Identification of two new species of chewing lice in pigeon (Columba livia domestica) in Kerbala Province, Iraq

Cite as: AIP Conference Proceedings **2290**, 020037 (2020); https://doi.org/10.1063/5.0027457
Published Online: 04 December 2020

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Identification of two new species of chewing lice in pigeon (columba livia domestica) in Kerbala province,Iraq

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Abstract.The goal of this study was to determine the spread and identify of chewing lice on pigeons (*Columba livia domestica*) during the period from July to December 2019. Three species of lice were only found *Columbicola columbae* (Linnaeus 1758), *Columbicola tschulyschman* (Eichler, 1942) and *Campanulotes compar* (Burmeister, 1838) in Kerbala province, Iraq. A total of 180 pigeons were randomly selected from the cubbyholes in markets (90 males and 90 females) to estimate the presence of chewing lice. Results were recorded two species of ectoparasites including *Columbicola tschulyschman* (Eichler, 1942) and *Campanulotes compar* (Burmeister, 1838) for the first time. The total infestation of pigeons was 81% of all examined pigeons. No significant differences were observed between males, female and months (P>0.05). The highest percentage was (100%) in July and August and lowest in September and December was 66.6%. Although *Columbicola columbae* was more abundant, but other two species of lice was found. No significant differences between lice Species and sex birds were observed (P>0.05). A significant differences were found among monthly infestations and lice Species (P ≤ 0.05).

Keywords: chewing lice, domestic pigeons, external parasites

INTRODUCTION

Ectoparasites or external parasites, are permanent arthropods that live in or on the feathers or skin, using many hosts and they feed on skin scales and feathers. Ectoparasites have direct and indirect effects on animal health and productivity (Adams *et al* 2005; Girisgin *et al* 2013). There are several genera of chewing lice, that continuously infest many pigeon and causing symptoms such as: atrophy in body, weakness, blood problems, restlessness, pruritus, dermatitis, skin reddening, feathers' lesion, decreasing of body weight discomfort and itching. At the same time of infestation of chewing lice, pigeon began scratching and picking to avoid the provocation caused by the louse (Jahantigh *et al* 2016; Kolomak and Kruchynenko 2017).

Globally ectoparasites are recorded to infest all species of pigeons and found on all parts hosts and may be reach to 20 species of lice in wild and domestic pigeons. Pigeons carry many types of ectoparasites (chewing lice, ticks, mites and flies (Naz *et al* 2016; Kolomak and Kruchynenko 2017). In Europe, Central Asia, and Africa *Columbicola columbae* lice was the first member have been described to infest pigeon (Columba) and many other species and type host Adams *et al* (2005). In Canadian seabirds, passerine birds and shorebirds, overall 463(54%) of chewing lice fauna has been reported Galloway (2019)

In Ukraine, five species of lice have been reported on domestic pigeons: *Campanulotes compar*, *Columbicola columbae* , *Bonomiella columbae* , *Neocolpocephalus turbinatum, Hohorstiella lata* . The infestation rate of *Bonomiella columbae* and *C. columbae* was 100 %, while the infestation rate of *C. compar* was (41.8 %) Kolomak and Kruchynenko (2017). The general health status of 139 free-living pigeons in the city of Ljubljana, Slovenia. The examinations was included parasitic, bacterial, and viral diseases, and prevalenc totally72.7%. *C.columbae* more common than *Campanulotes bidentatus compar* Dovč *et al* (2004).

Naz *et al* (2010) examined 73 pigeons for chewing lice and found *C. columbae*, *C. tschulyschman*, *C. compar* and menoponidae (Amblycera) in the Karachi Region of Pakistan with prevalence over 50% of all examined. Other study carried out by Naz *et al* (2016) was reported the first chewing lice Menoponidae and Philopteridae in different birds. These chewing lice were *Columbicola columbae* (Linnaeus, 1758), *Campanulotes compar* (Burmeister, 1838). One hundred of domestic pigeons (*Columba livia*) in Tripoli and ;

The 8th International Conference on Applied Science and Technology (ICAST 2020)
AIP Conf. Proc. 2290, 020037-1–020037-7; https://doi.org/10.1063/5.0027457
Published by AIP Publishing. 978-0-7354-4020-3/$30.00

Libya was examined of chewing lice with total prevalence 89% (*Columbicloa columbae* 82%, *Goniodes gallinae*18%, *Menopon gallinae* 3% and *Pseudolynchia canariensis*1%) Alkharigy *et al* (2018).

