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Chewing lice parasitic on migratory aquatic birds in Al-Delmaj marsh/ Iraq

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Abstract

This study was conducted to detect the chewing lice infested migratory aquatic birds in Al-Dalmaj marsh during the period from October 2017 to March 2018, for this aim 154 birds specimens belonging to 11 bird species were examined for the chewing lice infestation. Results of the current study showed recorded nine species of ectoparasites were: *Menacanthus stramineus* (37.01%), *Menacanthus cornutus* (18.18%), *Menacanthus eurysternus* (11.04%), *Menopon gallinae* (18.18%), *Trinoton querquedulae* (5.84%), *Columbicola columbae* (8.44%), *Aaticola crassicornis* (3.90%), *Fulicoffula gallinule* (3.25%) and *Saemundssonaria lari* (2.69%), two species of them recorded for the first time in Iraq were: *M. eurysternus* and *T. querquedulae*. No significant differences between males and females birds in infested with ectoparasites, while the infestation percentage of ectoparasites significantly decreased with weight increase at level ($P \leq 0.05$). The double infestation was the highest with a significant difference followed by single infestation then the triple infestation.

Keywords: migratory aquatic birds, Al-Dalmaj marsh, chewing lice

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INTRODUCTION

Birds are infested with various types of parasites that are usually present on the outer surface of the bird's body such as skin and feathers in a permanent or temporary manner. They play a dangerous and important role in transmitting fungal, bacterial and viral pathogens to humans and other animals, in addition, may be as an intermediate host for other parasites (Abrahamovich *et al.* 2006). It also reduces the resistance of birds to diseases and thus makes the bird susceptible to secondary infestation of bacteria and viruses, leads to the death of infected birds (Adang *et al.* 2008, Nasiri *et al.* 2014). Lice is one of the most widespread ectoparasites due to their high reproductive efficiency and their ability to tolerate of inappropriate conditions and hiding, making them pests kills birds (Permin and Hansen 1998), as well as having many of the structural and behavioral transformations that helped her to spend her life cycle with her hosts (Horak *et al.* 2005).

The lice of birds feed on nibbling or chewing dry skin and feathers, sweat and mucus secretion, and some lice feed on eggs and nymphs of the same type (Ford *et al.* 2004) and on the dry blood collected on the skin in the place of irritation caused by lice (Whiteman and Parker 2004).

Lice cause irritation of birds because of feeding, and their bites are severe and painful as well as the saliva is exciting and irritating (Ciszewska *et al.* 1996), in

addition, its cause skin rupture, feather damage, discomfort, and sleep disturbance in severe infection (Pickworth and Morishita 2007, Ece and Tünay 2018).

Several studies have indicated that aquatic birds infested with lice, in the Chafarinas Islands the western Mediterranean, Lafuente *et al.* (2000) study parasites that infested *Larus audouinii* and was able to isolate three types of chewing lice were: *Saemundssonaria lari*, *Austromenopon transversum* and *Koeniginirmus punctatus*, in addition one type of tick was: *Ornithodoros maritimus*, in France, Palma *et al.* (2002) reported infested *Greater flamingo* with four types of lice were: *Anaticola phoenicopteri*, *Anatoecus pygaspis*, *Colpocephalum heterosoma* and *Trinoton femoratum*, Dik (2010) recorded the following types of chewing lice *Columbicola bacillus*, *Afrimenopon waar* and *Anatoecus icterodes* Parasitic on some types of ducks in Turkey, in Iraq Awad and Mohammad (2015) noted infested aquatic birds located in Al-Sanaf marsh in the province of Dhi Qar with three species of chewing lice were: *Ardeicola expallidius*, *Fulicoffula gallinulae* and *Incidifrons* sp.

Due to Iraq has large water areas make its suitable environment for the presence of migratory aquatic birds during the winter and lack of studies of ectoparasites infested migratory aquatic birds, so the current study

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Table 1. Show names and numbers of examined birds

Birds name	Numbers
Anas crecca	14
Netta rufina	14
Anas strepera	14
Aythya ferina	14
Aythya nyroca	16
Anas platyrhynchos	14
Anas acuta	16
Anas Penelope	14
Anas clypeata	14
Fulic atra	14
Larus ridibundus	10

aims to isolate and diagnose ectoparasites from those birds (Al-Sadda *et al.* 2018).

MATERIALS AND METHODS

Birds Collect

During the period from October 2017 to March 2018 collected 154 aquatic birds belonging to 11 species from Al-Delmaj marsh, birds were transferred to the laboratory of parasitology at the department of biology, college of education, university of Al-Qadisiyah, date of collection, weight and sex of birds were recorded and classified birds depending on Allouse (1960 and 1961) as **Table 1**.

