

Some Aspects of Infestation of Chewing Lice in Chickens and Pigeons in Basrah Province, Iraq

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Abstract

Poultry is infected with many external parasites, chewing lice is the most important of those parasites. It attacks poultry, especially in rural and local free farms. The aim of this study is to identify the species of chewing lice parasitize chickens and pigeons in Basrah province, and to study some aspects of the infestation. A total of 240 chickens and 240 pigeons were examined. The results showed a recording of six species of chewing lice, three were parasitic on chickens: *Macanthus stramineus*, *Menacanthus cornutus*, and *Menapon gallinae*. There were also three species on pigeons: *Campanulotes bidentatus*, *Hohorstiella lata*, and *Columbicola columbae*. The total prevalence in chickens was 45.42% and in pigeons 42.92%. The prevalence of chewing lice species varied during the study period. In Chickens and in pigeons. Triple infestation was the highest rate in chickens and pigeons. The sites of infestations in birds' bodies were observed. The aim of this study is to identify the species of chewing lice that parasitize chickens and pigeons in Basrah province and to study some aspects of the infestation.

Keywords: Chewing lice, Chickens, Pigeons.

Introduction

Poultry production is an important economic sector in the world. Chickens are an important source of protein in various

countries (1). All birds are susceptible to infestation by internal and external parasites, and infected birds pose a significant risk due

to their role in transmitting many pathogens such as bacteria, viruses, and fungi (2). Lice can infect most birds and mammals (3). Chewing lice infestations in birds can also lead to stunted growth, decreased egg production, and susceptibility to other diseases (4). Infected birds also suffer from poor health due to the appearance of ulcers that lead to bacterial infestation and weight loss (5). Lice belong to the order Phthiraptera, which is classified into four suborders: Amblycera, Ischnocera, Rhyncophirinae, and Anoplura (6). Biting lice are wingless parasites that live permanently on their hosts (7). It is characterized by its body divided into a head, thorax, and abdomen, and strong

Materials and Methods

Study area: Lice samples were randomly collected from 240 local chickens *Gallus domesticus* and 240 domestic pigeons *Columba livia* from different areas of Basra. The sites of study were varied in environmental and geographical characteristics, some of which were residential areas and some of which were agricultural areas. The period of study was from November 2023 to October 2024.

Sample collection and preservation:

The birds were examined monthly for a period of one year, as they were examined with the naked eye for all areas of the body, including the head, neck, wings, and around the anus, and insects were isolated by hand and forceps, and they were kept in a glass tube containing 70% alcohol, and lice were placed for each area of the host's body in an independent glass tube and the information

mouthparts located on the ventral surface of the head (8). It has antennae that are visible or hidden within grooves on the head, and legs that are modified for adhesion and attachment to feathers, ending in claws (9). Lice are easily transmitted from one bird to another by chemical contact, and the infestation spreads quickly among birds that live in the same environment, which lacks means of hygiene and disease prevention (10). It is found in different parts of the bird's body, such as the head, wings, chest, abdomen, and rear of the body. Lice depends for its nutrition on nibbling feathers and skin and sucking blood (11). It spends its entire life cycle on the host because it needs warmth and temperature to remain alive (12)

was recorded on it, as the isolated lice were transferred to a 10% KOH solution for 24 hours for clarification. They were then washed with distilled water and placed in xylol for 1-2 minutes. They were then mounted on glass slides using Canada Balsam solution. They were then examined under a microscope for morphological diagnosis based on the taxonomic keys (13) and (14). The diagnosis was confirmed by the Natural History Museum at the University of Baghdad.

Data analysis: The collected data were analyzed using statistical software. Pearson's chi-square test was used to determine the effect of environmental factors such as temperature and humidity on percentage and the severity of the with biting lice SPSS(15)

Results

The current study, six species of chewing lice were identified. The total prevalence in

chickens was 45.42% and 42.92% in pigeons. Three species were recorded from chickens, *Menacanthus stramineus*, *Menopon gallinae*, and *Menacanthus*

cornutus. Three species isolated from pigeons as follows, *Hohorstiella lata*, *Columbicola columbae*, and *Campanulotes bidentatus* (figure1).

