

Chewing Lice (Phthiraptera: Amblycera, Ischnocera) on Several Species of Wild Birds around the Lake Van Basin, Van, Eastern Turkey

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Article Code: KVFD-2014-12484 Received: 15.09.2014 Accepted: 03.11.2014 Published Online: 11.11.2014

Abstract

This study was performed to detect chewing lice on the wild birds in Eastern Turkey, between April 2013-September 2014. 108 injured birds brought to Wild Animal Protection Center of Yüzüncü Yıl University were examined for louse. The feathers of each bird specimens were inspected for louse, macroscopically. Collected lice samples on the birds were preserved in 70% ethyl alcohol and mounted on slides in Canada balsam after transparented in 10% KOH. Fifteen (14.95%) out of the 108 were found to be infested with at least one chewing louse species. Nineteen lice species in 15 genera were found on the infested birds. *Gonicocotes megaloccephalus* (Uchida, 1916) on the Helmeted Guineafowl (*Numida meleagris*); *Actornithophilus piceus lari* (Packard, 1870) on the Armenian Gull (*Larus armenicus*); *Kurodaia fulvofasciata* (Piaget, 1880) on the Long-legged Buzzard (*Buteo rufinus*); *Laemobothrion* sp. on the Golden Eagle (*Aquila chrysaetos*); *Trinoton anserinum* (Fabricius [J.C.], 1805) and *Holomenopon* sp. on the Greylag Goose (*Anser anser*) were recorded for the first time from Turkey in this study.

Keywords: Chewing lice, Wild bird, Lake Van Basin, Van, Turkey

Doğu Anadolu'da Van Gölü Havzası Çevresinde Bulunan Çeşitli Yabani Kuş Türlerinde Saptanan Çiğneyici Bit (Phthiraptera: Amblycera, Ischnocera) Türleri

Özet

Bu çalışma Doğu Anadolu'daki yabani kuşlardaki çiğneyici bit türlerini belirlemek amacıyla Nisan 2013-Eylül 2014 tarihleri arasında yapılmıştır. Yüzüncü Yıl Üniversitesi Yaban Hayvanlarını Koruma Merkezine getirilen 108 yaralı kuş bit yönünden incelenmiştir. Kuşların tüyleri bit yönünden makroskobik olarak muayene edilmiş, toplanan bitler %70'lik alkol içinde saklanmış, %10'luk KOH'de saydamlaştırıldıktan sonra Kanada balsamı ile lamlara yapıştırılmıştır. İncelenen 108 kuşun %14.95'i en az bir bit türü ile enfeste bulunmuş ve enfeste kuşlarda 15 cinse ait 19 bit türü saptanmıştır. Beç tavuğundan (*Numida meleagris*) *Gonicocotes megaloccephalus* (Uchida, 1916); Van Gölü Martısı (*Larus armenicus*)'ndan *Actornithophilus piceus lari* (Packard, 1870); Kızıl Şahin (*Buteo rufinus*)'den *Kurodaia fulvofasciata* (Piaget, 1880); Kaya Kartalı (*Aquila chrysaetos*)'ndan *Laemobothrion* sp.; Yaban Kazı (*Anser anser*)'nden *Trinoton anserinum* (Fabricius [J.C.], 1805) ve *Holomenopon* sp., Türkiye'den ilk kez bu çalışma ile bildirilmiştir.

Anahtar sözcükler: Çiğneyici bit, Yabani kuş, Van Gölü Havzası, Van, Türkiye

INTRODUCTION

Chewing lice are small, wingless, dorso-ventrally flattened insects that parasitize birds and some mammals. Most of the lice species on birds feed on feathers, dead

skin and skin products. Some species also feed on blood. Chewing lice normally cause small and subclinical infestation but when present in large numbers they can cause severe irritation and serve as a vector of some bloodborne parasites including some species of filarial worms^[1,2].



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The Van province (38° 28' N 43° 20' E) is part of the Eastern Region of Turkey. The city is located around the Lake Van, the largest lake of Turkey. There are approximately 500 bird species so far recorded in Turkey [3]. Lake Van Basin lies along flyways of many migratory birds and this closed basin is hosted 213 of the bird fauna found in Turkey [4]. In addition, Erçek lake that host about 179 bird species is located 20 km east of Van city [5]. Erçek Lake takes as important bird area according to national and international marshy grouping and accepted B group of marshy region [6].