One hundred of domestic Pigeons (*Columba livia domestica*) have been reported of ectoparasites in Bursa Province/Turkey. The research include 10 different sites with total province; 72%. *Goniocotes bidentatus* (47%), *C.columbae* (44%) and Menopon gallinae (1%) Senlık *et al* (2005).While Girisgin *et al* (2013) was recorded prevalence 68 (58.8%) in migratory and non-migratory wild birds. Al-Shaibany (2008) was the first study that reported chewing lice on rock pigeon *Columba livia* (Gmelin 1789) in AL-Diwaniya province: *C. tschulyschman*, *C. compar*, *C. columbae*, *Coloceras damicorne*, *Hohorstiella lata*, *Bonomiella columbae*, *Columbicola* sp., *Simulium* sp. and *Argas persicus*. Totally of ectoparasites infestation rate was (%68.42).

Hasan (2019) has been examined of ectoparasites on 85 birds of domestic pigeons (*Columba livia domestica*) in different sites of Mosul province. The results were showed two types of ectoparasites are: *C. columbae* 87.5%,and soft ticks is *Argas persicus* 18.8%.In Baghdad, Iraq (al-Bayati and Alamary 2012) was isolated ectoparasites from family *Columbidae*. Totally the study revealed two Lice species, *Columbicola columbae* 44.66%, and *Campanulotes bidentatus caompar*e 1.66% *Pseudolynchia canariensis* 3.33% and *Argas persicus* 35.71%. Another study in Baghdad city,Iraq was reviewed diagnosis of louse infested birds from Columbidae family, and more common are: *Columbicola columbae*, *Menacanthus stramineus*, *Cuclutogaster heterographus, Goniocotes gallinae* and *Menopon gallinae*. These study focused on only two louse *Columbicola columbae* (Linnaeus 1758) and *Menacanthus* sp. (Neumann, 1912) Jassim and Hadi (2019).

While Al-Mayali and Al-Shabany (2014) was collected ectoparaites in Al-Dywania, Iraq from *C.livia* and *C.domestica* and infest with *C. columbae*, *C. tschulyschman*, *C. compar*, *Coloceras damicorne*, *Bonomiella columbae*, *Hohorstiella lata* and only *Menacanthus stramineus* in *C.domestica*. Chewing lice infest different types of birds including them migratory aquatic birds in Al-Dalmaj marsh/Iraq. The study include 154 birds and Results were recorded *C.* columbae (8.44%) and other ectoparasites, two species of them recorded for the first time in Iraq were: Menacanthus eurysternus (11.04%), and Trinoton querquedulae (5.84%) Al-Aredhi and Al-Mayali (2019).

Al-Barwari and Saeed (2012) was searched for 128 of the live rock pigeon (*Columba livia)* from many sites of Iraq. The samples were obtained from carcasses is *Columbicola sp.* 64.4% in female, 57.6% in male. Parasitic infections caused many of pathological disorders in wild pigeons from *C. columbae* in Duhok province from 100 adult pigeons with prevalence 6 (6 %) and *Raillietina tetragona* 22 (22%). Skin infestation cause pathological change characterized by excessive mucoid masses and mild catarrhal inflammation Omer (2015). The aim of the current study were to determine the ectoparasites on pigeons (*Columba livia domestica*) in the Kerbala province, identify of the lice species, and prevalence of lice and detect the rates of infestation.

MATERIAL AND METHODS

Collection of specimens

Firstly each bird were examined with the naked eye of feathers and skin birds by use magnifying glass. A total of 180 pigeons (*Columba livia domestica*) from different markets at the Kerbala province/Iraq, during the period from July to December 2019 and consist of (90 males and 90 females). Pigeons were transferred to the laboratory of veterinary parasitology, college of veterinary medicine, university of Kerbala, data of pigeons (sex, number of infested pigeon per month) were recorded.