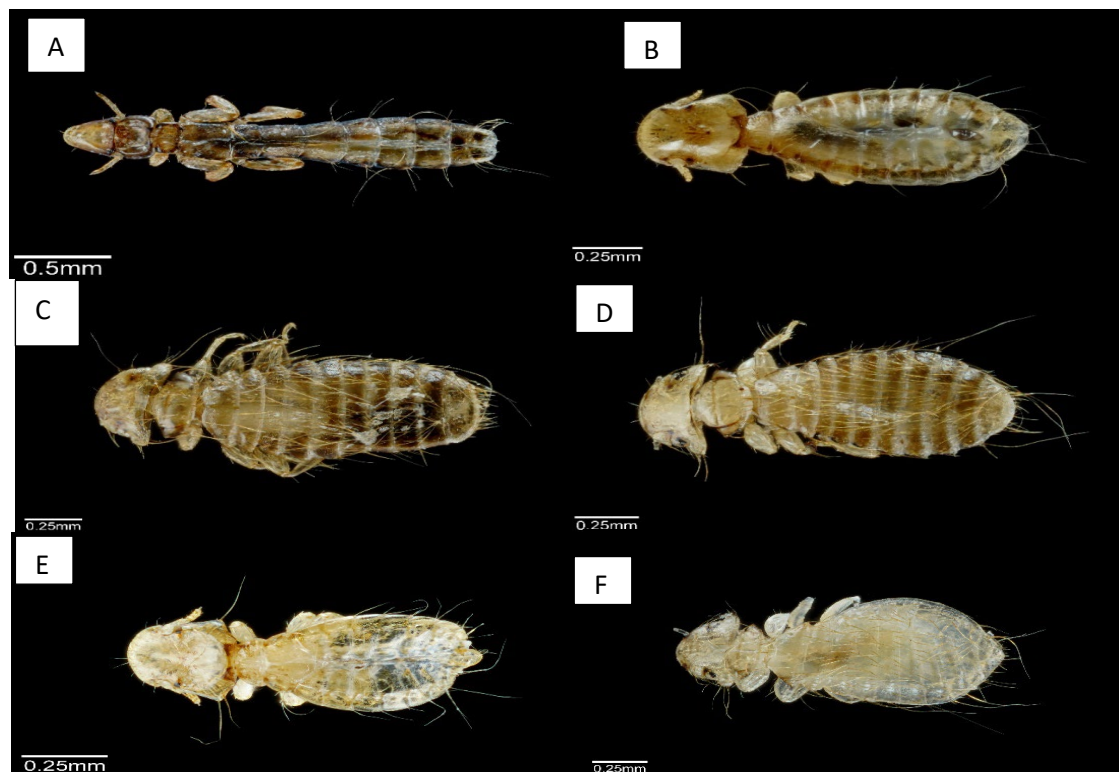


Figure 1: The species of chewing lice that recoded in the study. (A) *Columbicola columba* (B) *Campanulotes bidentatus* (C)*Mencanthus stramineus* (D)*Menopon gallina*, (E) *Menacanthus cornutus*, (F) *Hohorstiella lata*.

The prevalence of chewing lice species varied during the study period. In Chickens, the highest percentage was for *Menacanthus stramineus* at 41.25%, followed by *Menacanthus cornutus* 37.08%, while *Menopon gallinae* recorded 25.83%. The proportions also varied during the months of the study. *M. stramineus* recorded the highest percentage in October and November, amounting to 55%, while the lowest was during January at 25%. *M. cornutus* recorded the highest percentage in

May and October with 50%, and the lowest was in January 20%. Whereas *Menopon gallinae* recorded the highest infestation in October with 40%, and the lowest infestation was in January at 15%. The results of the statistical analysis showed significant differences during the months of the study at the level of the probability of $P < 0.05$, as shown in Figure (2). Figure 3 shows the number of lice isolated from each species infesting chickens during the study period.

