

## Chewing lice found on aquatic birds collected from some marshes of Thi-Qar governorate-South of Iraq

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### Abstract

This study was performed to detect the chewing lice infested on some aquatic birds in some marshes of Thi-Qar governorate-South of Iraq during the period from December 2012 to April 2013, for this aim 76 bird specimens belonging to 4 bird species were examined for the chewing lice infestation.

The results found seventeenth out of totally 76 (22.36%) birds were found to be infested with at least one chewing louse species and three different species of chewing lice were reported: *Ardeicola expallidius* (Blagoveshtchensky, 1940) 7.89%, *Fulicoffula gallinulae* (De Geer, 1778) 13.15%, *Incidifrons* sp. (Blagoveshtchensky, 1951) 9.21% have been recorded from Iraq for the first time. A significant differences were found among infested birds according to the lice species ( $P \leq 0.05$ ).

The result revealed that the infestation by the lice on one aquatic bird different between single and double.

A significant differences was found among infested birds according to the infestation type ( $P \leq 0.05$ ). No significant differences was found between male and female of infested birds. The result revealed a significant differences among infested birds according to the monthly distribution ( $P \leq 0.05$ ) and the highest infestation rates was in January 41.17%.

**Key words:**chewing lice , some aquatic birds

### الخلاصة

أجريت هذه الدراسة للكشف عن وجود القمل القارض المصيب لبعض الطيور المائية في بعض احوار محافظة ذي قار -جنوب العراق خلال الفترة من شهر كانون الثاني 2012 ولغاية شهر نيسان 2013 ولهذا الغرض تم فحص 76 طيرا مائيا تعود إلى أربعة أنواع للتحري عن إصابتها بالقمل القارض.

أظهرت النتائج أن سبعة عشر طيرا من مجموع 76 (22.36%) كانت مصابة وعلى الأقل بنوع واحد من القمل القارض. سجل وجود ثلاثة أنواع من القمل القارض هي: *Ardeicola expallidius* (Blagoveshtchensky, 1940) وبنسبة 7.89%، *Fulicoffula gallinulae* (De Geer, 1778) وبنسبة 13.15%، وبنسبة 9.21% وهي تسجل لأول مرة في العراق وسجل وجود فروق معنوية بين الطيور المصابة حسب نوع القمل وبمستوى احتمالية ( $P \leq 0.05$ ).

أظهرت نتائج الدراسة أن الإصابة بالقمل القارض في الطيور المائية اختلفت بين الأحادية والثنائية وكان هناك فرقا معنويا بين الطيور المصابة حسب نمط الإصابة وبمستوى احتمالية ( $P \leq 0.05$ ) علما أن الإصابة الثنائية أكثرها شيوعا. لم تسجل فروق معنوية بين ذكور وإناث الطيور المصابة في حين سجلت فروق معنوية بين أعداد الطيور المصابة حسب التوزيع الشهري للإصابة ( $P \leq 0.05$ ) وكان أعلى معدل للإصابة خلال شهر كانون الثاني وبنسبة 41.17%.

**الكلمات المفتاحية:** القمل القارض ، الطيور المائية

### Introduction:

Chewing lice are permanent obligate ectoparasites mostly parasitic on bird species and they feed on feathers and skin scales, although they have mouthparts designed for chewing some species cause skin irritation and suck blood.

They cause decrease in productivity of the host (Dik *et al.*, 2011), discomfort, irritation, loss of plumage, stunted growth, decrease in egg production and anemia (Edgar *et al.*, 1958) and also serve as carriers of bacterial, viral or protozoal diseases from one bird to another.

Chewing lice spent their entire life cycle on the host and cause harmful effect especially in cold weather and their damage depend on the numbers of parasites , nutritional status of the host and inter current diseases (Margaret, 1969).

About 4000 lice species were recorded on birds in the world (Price *et al.*, 2003). The first record of the chewing lice in Iraq was that of (Khalaf, 1959) who presented a list of these lice collected from fowls, birds and mammals.