Examination of Parasites

All the lice were counted and examined species of Columbidae family preserved in 70% ethyl alcohol and then clarified in KOH 10% for 24 hours and washed with distilled water, then mounted using canada balsam and identified using a light microscope in accordance with Girisgin *et al* (2013). The prevalence of infestation with percentage were calculated using Margolis *et al* (1982). Although the detection was depended on Adams *et al* . (2005), the final diagnosis was done by **Sarah E. Bush, (Ph.D. Entomology, University of Utah, Department of Biology).**

RESULTS

The current study showed that the distribution and identification of lice species in domestic pigeon (*columba livia domestica*) in Kerbala province. A total of (180) pigeon, the number infested was (146), the infestation rate of chewing lice was 81%. The highest percentage was (100%) in July and August and lowest in September and December was 66.6% as shown in **Table (1)**. No significant differences were observed between males, female and months (P>0.05). In the these study, three species of chewing lice were reported in domestic

pigeon *C. columbae* , *C. tschulyschman* and *C. compar*. Two species of them record for the first time in Kerbala province were (*C. tschulyschman* and *C. compar*) as shown in **Table (2)**. No significant differences between lice Species and sex birds were observed (P>0.05).The highest infestation number was (30) in November and lowest in August was (10) as shown in **Table (3)**. Statistical analysis was done using SPSS software, version 16. A significant differences were found among infested birds according to the lice species and months ($P \leq 0.05$).

TABLE 1. The relationship between months infestations rate and sex birds

Month	**No. of pigeon**	**No of infested male**	**prevalence of infested male%**	**No of infested female**	**prevalence of infested female%**	**No of infested pigeon**	**Total Prevalence of infested pigeon%**
July	30	15	50	15	50	30	100
August	30	15	50	15	50	30	100
September	30	6	20	14	46.6	20	66.6
October	30	11	36.6	13	43.3	24	80
November	30	6	20	16	53.3	22	73
December	30	5	16.6	15	50	20	66.6
total	180	58	32.2	88	48.8	146	81

TABLE 2. The relationship between lice Species and sex birds.

Louse Species	No. of parasites in Male pigeon	No. of parasites in Female pigeon	Total of louse	Prevalence of louse (%)
Columbicola columbae Linnaeus 1758	30	20	50	44
Columbicola tschulyschman-Eichler, 1942	11	26	37	32.7
Campanulotes compar-Burmeister, 1838	2	24	26	23

Table 3. The relationship between monthly infestations and lice Species

July	7	5	2	14
August	5	5	0	10
September	9	5	4	13
October	9	2	5	16
November	10	15	5	30
December	10	5	10	25
	50	37	26	113