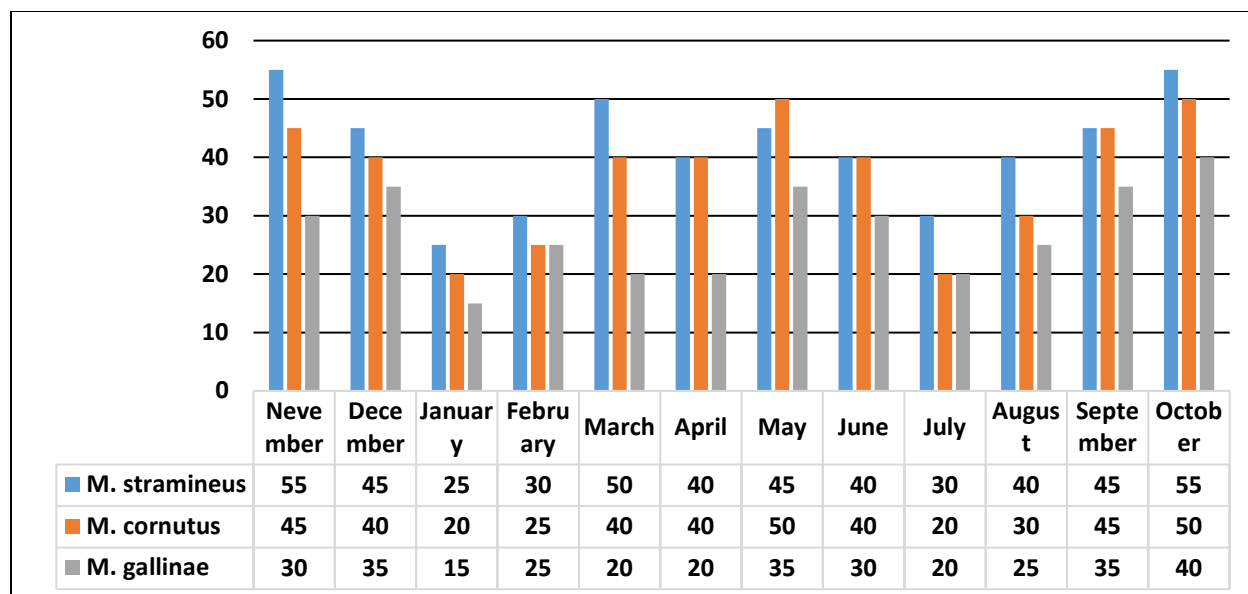


Figure2: The percentages of chickens with species of chewing lice during the study period

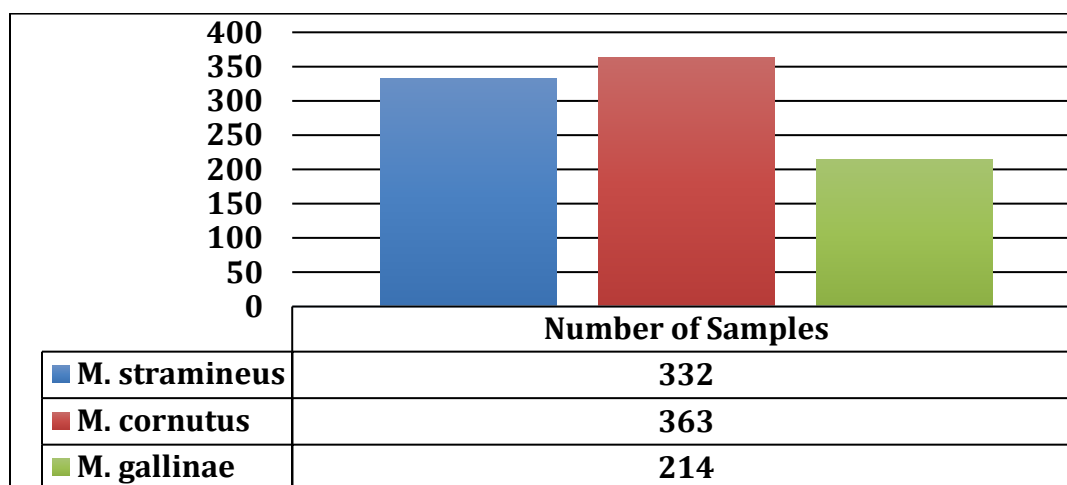


Figure3: Number of samples of chewing lice infesting chickens.

The highest total infestation of chewing lice in chickens was recorded in October at 60%, and the lowest infestation was in January at 30%. The statistical analysis showed

significant differences between the infestation rates and the months of the year under the level of probability $P < 0.05$, as shown in the table (1).

Table1: Total of chewing lice in chickens during the study period.

Months	Number of chickens examined	Number of chickens infested	Percentage %
November	20	11	55
December	20	9	45
January	20	6	30
February	20	7	35
March	20	11	55
April	20	10	50
May	20	10	50
June	20	8	40
July	20	7	35
August	20	8	40
September	20	11	55
October	20	12	60
Total	240	109	45.42

Some environmental factors were measured monthly during the period of study including temperature and relative humidity. The results of the statistical analysis showed

significant differences in temperature and relative humidity with the percentages of chewing lice in the months at the level of significance $P < 0.05$ as shown in Figures (4).