There are approximately 4.000 lice species on birds in the worldwide [7]. Some studies had been performed to detect on chewing lice on the birds in Turkey, recently [8-22]. Up to this time, more than 100 chewing louse species were reported from birds in Turkey. A few studies were done on chewing lice on birds in Eastern Turkey. Unfortunately, there is only one study [15] on the chewing lice on the birds in Van province.

This study was carried out to detect chewing lice species on birds in Van province in Turkey.

MATERIAL and METHODS

The study was carried out between April 2013-

September 2014 in Wild Animal Protection Center, Yüzüncü Yıl University, Van, Eastern Turkey. In this period, 108 birds specimens in 16 genera, 10 families belonging to 9 orders were examined for louse (Table 1). The feathers of each bird were inspected carefully for louse, macroscopically. The lice collected on the birds were preserved in alcohol 70%, transparented in 10% KOH for a day, washed with distilled water, passed in alcohol series 70%, 80%, 90% and 99% in four consecutive days and mounted on slides in Canada balsam. They were examined under binocular light microscope (Leica DM750) and identified to species using some literatures [7,23-30].

RESULTS

Fifteen out of the 108 (14.95%) were found to be infested with at least one chewing louse species and 19 lice species belonging to 15 genera were identified on infested birds (Table 2).

Ischnocera

Anaticola anseris (Linnaeus, 1758): Studied material: 6 Adult, Van-Özalp. Host; Greylag Goose (*Anser anser*).

Anaticola crassicornis (Scopoli, 1763): Studied material: 1 ♀, 1 ♂, December, 2013, Van-Özalp. Host; Mallard (*Anas platyrhynchos*).

Table 1. Orders, families, genera and species of the examined birds in the study

Tablo 1. Çalışmada incelenen kuşların takım, aile, cins ve türleri

Orders	Families	Genera	Species	Numbers of the Examined Birds
Accipitriformes	Accipitridae	<i>Aquila</i>	<i>Aquila chrysaetos</i>	6
		<i>Circus</i>	<i>Circus pygargus</i>	3
			<i>Circus aeruginosus</i>	2
			<i>Buteo</i>	<i>Buteo buteo</i>
		<i>Buteo rufinus</i>		1
Falconiformes	Falconidae	<i>Falco</i>	<i>Falco naumanni</i>	7
Strigiformes	Strigidae	<i>Bubo</i>	<i>Bubo bubo</i>	5
		<i>Asio</i>	<i>Asio flammeus</i>	4
Galliformes	Numididae	<i>Numida</i>	<i>Numida meleagris</i>	10
	Phasianidae	<i>Meleagris</i>	<i>Meleagris gallopavo</i>	1
		<i>Coturnix</i>	<i>Coturnix coturnix</i>	10
		<i>Alectoris</i>	<i>Alectoris graeca</i>	5
Anseriformes	Anatidae	<i>Anas</i>	<i>Anas querquedula</i>	2
			<i>Anas clypeata</i>	2
			<i>Anas platyrhynchos</i>	2
		<i>Anser</i>	<i>Anser anser</i>	1
Ciconiiformes	Ciconiidae	<i>Ciconia</i>	<i>Ciconia ciconia</i>	2
Charadriiformes	Laridae	<i>Larus</i>	<i>Larus armenicus</i>	21
Passeriformes	Corvidae	<i>Corvus</i>	<i>Corvus corone</i>	10
Coraciiformes	Meropidae	<i>Merops</i>	<i>Merops apiaster</i>	11
Total				108

Table 2. Bird species, infestation rate and detected louse species**Tablo 2.** Kuş türleri, infestasyon oranları ve saptanan bit türleri