Examination of Birds

Birds were examined by eye and with use magnifying hand lens and the fine brush to isolate the lice from the feathers and skin, the lice collected preserved in 70% ethanol, placed in 10% KOH solution for 24 hours for clarification and washed with distilled, then mounted on a glass slide using canada balsam and covered by cover slide and examined under light microscope 4X and 10X (Dik and Uslu 2011). Identification based on Adams *et al.* (2005), Percentage and intensity of infestation were calculated using Margolis *et al.* (1982).

STATISTICAL ANALYSIS

Results data were statistically analyzed using the Analysis of variance (ANOVA table) according to the complete randomized design (C.R.D.). The mean of the coefficients compared when the differences were significant by using the Least Significant Difference (LSD) test at the probability level ($P \leq 0.05$) (Steel *et al.* 1997).

RESULTS AND DISCUSSION

Results of the current study showed that the infestation rate of ectoparasites in migratory aquatic birds was 55.80%, which is lower than percentage 87.00% recorded by Garbarino *et al.* (2013) in their study on 13 species of aquatic birds in Georgia, and higher than percentage 22.36% recorded by Awad and Mohammad (2015) in Iraq.

The different percentages (highest and lowest) due to the difference of numbers and types birds examined, different study areas and climatic conditions that may

Table 2. Lice species isolated from migratory birds with percentage and Intensity of infestation (N = 154)

Lice species	No. infested	Percentage	Intensity
<i>Menacanthus stramineus</i>	57	37.01	1.42
<i>Menacanthus cornutus</i>	28	18.18	1.29
<i>Menacanthus eurysternus</i>	17	11.04	1.12
<i>Menopon gallinae</i>	28	18.18	1.11
<i>Trinoton quergedulae</i>	9	5.84	1.22
<i>Columbicola columbae</i>	13	8.44	1.15
<i>Anaticola crassicornis</i>	6	3.90	1.33
<i>Fulicoffula gallinule</i>	5	3.25	1.40
<i>Saemundssonina lari</i>	4	2.60	1.25

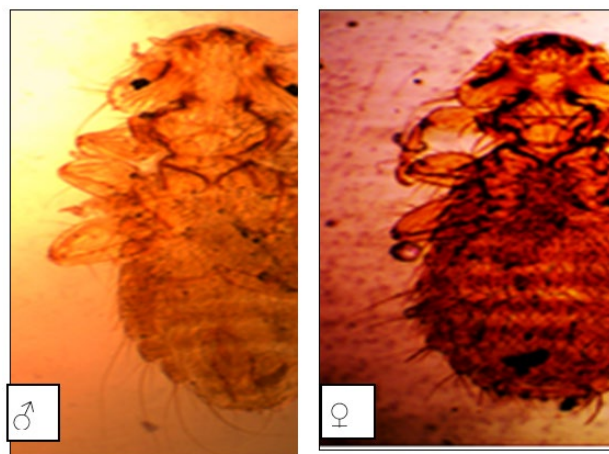


Fig. 1. *Menacanthus stramineus* (40x)



Fig. 2. *Menacanthus cornutus* (40x)



Fig. 3. *Menacanthus eurysternus* (40x)

play important role in the increase or decrease the infestation rate of ectoparasites.

In the current study, nine species of chewing lice were recorded in migratory birds present in Al-Delmaj marsh, tow species of them record for the first time in Iraq as shown in **Table 2** and **Figs. 1-9**.



Fig. 4. *Menopon gallinae* (40x)

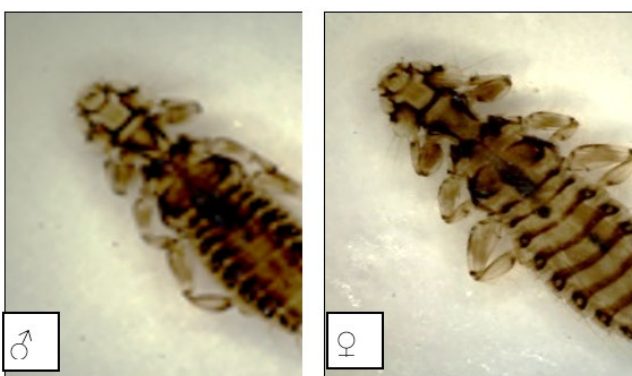


Fig. 5. *Trinoton querquedulae* (40x)



Fig. 6. *Columbicola columbae* (40x)