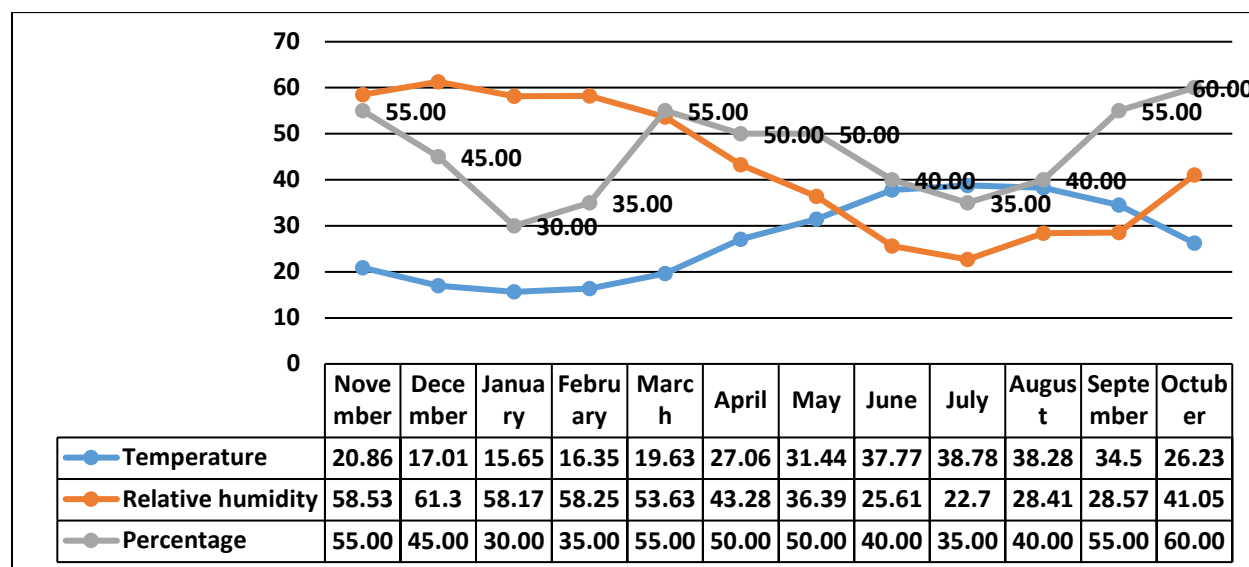


Figure4: The relationship between the monthly percentage of chewing lice in chickens with temperature and relative humidity.

Table (2) showed the patterns of chewing lice in chickens. The triple was constituted a percentage of 57.79% followed by double with 22.93%. While the single infestation was the least frequency by 19.26%.

Statistical comparison found significant differences in the patterns of infestation during the study at the level of significance $P < 0.05$.

Table2: Patterns of infestation of chewing lice in chickens.

Type of	Number of cases	Percentage
Single	21	19.26
Double	25	22.93
Triple	63	57.79

Table 3 showed that there is a difference in the locations of lice species on the parts of the bird's body, as it was found that each type has a place designated on the bird's

body, as the type *M. stramineus* is found in the neck, abdomen and tail. *M. cornutus* is widespread in most parts of the body, while *M. gallinae* affects wing and tail feathers.

Table3: Sites of infestation of chewing lice in chicken's body, (+), (-) no.

Lice species	Head	Neck	Wing	Abdomen	Tail
<i>M. stramineus</i>	+	+	-	+	+
<i>M. cornutus</i>	+	+	+	+	+
<i>M. gallinae</i>	-	-	-	-	+

In domestic pigeons, Figure (5) shows the monthly distribution of the species of lice on domestic pigeons. The species *C. bidentatus* recorded the highest percentage in April with 65%, and the lowest was in January at 20%. *C. columbae* recorded the highest percentage in May with 60%, and the lowest was in January and July at 20%. While *H.*

lata recorded the highest percentage in May with 40%, and the lowest was in January at 15%. The results of the statistical analysis showed significant differences in incidence rates during the months of the study. Figure 6 shows the number of lice isolated from each species infesting pigeons during the study period.