FIGURE1. *Columbicola columbae,* A- Female B- Male

FIGURE2. *Columbicola tschulyschman,* A- Female B- Male

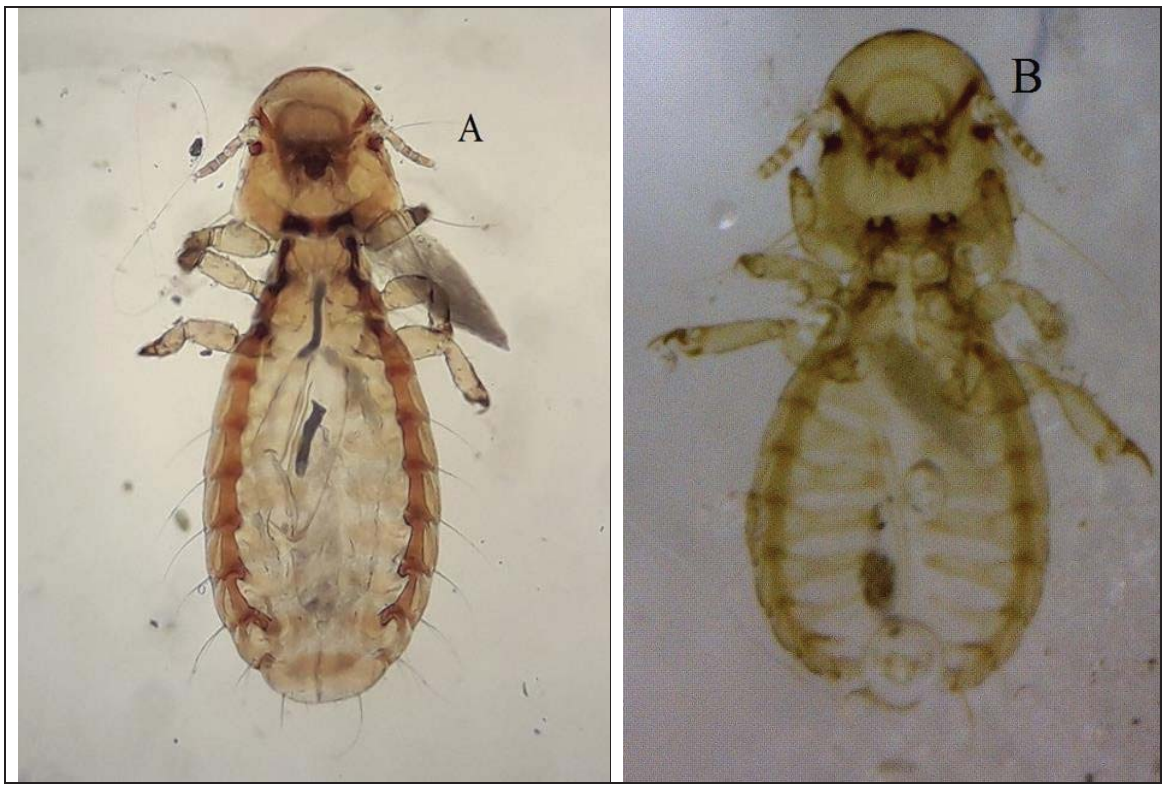

FIGURE3. *Campanulotes compar*, A- Female B- Male

DISCUSSION

During the period of the current study were ranged from July to December 2019.The results of the present study reported three species of ectoparasites in Kerbala province. Among (180) pigeon, the number of infested is (146) with total infestation rate was (81%) and this in agreement with Al-Shuaaibi (2007) who reported prevalence 80% of chewing lice in pigeon (domestic and feral) in Al-Anbar city and Jahantigh *et al* (2016) was recorded 78.40 % in pigeons of Zabol, southeast of Iran, but not in agreement with Chu *et al* (2019) who reported of chewing lice of wild birds in China giving an 28.1%. The identified chewing lice for the first time are *C. columbae* (Linnaeus 1758), *C. tschulyschman* (Eichler, 1942) and *C. compar* (Burmeister, 1838), figure(1,2 and 3).The high infestation rate was (100%) in July and August. This finding was in agreement with Chu *et al* (2019) who reported the highest in the Columbiformes and Galliformes (100%) and lowest in September and December was 66.6%. The different infestation rates due to the various of types, numbers of birds examined, various study areas geographical distribution and climatic status that may play major role in the different of the infestation rate.

The distribution of body lice may fall to the ground more often than wing lice and explain that body lice are dislodged four times more often than wing lice on the ground Johnson *et al* (2011). No significant differences were observed between males, female of domestic pigeons and months and lice infestation refer to that both sex are equally exposed to the infestation at the same rearing.

Although wing lice (*C. columbae*) are more common in all of the world. High infestation rates of disease was recorded for all domestic and wild pigeon lice species, while the intensity and, the richness were considerably various (Kolomak and Kruchynenko 2017). No significant differences between lice Species and sex birds. In this study, *C. columbae* reach to (44%), this agreement with (Kolomak and Kruchynenko 2017), but (*C. tschulyschman*, *C. compar*) was (32.7%,23%) respectively, this agreement with Chu *et al* (2019).The two new species were *C. tschulyschman* and *C. compar* that explain Free-living pigeons are a source or potential with continuously contact with humans and animals. There are many pigeons do not obvious any clinical findings of disease, they may be a permanent source of disease Dovč *et al* (2004).

A ccording to monthly infestations with lice Species. The highest infestation number was (30) in November and lowest in august was (10).While the highest infestation of (*C. columbae*) was (10) in November and

December and lowest in August (5). *C. tschulyschman* have been recorded highest infestation was (15) in November and lowest was (2) in October. *C. compar* was recorded highest was(10) in December and lowest was(0) in August. A significant differences were found among infested birds according to the lice species and months ($P \leq 0.05$). This study agreement with (Awad and Mohammad, (2015); Chu *et al* (2019). In the present data, explain the difference between monthly infestations and lice Species may be related with temperature and humidity during collection of lice and different environments.

CONCLUSION

In conclusion, this is the first diagnosis of chewing lice in Kerbala province, Iraq on pigeon (*Columba livia domestica*) and study shows that external parasites and could be infest with many categories and that may be a potential of zoonotic parasites for Human population especially pigeon fanciers.

ACKNOWLEDGEMENTS

The authors would like to express their grateful to entomology scientist to **Sarah E. Bush, (Ph.D. Entomology, University of Utah, Department of Biology).** for here assistance in detection diagnosis of pigeon lice.

CONFLICT OF INTEREST

There is no conflict of interest.

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