parasites and their hosts (7, 8).

The genus *Columbicola* includes approximately 88 described morphotypes, which parasitize doves and pigeons (Columbiformes). Species in this genus are relatively host-specific, with most being specific to only one host species. The primary mode of transmission of lice between birds is through direct contact, such as between parent birds and their young in the nest. In addition, species in this genus can inadvertently spread the winged parasite of birds, the hippoboscid louse fly. (9,10).

Lice consume the bodily fluids of birds, such as feathers and blood. Lice have chewing mouthparts that feed on scab tissue, dried skin flakes, and sections of a feather. However, the effects of lice parasites extend beyond bloodsucking and skin irritation. They can sometimes be severe, including other infections and stunted growth. (11). *Columbicola columbae* louse is the first species documented as a parasite of pigeons, and it infects a large number of other species and hosts (12). The pigeon louse (*C. columbae*) is a prominent and important example in research on ectoparasites and host-parasite interconnected coevolution (13).

Doves and pigeons can transmit a wide range of parasites and pathogens (bacterial and viral infections) to different flocks, making them a major source of disease transmission and infection. (14, 15). There are many factors that can affect the incidence of parasitic infections in doves and pigeons, including geographic location, availability of food sources, varying climatic conditions, and interactions with other bird species (16).

Columba livia domestica, a ubiquitous domestic pigeon, is associated with humans in many parts of the world. This pigeon often inhabits human homes and causes environmental pollution with its droppings. Parasites can cause significant damage to *C. livia*, causing slow growth, nutrient deficiencies, decreased egg production, weakened immunity, and even death (16, 17). The laughing dove (*Streptopelia senegalensis*) is a resident bird belonging to the pigeon family, and its presence is distributed in almost all regions of the world. It has been given the name "resident dove" due to its constant presence throughout the year in various ecosystems within the region. This bird can be seen in diverse natural environments, as well as in residential neighbourhoods, cities, and villages (18).

Due to the importance of these external parasites that infect birds from an economic and veterinary perspective, we found it necessary to conduct this study aimed at identifying the types of external parasites that infect wood pigeons and Eurasian collared doves.

Material and Methods

A total of 123 birds (66 domestic pigeons *Columba livia*, and 57 laughing doves *Streptopelia senegalensis*) were purchased and captured during the period from November 2024 to July 2025 from different locations in the districts and sub-districts of Babylon Governorate. The diagnosis was based on Allouse (19). The parasite was identified and classified based on descriptions in several researches, including: Issa *et al*. (20); Hassan *et al*. (21); Hamza & Ndams (22); Al-Shabibi & Hatem (23). Ethical approval was obtained from the University of Babylon/College of Basic Education/Department of Science, approval number and date 16 dated 05/01/2025.

Lice collection: Lice were collected from the feathers wing, under the tail, back, and belly using fine forceps. The samples were placed in small containers containing 70% alcohol and a few drops of glycerol until the day of examination. Samples were diagnosed using lenses 10x and 40x and imaged using a 40 mica microscope camera. (22).

Results: Fifty-seven laughing dove samples were examined, and 17 (29.82%) were found to be infected with ectoparasites. Sixty-six domestic pigeon samples were examined, and 21 (31.81%) were found to be infected. Only one ectoparasite species was diagnosed, *Columbicola columbae*, which was found in wing and tail feathers (Figure 1).

Detailed data on the prevalence and locations of parasites are presented in Tables (1,2).

Fig. 1: *Columbicola columbae* louse (10x) on two bird species

Table 1: Infection prevalence rate of *Columbicola columbae* lice in laughing doves and domestic pigeons.

Type of birds	Number examined	Infestation rate
Laughing doves	57	17 (29.82%)
Domestic pigeons	66	21 (31.81%)

Table 2: Locations of *Columbicola columbae* lice in the feathers wing, under the tail, back, and belly.

Type of birds	back, and belly	wing, under the tail
Laughing doves	22%	78%
Domestic pigeons	27%	73%

Discussion

Comparing the results of our current study with other studies in Iraq, the incidence of this type of lice was lower than the rates recorded in studies such as: Alali *et al*. (24) on pigeons endemic to Karbala, at a rate of 81%, and Zangana & Sultan (25) on domestic chickens in Tal Afar district, at a rate of 50.90%, but lower than the findings of (26), who indicated that pigeons in the governorates of Duhok, Erbil, and Sulaymaniyah were infected at rates of 19%, 18.5%, and 10.5%, respectively.