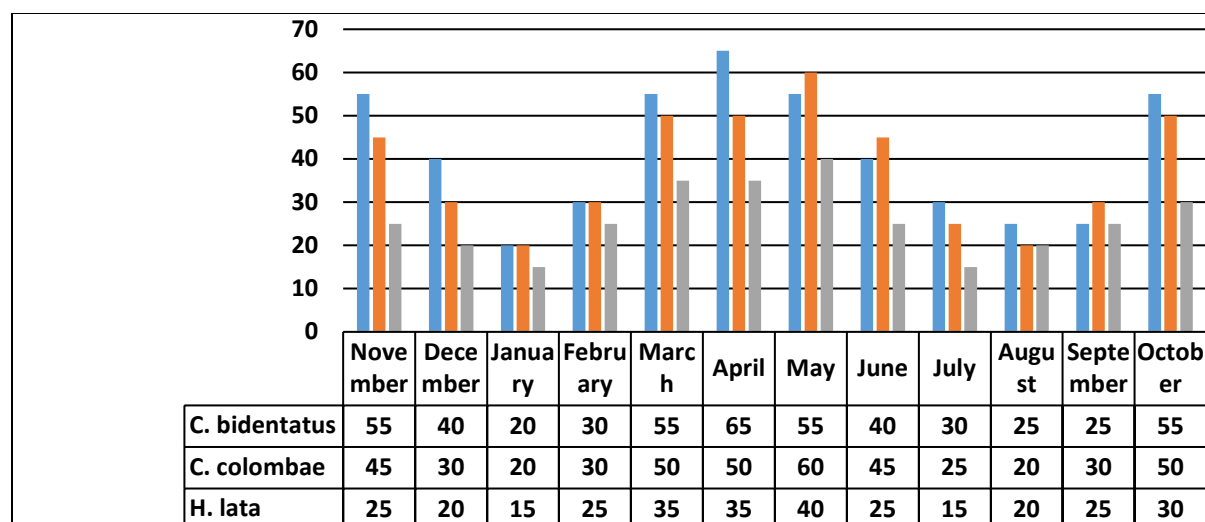


Figure5: The percentages of pigeons with species of chewing lice during the study period.

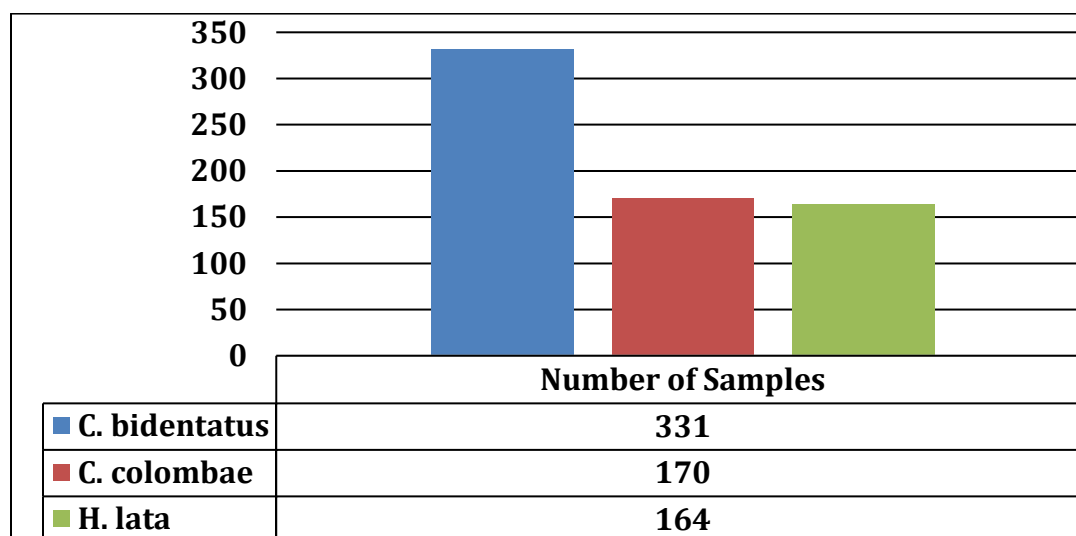


Figure6: Number of samples of chewing lice infesting pigeons

Table (4) and figure 7 shows the total percentages of infestation of domestic pigeons. The percentages of infestation varied during the months. The highest infestation was recorded in May, June and October with 55%, while the lowest

percentage was recorded in January at 20%.

The statistical analysis showed significant differences between the rates of infestation during the months in the level of significance $P < 0.05$.