The specimens of Khalaf (1959) were identified by Johnson and Emerson, both of the American Museum of Natural History. Derwesh (1965) republished the same list of Khalaf (1959).

In Al- Diwaniya city Hamza *et al.* (2011) identify five species of chewing lice on white checked bulbul *Pycnonotus leucotis* with total infestation of 87.5% these species were: *Menacanthus* sp., *Columbicola columbae*, *Bonomiella columbae*, *Coloceras damicorne*, *Acedoecus* sp.

Al-Barwari and Saeed (2012) reported five species of Mallophaga in Chukar partridge *Alectoris chukar* in north of Iraq including: *Menacanthus cornutus*, *Columbicola columbae*, *Goniodes dispar*, *Cuclotogaster hetreographus*, *Lipeurus caponis*.

Two lice species isolated from family Columbidae including: *Columbicola columbae*, *Companulotes bidentatus coapare* in a rate 44.66%, 1.66% respectively (Al-Bayati and Alamary, 2012).

The aim of current study was to identify the chewing lice fauna of aquatic birds in marshes of Thi-Qar governorate- South of Iraq and the present work was the first study of ectoparasites on aquatic birds in Iraq.

### **Materials and Methods:**

During the period from December 2012 to April 2013 chewing lice were examined from 76 aquatic birds belonging to 4 species (Allouse, 1960 and 1961) collected from Sanaf marshes of Thi-Qar governorate, the feathers of each birds were carefully examined, then the birds were placed in nylon bags contain chloroform in cotton pieces for 15 min and then the lice collected and preserved in 70% ethanol, cleared in 10% KOH and washed with distilled water, passed in alcohol series 70%, 80%, 90% and 99% and then mounted on slides in Canada balsam and examined by light microscope (Dik and Uslu, 2011).

The identification of the lice species was carried out according to Adam (2004); Dik and Uslu (2011); Price *et al.* (2003). The identification of lice were confirmed by Bilal Dik from Selcuk Univ. Turkey. The results analyzed by using T test and Chi-Square with probability (0.05) level (Al-Rawi, 1984).