While the infection rate was somewhat similar to the infection rate reported by (27) on domestic pigeons, turkeys and chickens in Babil Governorate, at a rate of 32%, the incidence rate was higher than that recorded by. (28) on migratory birds in Lake Razzaza.

At the same time, when comparing the results with the results of other studies in the world, the percentage was lower than the percentages reported in several studies, including: Rezaei *et al*. (29) on free-range chickens, domestic pigeons, and turkeys in Kermanshah Province, western Iran, with a percentage of 61.7%, and in Zabol, southeastern Iran, by (30) on pigeons with a percentage of 78.40%, and in the Sargodha area, eastern Pakistan, by (31) on pigeons with a percentage of 87.95%, and when studying the large increase in the number of pigeons endemic to the urban areas of Carmen de la Legua, Callao, Peru, by (32), the prevalence of lice reached 96.7%, and in the city center of Diyarbakir, Turkey, (33), found that 48% of pigeons were infected with this type of lice. While (34) found in the urban area of the city of Villavicencio, Mita, reported that 100% of endemic pigeons were infested. In the Sadar Upazila of Dinajpur, Bangladesh, (35) found that the incidence of this lice in farmed pigeons was 78.67%. (36) reported an 86.6% infestation of pigeons in Malakand District, Khyber Pakhtunkhwa Province, Pakistan. (37) reported a 33.33% infestation rate in their study of pigeons in the mountainous areas of Meghalaya.

Several studies have reported lower infection rates than those recorded in the current study, including: (38) on laughing doves in Zaria, Nigeria, with a rate of 9.7%; (22) on laughing doves and pigeons in Zaria, Nigeria, with a rate of 2.82%; and finally, (21) on local chickens in Ismailia Governorate, Egypt, with a rate of 15.88%. Regarding the presence of lice on the back and tail areas of the body mentioned in Table 2, the infection rates were like the rates mentioned in the studies mentioned above. These differences in infection rates in studies and research, whether in Iraq or abroad, are due to the number of birds examined, the season of the year, and the locations where they were collected or hunted, whether in urban or rural areas.

Conclusions

The current study found that Domestic pigeons and laughing doves were infected with *Columbicola columbae* lice, with an infection rate of 31.81% and 29.82% respectively. The study showed that the density of the parasite under the wing and tail increased by 78% and 73% compared to the back and abdomen (22% and 27%) in laughing doves and domestic pigeons. The importance of these results is highlighted by the harm that parasites cause to birds and their potential role in transmitting diseases to humans and animals, and this type of lice was also recorded for the first time in laughing doves in Iraq.

Conflict of Interest

The authors declare that there is no indication of a conflict of interest.

Ethical Approval

The Research Ethics Committee approved this work.

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انتشار قمل *Columbicola columbae* في الحمام المتوطن وفاختة النخيل في محافظة بابل

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الخلاصة

تُعد الطفيليات الخارجية، وخاصة القمل، من مسببات الأمراض الشائعة في اليمام والحمام، حيث أظهرت الدراسات معدلات انتشار عالية بشكل ملحوظ. تشير الأدلة العلمية إلى أن الإصابة الشديدة بالقمل ترتبط بتغيرات سلوكية غير طبيعية، وانخفاض الأداء الإنجابي، وضعف الاستجابة المناعية لدى الطيور المصابة. تم إجراء المسح الميداني في الفترة من نوفمبر 2024 إلى يوليو 2025، وشمل فحص 123 عينة تمثل فاختة النخيل (*Streptopelia senegalensis*) والحمام المتوطن (*Columba livia*). تم جمع العينات من مختلف اقضية ونواحي محافظة بابل باستخدام منهجية أخذ العينات العشوائية المنهجية لضمان التمثيل الجغرافي الشامل للطيور في المنطقة المدروسة. وأشارت نتائج الدراسة الحالية إلى أن معدل انتشار قمل *Columbicola columbae* في الحمام المنزلي بلغ 31.81%، بينما بلغ في فاختة النخيل 29.82%. وكانت كثافة الطفيلي تحت الجناح والذيل أعلى بنسبة 78% و73% من وجوده على الظهر والبطن، والتي كانت 22% و27% في فاختة النخيل والحمام المتوطن، على التوالي. ولهذه النتائج أهمية كبيرة نظرا للضرر الذي تسببه هذه الطفيليات للطيور المصابة، بالإضافة إلى كونها مصدرا محتملا لانتقال الأمراض الشائعة بين الإنسان والحيوان. تم تسجيل هذا النوع من القمل لأول مرة في فاختة النخيل (*S. senegalensis*) في العراق.

الكلمات المفتاحية: القمل، الحمام المتوطن، فاختة النخيل، بابل.