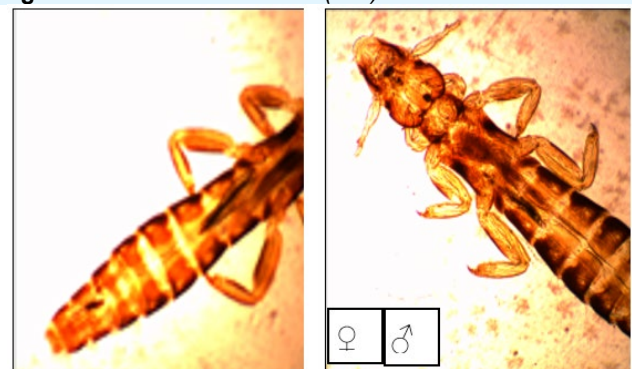


Fig. 7. *Fulicoffula gallinule* (40x)

Menacanthus spp. Its one of the most common species in the current study that affects various types of birds, Jeffer *et al.* (2005) indicate that the high infested of this type of lice is due to the short life cycle and a large



Fig. 8. *Anaticola crassicornis* (40x)



Fig. 9. *Saemundssonsonia lari* (40x)

number of eggs placed by the female, which ranges between 50-300 eggs.

The high infestation of rate with this lice is a major threat to birds, Al-Mayali and Al-Libawi (2017) were able to detect B1 gene of *Toxoplasma gondii* in the lice isolated from the chicken, naturally infected with lice and *Toxoplasma gondii*, confirming the role of lice in the transmission of the *Toxoplasma gondii* from infected birds to healthy birds while feeding on her blood.

In Poland recorded five species of *Trinoton* spp. infested ducks were: *T. querquedulae*, *T. anserinum*, *T. luridu*, *T. nyrocae* and *T. spinosumm* by Kadulski (2007), while Cohen *et al.* (1991) revealed that *T. anserinum* could transmit filariasis in swans.

Dik *et al.* (2011) reported 13 species of chewing lice parasitic on aquatic birds in turkey were: *Austromenopon durisetosum*, *Actornithophilus multisetosus*, *Anaticola crassicornis*, *Cummingsiella ambigua*, *Menacanthus alaudae*, *Menacanthus curuccae*, *Menacanthus eurytarnus*, *Menacanthus pusillus*, *Meromenopon meropis*, *Myrsidea picae*, *Pseudomenopon scopulacorne*, *Rhynonirmus scolopacis* and *Trinoton querquedulae*.

Al-Mayali and Al-Shabani (2014) in Iraq isolated seven species of chewing lice infested *Columba liva* and *Columba domestica* were: *Columbicola columbae*, *Columbicola tschulyschman*, *Campanulotes compar*, *Coloceras damicorne*, *Bonomiella columbae*, *Hohorstiella lata*, *Menacanthus stramineus*.

Mohammad (2014) isolated 27 species of lice from aquatic birds in Iraq among them *Fulicoffula gallinule*, *Anaticola crassicornis* and *Saemundssonsonia lari*.

Table 3. The relationship between infestations rate of lice and sex of birds

Sex of birds	No. examined	No. infested	percentage
male	74	34	^a 45.95
Female	80	32	^a 40.00
Total	154	66	42.86
LSD (P ≤ 0.05)		N. S.	

Table 4. The relationship between infestations rate with weight of birds

Weight group/gm	No. Examined	No. infested	Percentage
<300	17	10	58.82 ^a
<300-600	21	11	52.38 ^b
<600-900	74	24	32.43 ^d
More 900	42	21	50.00 ^c
LSD (P ≤ 0.05)		2.28	

No significant differences between males and females birds in the percentage of infestation lice at ($P \geq 0.05$) as in the **Table 3**.

These results are consistent with all of Brown (1972), who noted no significant differences between host sex and infestation of parasites, also agreed with the study of Permin *et al.* (2002) in Zimbabwe noted that all examined chicken samples were infested, explaining the similarity of percentage of infestation among males and females birds to the living sex of birds together in one environment and their mixing during nutrition and mating.

Table 5. Infestation types of lice in migratory aquatic birds

Infestation type	No. infested	percentage
Single	17	^b 25.76
Double	36	^a 54.55
Triple	13	^c 19.70
Total	66	100.00
LSD (P ≤ 0.05)		1.46

Table 4 shows a significant difference in the relation of parasitic infestation with the weight of migratory birds. It was noted that the infestation percentage of lice decrease with weight increased to a minimum of 32.43% at the weight group confined between (<600-900) gm.

Decrease infestation percentage with lice by increasing the weight of birds may be due to the detection of immunity, therefore less infested in large birds.

Table 5 shows double infestation with lice was highest (54.55%) followed by single and triple infestation (25.76% and 19.70%) respectively with a significant difference at level ($P \leq 0.05$).

These results agree with all of Dovic *et al.* (2004), that revealed to double infestation with lice were more distributed than other infestation and Hamza *et al.* (2011) in their study on *Pycnonotus leucotis* noted double infestation was highest because the acute infestation with one type of lice may encourage infested by other types due to weak immune system of the bird due to infestation.

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