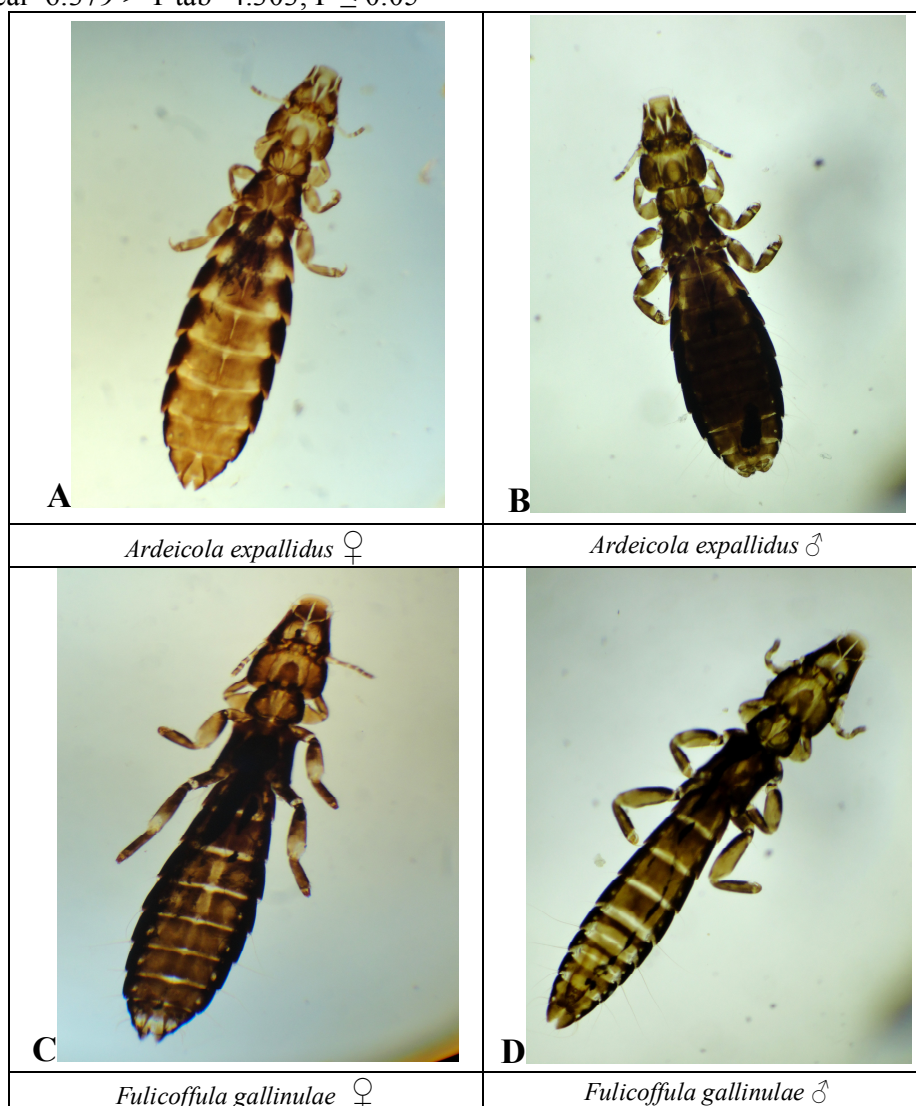
### **Results:**

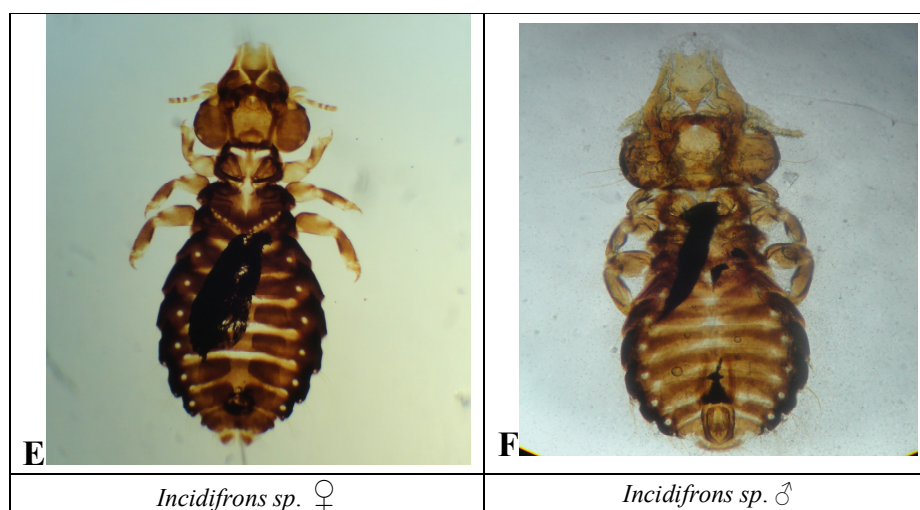
Table (1) shows three different species of chewing lice identified from aquatic birds: *Ardeicola expallidius* (Blagoveshtchensky, 1940), Fig A and B, *Fulicoffula gallinulae* (De Geer, 1778), Fig C and D, *Incidifrons* sp. (Blagoveshtchensky, 1951), Fig E and F and they have been recorded from Iraq for the first time. A significant differences were found among infested birds according to the lice species ( $P \leq 0.05$ ).

Table (1): Distribution of lice species on aquatic birds.