Table4: Total of chewing lice in pigeons during the study period

Months	Number of Pigeons examinee	Number of Pigeons infested	Percentage %
November	20	10	50
December	20	9	45
January	20	4	20
February	20	8	40
March	20	9	45
April	20	10	50
May	20	11	55.
June	20	11	55
July	20	7	35
August	20	5	25
September	20	8	40
October	20	11	55
Total	240	103	42.92

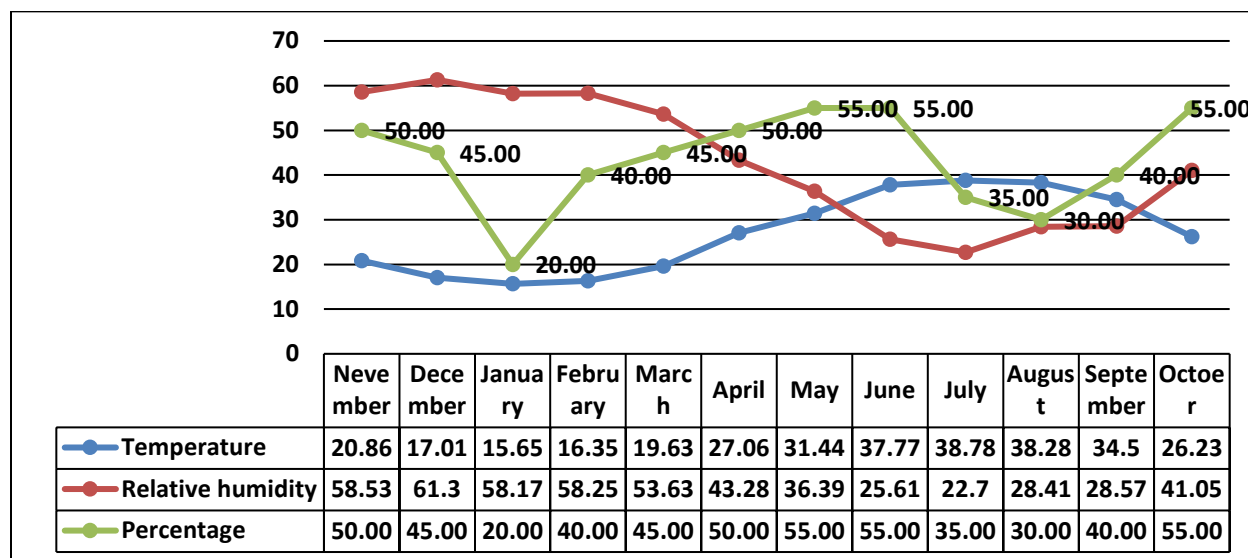


Figure7: The relationship between the monthly percentage of chewing lice in pigeons with temperature and relative humidity.

Table (5) shows the patterns of s of the species during the study in the domestic pigeons. The triple recorded the highest percentage with 60.19%, while the double

was 22.33%, and the single was 17.47%. The statistical analysis observed significant differences in the kinds of infestation during the study to the level of significance $P < 0.05$.

Table 5: Patterns of infestation of chewing lice in pigeons.

Type of	Number of cases	Percentage
Single	17	16.5
Double	24	23.3
Triple	62	60.19

Table 6 shows the distribution of the three types of chewing lice on the body of domestic pigeons, as the species *C. bidentatus* appeared in the areas of the feathers of the neck and the base of the tail,

while *C. columbae* concentrated its presence in the feathers of the wings, while *H. lata* is spread in the bases of the feathers located in the wings and the base of the tail.

Table6: Sites of infestation of chewing lice in pigeon's body, (+) , (-) no .

Lice species	Head	Neck	Wing	Abdomen	Tail
<i>C. bidentatus</i>	-	+	-	+	+
<i>C. columbae</i>	+	-	+	-	-
<i>H. lata</i>	-	-	+	-	+

Discussion

During the present study, there are some variations in the percentages of lice infestation during the months. On the other hand, the percentage of infestation of chickens varied from in pigeons, as the percentage in chicken infestation reached 45.42% of the total number of chickens, while in pigeons, it reached 42.92%. Which is similar to the rates recorded globally by (16) in Iran and (17) in Nigeria.