	Lice species	Bird species	No. of examined birds	No. of infested birds	%	No. of lice	Mean of intensity
1	<i>Ardeicola expallidus</i>	<i>Egretta garazeta</i>	24	4	16.66	13	3.25
		<i>Ardeola ralloides</i>	37	2	5.40	5	2.50
	Total	2	61	<b>6</b>	9.83	18	3.00
2	<i>Fulicoffula gallinulae</i>	<i>Fulica atra</i>	3	3	100.00	20	6.66
		<i>Gallinulua chloropus</i>	12	7	58.33	101	33.66
	Total	2	15	<b>10</b>	66.66	121	12.10
3	<i>Incidifrons</i> sp.	<i>Fulica atra</i>	3	3	100.00	12	4.00
		<i>Gallinulua chloropus</i>	12	4	33.33	21	5.25
	Total	2	15	<b>7</b>	46.66	33	4.71

Tcal=6.379 > T tab=4.303, P ≤ 0.05





It is clear from table (2) a significant differences were detected among infested birds according to the lice species ( $P \leq 0.05$ ), seventeenth out of totally 76 (22.36%) examined birds were found to be infested with at least one chewing louse species and the results revealed that the infestation with *Fulicoffula gallinulae* 13.15% was more than the two other species of lice *Incidifrons sp.* 9.21% and *Ardeicola expallidus* 7.89%.

Table (2): Distribution of infestation of lice according to bird species.

	Bird species	No. of examined bird	<i>Ardeicola expallidus</i>		<i>Fulicoffula gallinulae</i>		<i>Incidifrons sp.</i>	
			No. of infested bird	%	No. of infested bird	%	No. of infested bird	%
1	<i>Egretta garazeta</i>	24	4	16.66	-	-	-	-
2	<i>Ardeola ralloides</i>	37	2	5.40	-	-	1	2.70
3	<i>Fulica atra</i>	3	-	-	3	100.00	3	100.00
4	<i>Gallinulua chloropus</i>	12	-	-	7	58.33	4	33.33
	Total	76	<b>6</b>	7.89	<b>10</b>	13.15	<b>7</b>	9.21

$T_{cal}=6.379 > T_{tab}=3.182, P \leq 0.05$

Table (3) revealed a significant differences among infested birds according to the infestation type ( $P \leq 0.05$ ) and the double infestation was more than the single infestation with chewing lice and the mean of intensity for infested birds was 10.11.

Table (3): Frequency of single and mixed chewing lice infestation on aquatic birds.

	Bird species	Infestation type	Lice species	No. of examined bird	No. of infested bird	Number of lice	Mean of intensity
1	<i>Fulica atra</i>	Double	<i>Fulicoffula gallinulae</i> + <i>Incidifrons sp.</i>	3	3	33	11.00
2	<i>Gallinulua chloropus</i>	Double	<i>Fulicoffula gallinulae</i> + <i>Incidifrons sp.</i>	12	8	121	15.12
3	<i>Egretta garazeta</i>	Single	<i>Ardeicola expallidus.</i>	24	4	13	3.25
4	<i>Ardeola ralloides</i>	Single	<i>Ardeicola expallidus.</i>	37	2	5	2.50
	Total			76	17	172	10.11

$T_{cal}=3.231 > T_{tab}=3.182, P \leq 0.05$

The results in table (4) revealed no significant differences ( $P \geq 0.05$ ) between male and female birds infested with chewing lice and the female infestation rate was 26.08% more than male infestation rate 16.66%.

Table (4): Distribution of infestation of lice according to bird sex.

Sex	No. of examined birds	No. of infested birds	%
Male	30	5	16.66
Female	46	12	26.08
Total	76	17	22.36

$$X^2_{tab} = 3.84 > X^2_{cal} = 0.636$$

Table (5) showed distribution of lice species according to bird sex in which a significant differences among male and female birds were recorded according to the lice species ( $P \leq 0.05$ ). (6) female birds out of (61) birds were infested with *Ardeicola expallidus* 9.83% , (10) birds consist from (3) males and (7) females out of (15) birds were infested with *Fulicoffula gallinulae* 66.66% and (7) birds consist from (2) males and (5) females out of (15) birds were infested with *Incidifrons* sp. 46.66%.

Table (5): Distribution of infestation of lice according to bird sex and lice species.

	Lice species	Host	No. of examined birds			No. of infected birds			%
			M	F	Total	M	F	Total	
1	<i>Ardeicola expallidus</i>	<i>Egretta garazeta</i>	7	17	24	-	4	4	16.66
		<i>Ardeola ralloides</i>	15	22	37	-	2	2	5.40
	Total	2	22	39	61	-	<b>6</b>	6	9.83
2	<i>Fulicoffula gallinulae</i>	<i>Fulica atra</i>	-	3	3	-	3	3	100.00
		<i>Gallinulua chloropus</i>	8	4	12	3	4	7	58.33
	Total	2	8	7	15	<b>3</b>	<b>7</b>	10	66.66
3	<i>Incidifrons</i> sp.	<i>Fulica atra</i>	-	3	3	-	3	3	100.00
		<i>Gallinulua chloropus</i>	8	4	12	2	2	4	33.33
	Total	2	8	7	15	<b>2</b>	<b>5</b>	7	46.66

$$T_{cal} = 5.237 > T_{tab} = 2.776, P \leq 0.05$$

The distribution of male, female, nymph stages of chewing lice on avian hosts was shown in table (6).

Table (6): Distribution of life cycle stages of lice on aquatic birds.

	Lice species	Bird species	No. of examined birds	No. of infected birds	No. of lice			
					M	F	N	Total
1	<i>Ardeicola expallidus</i>	<i>Egretta garazeta</i>	24	4	3	10	-	13
		<i>Ardeola ralloides</i>	37	2	1	4	-	5
	Total	2	61	6	4	14	-	18
2	<i>Fulicoffula gallinulae</i>	<i>Fulica atra</i>	3	3	4	12	4	20
		<i>Gallinulua chloropus</i>	12	7	14	49	38	101
	Total	2	15	10	18	61	42	121
3	<i>Incidifrons</i> sp.	<i>Fulica atra</i>	3	3	3	6	3	12
		<i>Gallinulua chloropus</i>	12	4	10	6	5	21
	Total	2	15	7	13	12	8	33
Total					35	87	50	172

$$T_{tab}=4.303 > T_{cal}=3.710, P \geq 0.05$$

Table (7) revealed a significant differences among infested birds according to the monthly distribution ( $P \leq 0.05$ ) and the higher rate of infestation during January 41.17% in compared with other months.

Table (7): Monthly distribution of infestation of lice within examined birds.

Months	No. Of examined birds	No. of infested birds	%
December	14	<b>4</b>	28.57
January	17	<b>7</b>	41.17
February	11	<b>2</b>	18.18
March	18	<b>1</b>	5.55
April	16	<b>3</b>	18.75
Total	76	17	22.36

$$T_{cal}=3.302 > T_{tab}=2.776, P \leq 0.05$$

## Discussion:

Throughout the period of the current study three species of chewing lice were identified for the first time among 76 aquatic birds in Thi-Qar governorate-South of Iraq, the three lice species: *Ardeicola expallidus* (Blagoveshtchensky, 1940) 7.89% , *Fulicoffula gallinulae* (De Geer, 1778) 13.15%, *Incidifrons* sp. (Blagoveshtchensky, 1951) 9.21% isolated from 4 aquatic bird species and there is a significant differences among infested birds according to the lice species ( $P \leq 0.05$ ).

In the present study *Ardeicola expallidus* isolated from *Egretta garazeta* and *Ardeola ralloides* while *Fulicoffula gallinulae* isolated from *Fulica atra* and *Gallinulua chloropus*, the *Incidifrons* sp. isolated from *Fulica atra* and *Gallinulua chloropus*.

The chewing lice in New Zealand that infested birds including *Ardeicola expallidus* on *Egretta alba modesta*, *Egretta garzetta immaculate* and *Fulicoffula* sp. on *Porzana pusilla affinis* , *Porzana tabuensis plumbea* and *Fulicoffula lurida* on *Fulica atra australis* and *Incidifrons* sp. on *Porzana pusilla affinis* and *Incidifrons fulicae* on *Fulica atra australis* (Pilgrim and Palma, 1982).