The rates of infestations of species varied during the months of the study. (18) pointed out during their study on the effect of seasons on the rates of infestation of parasitic lice in India. The impact of climate

on the incidence of chewing lice, while (19) in South America, where the percentage of chewing lice insects increases in winter and spring as cold and mild weather (20). The incidence of chewing lice and their numbers increase during the autumn and winter seasons, and this generally depends on the climate of the areas where is present with those insects. As the current study found that the species were present during the months of the year and in different proportions and that the infestation with chewing lice is not affected by environmental factors much, perhaps depend on good poultry breeding, cleanliness and

attention to their nutrition only, it was noted that areas with negative breeding of those domestic animals increase the incidence compared to the correct breeding areas, and this is consistent with the study of (21) indicated that there is no difference in the rates of infestation of species with the change of the environmental factor (temperature and relative humidity).

Regarding the differences between the prevalence of lice species recorded during the study: It was clear that the incidence of chicken body lice *Menacanthus stramineus* was the highest rates compared to other species, and this is similar to the results of studies of (22) and (23). This study is consistent with (24), that the incidence of *Menacanthus stramineus* in the city of Mosul is the highest rate. The results of the present work differ from the studies (25), (26), and (27). As they confirmed that the single the most common of the rest of the infestations. The reason for the high incidence of one species is due to the living and environmental competition between parasites on the host, and agreed with (28). The reason is attributed to the high incidence of the rate of triple infestation, especially in acute infestation to encourage with other species of external parasites due to the weak resistance of the bird due to the infestation.

The species of lice isolated during the study differed from each other in terms of the locations where they were found in the bodies of the birds studied. Tables (5) and (6) also show the different places where lice parasitize on the bodies of birds. The variation in the distribution of specific lice

species across different regions of the host's body is attributed to the morphological adaptations of the lice. Species with short, rounded bodies are more suited to certain areas, whereas species of the order Ischnocera predominantly occupy the head and neck regions due to their body structure. Additionally, the dorsoventral flattening of some species enables them to inhabit the wings and back. The dominance of certain species over others may also be influenced by their reproductive success, which allows them to colonize larger areas of the host's body compared to less fertile species (29).

Conclusion

There are some differences in the infestation rates among the recorded species of chewing lice on chickens and pigeons, in terms of prevalence and number of lice. The infestation percentages in chickens and pigeons increase in areas lacking health conditions and where improper rearing practices are followed. A high degree of host specificity was observed between chewing lice species and bird hosts

Conflicts of interest

The authors declare that there is no conflict of interest.

Ethical Clearance

This work is approved by The Research Ethical Committee

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بعض جوانب الإصابة بالقمل المتطفل على الدجاج والحمام المنزلي في محافظة البصرة، العراق.

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الخلاصة

تصاب الدواجن بالعديد من الطفيليات الخارجية من أهمها القمل القارض، الذي يهاجم الدواجن خصوصاً في المناطق الريفية وحقول الدواجن. تؤدي الإصابة بالقمل الى العديد من التأثيرات المرضية، منها توقف النمو وانخفاض انتاج البيض وتساقط الريش وغيرها. هدفت الدراسة الحالية الى تشخيص أنواع القمل المتطفل على الدجاج المحلي والحمام المنزلي مظهرياً والى تقدير النسب المئوية وتحديد التواجد الشهري للإصابة ومدى تأثيره بالعوامل البيئية للفترة من تشرين الثاني 2023 لغاية تشرين الأول 2024 من عدة مناطق محافظة البصرة. تم فحص 240 طائر من الدجاج و240 طائر من الحمام المنزلي. وظهرت نتائج الدراسة الحالية تسجيل ستة أنواع من القمل القارض، ثلاثة منها كانت متطفلة على الدجاج وهي: *Macanthus stramineus*, *Menacanthus cornutus*, *Menapon gallinae* . اما الأنواع المعزولة من الحمام فقد كانت ثلاثة أيضاً وهي: *Hohorstiella lata*, *Campanulotes bidentatus*, *Columbicola columae* . وبلغت نسبة الإصابة الكلية في الدجاج 45.42% وفي الحمام 42.92%. تباينت نسب انتشار أنواع القمل حسب الأشهر خلال فترة الدراسة في الدجاج والحمام. وكانت الإصابة الثلاثية هي الأعلى إذ بلغت في الدجاج والحمام. وكذلك تم تحديد أماكن إصابة الأنواع المسجلة من القمل القارض في اجسام الدجاج والحمام.

كلمات مفتاحية: القمل القارض، الدجاج، الحمام.