Forrester *et al.* (1995) listed chewing lice (Mallophaga) from birds in Florida and this included infested *Casmerodius albus*, *Egretta thula* with *Ardeicola expallidius* and *Coturnicops noveboracensis* with *Fulicoffula* sp. and *Fulica americana* with *Incidifrons transpositus*.

In Argentina Abrahamovich *et al.* (2006) recorded *Incidifrons armillatus* on *Fulica armillata*, *Incidifrons emersoni* on *Fulica rufifrons* and *Incidifrons leucopterae* on *Fulica leucoptera*.

Rekasi and Kiss (2006) in northern Dobrogea (Romania) isolated *Ardeicola plataleae* from *Platalea leucorodia*, *Fulicoffula lurida* and *Incidifrons fulicae* from *Fulica atra*.

In Turkey Dik and Uslu (2011) isolated *Ardeicola ciconiae* from *Ciconia ciconia*, and *Fulicoffula lurida*, *Incidifrons fulica* both from *Fulica atra*.

In Iraq the study performed by Zangana (1982) only two species of lice were detected from domestic pigeons *Gonocoites gallinae* and *Columbicola tschulyschmann* at different parts of Ninewa province and some parts of Erbil and Duhok provinces-Iraq and Habeeb (2000) referred that the *Menacanthus cornutus*, *Goniocetes gallinae*, *Lipeurus caponis*, *Menopon gallinae*, *Cuclotogaster heterogaphus*, *Trichdectes canis* infested the local chickens in Basrah.

Al-Nakshabandy (2002) reported six species of chewing lice of chickens with infestation rate 70.46% in Erbil governorate: *Menacanthus stramineus*, *Menopon gallinae*, *Cuclotogaster heterogaphus*, *Lipeurus caponis*, *Goniodes gigas*.

Two species of chewing lice isolated from *Corvus frugilegus* and *Sturnus vulgaris*: *Alcedoecus* sp. and *Menacanthus* in Al-Najaf (Abdul-Abass, 2005).

Al-Saffar and Al-Mawla (2008) reported four species of chewing lice infested chickens with infestation rate 12.5 % in Al-Mosul city: *Menacanthus stramineus*, *Cuclotogaster heterogaphus*, *Goniocoites gallinae*, *Columbicola columbae*.

The current study revealed a significant differences among infested birds according to the infestation type ( $P \leq 0.05$ ) and the double infestation was common and this is in agreement with that of Hamza *et al.* (2011) because the ectoparasites can cohabit without causing harmful effects to each other and the interaction of two or more ectoparasites on the same host may be said to be low inter specific competitive interaction (Adang, 2008).

The single infestation was the most frequency type (Al-Nakshabandy, 2002 ;Foronda *et al.*, 2004).

No significant differences ( $P \geq 0.05$ ) were found between male and female birds infested with chewing lice and the female infestation rate was 26.08% more than male infestation rate 16.66% and the high infestation rate of the female birds found in the current study may be related to its staying in nests for incubation that led to infested with nests ectoparasites in compared with males which were spent most of their time in flying (Ciszewska *et al.*, 1996).

The other studies revealed that the sex of bird did not influence the number of bird lice present because all stages of the life cycle found near the skin in warm sites and with constant body temperature of the bird (Abul-hab, 1979; Adang *et al.*, 2008; Al-Bayati and Alamary, 2012; Hamza *et al.*, 2011; Mushi *et al.*, 2000; Petryszak *et al.*, 2000a).

In current study a significant differences among infested birds according to the monthly distribution ( $P \leq 0.05$ ) were recorded and the aquatic birds had higher prevalence rate during January 41.17% in compared with other months because of appropriate environmental condition (temperature and moist rate) at this time of the year which helped to increase the chewing lice number and activity. Petryszak *et al.* (2000b) reported that in cold weather the birds stayed besides each others that increased the chance of infestation with lice.

The infestation with chewing lice was increased in cold months because the birds were decreased their movement and flying and staying in their nests (Calyton and Walter, 2001) and the chewing lice may be need to the heat and warm condition of their avian host to complete the life cycle (Calyton *et al.*, 1999).

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