Bird Species	Locality	Number of the Examined Bird	Number of the Infested Bird	Lice Species
Eurasian Eagle Owl (<i>Bubo bubo</i>)	Bitlis	5	-	-
Helmeted Guineafowl (<i>Numida meleagris</i>)	Muradiye -Van	10	1	<i>Goniocotes megalcephalus</i>
Golden Eagle (<i>Aquila chrysaetos</i>)	Hakkari	6	1	<i>Laemobothrion</i> sp.
Montague's Harrier (<i>Circus pygargus</i>)	Muş, Karasu-Van	3	-	-
Marsh Harrier (<i>Circus aeruginosus</i>)	Van	2	1	<i>Degeeriella fusca</i> <i>Kurodaia fulvofasciata</i>
Lesser Kestrel (<i>Falco naumanni</i>)	Van	7	1	<i>Degeeriella rufa</i> <i>Laemobothrion tinnunculi</i>
Common Buzzard (<i>Buteo buteo</i>)	Van	3	-	-
Long-legged Buzzard (<i>Buteo rufinus</i>)	Van	1	1	<i>Kurodaia fulvofasciata</i>
Short-eared Owl (<i>Asio flammeus</i>)	Van	4	-	-
White Stork (<i>Ciconia ciconia</i>)	Bitlis	2	1	<i>Neophlopterus incompletus</i>
Armenian Gull (<i>Larus armenicus</i>)	Van	21	3	<i>Actornithophilus piceus lari</i> <i>Saemundssonina lari</i> <i>Quadriceps punctatus</i>
Greylag Goose (<i>Anser anser</i>)	Özalp-Van	1	1	<i>Anaticola anseris</i> <i>Trinoton anserinum</i> <i>Holomenopon</i> sp
Garganey (<i>Anas querquedula</i>)	Van	2	-	-
Northern Shoveller (<i>Anas clypeata</i>)	Van	2	-	-
Mallard (<i>Anas platyrhynchos</i>)	Özalp-Van	2	1	<i>Trinoton querquedulae</i> <i>Anaticola crassicornis</i> <i>Holomenopon</i> sp.
Turkey (<i>Meleagris gallopavo</i>)	Van	1	1	<i>Chelopistes meleagridis</i>
Carrion Crow (<i>Corvus corone</i>)	Van	10	-	-
European Bee-eater (<i>Merops apiaster</i>)	Erciş-Van	11	3	<i>Meropoecus meropis</i> <i>Meromenopon meropis</i> <i>Meropsiella apiastri</i>
Common Quail (<i>Coturnix coturnix</i>)	Erciş-Van	10	-	-
Rock Partridge (<i>Alectoris graeca</i>)	Van	5	-	-

Chelopistes meleagridis (Linnaeus, 1758): Studied material: 12 ♀, 4 ♂, August, 2014, Van. Host: Turkey (*Meleagris gallopavo*).

Degeeriella fusca (Denny, 1842): Studied material: 1 ♀, July, 2014, Van. Host: Marsh Harrier (*Circus aeruginosus*).

Degeeriella rufa (Burmeister, 1838): Studied material: 6 ♀, 2 ♂, July, 2014, Van. Host: Lesser Kestrel (*Falco naumanni*).

Goniocotes megalcephalus (Uchida, 1916): Studied

material: 1 ♀, July, 2014, Muradiye-Van (Fig. 1). Host: Helmeted Guineafowl (*Numida meleagris*). This species was recorded for the first time on Helmeted Guineafowl in Turkey.

Meropoecus meropis (Denny, 1842): Studied material: 1 ♀, 2 N, September, 2014, Erciş-Van; 12 Adult, September, 2014, Erciş-Van; 12 Adult, 2 N, September, 2014, Erciş-Van. Host: European Bee-eater (*Merops apiaster*).

Meropsiella apiastri (Denny, 1842): Studied material: 2 ♀, 1 ♂, September, 2014, Erciş-Van. Host: European Bee-eater (*Merops apiaster*).

Neophiloaterus incompletus (Denny, 1842): Studied material: 2 ♀, 8 ♂, September, 2014, Van. Host: White Stork (*Ciconia ciconia*).

Quadriceps punctatus (Burmeister, 1838): Studied material: 3 Adults, April, 2013, Van. Host: Armenian Gull (*Larus armenicus*).

Saemundssonina lari (Fabricius [O], 1780): Studied material: 4 ♀, 5 ♂, Van; 1 ♂, 1 N, April, 2013, Van. Host: Armenian Gull (*Larus armenicus*).

Amblycera

Actornitophilus piceus lari (Packard, 1870): Studied material: 2 ♀, 1 N, April, 2013, Van (Fig. 2). Host: Armenian Gull (*Larus armenicus*). This species was recorded for the first time on Armenian Gull (*Larus armenicus*) in Turkey and in the World.

Holomenopon sp.: Studied material: 1 ♀ 1 ♂, December, 2013, Özalp, Van. Host: Mallard (*Anas platyrhynchos*); 1 ♀, December, 2013, Özalp, Van. Host: Greylag Goose (*Anser anser*).

Remarks: The *Holomenopon* specimens collected from Mallard and Greylag goose are different species from each other.

Laemobothrion sp.: Studied material: 1 N, June, 2014, Hakkari. Host: Golden Eagle (*Aquila chrysaetos*). It was recorded for the first time on Golden Eagle (*Aquila chrysaetos*) in Turkey.

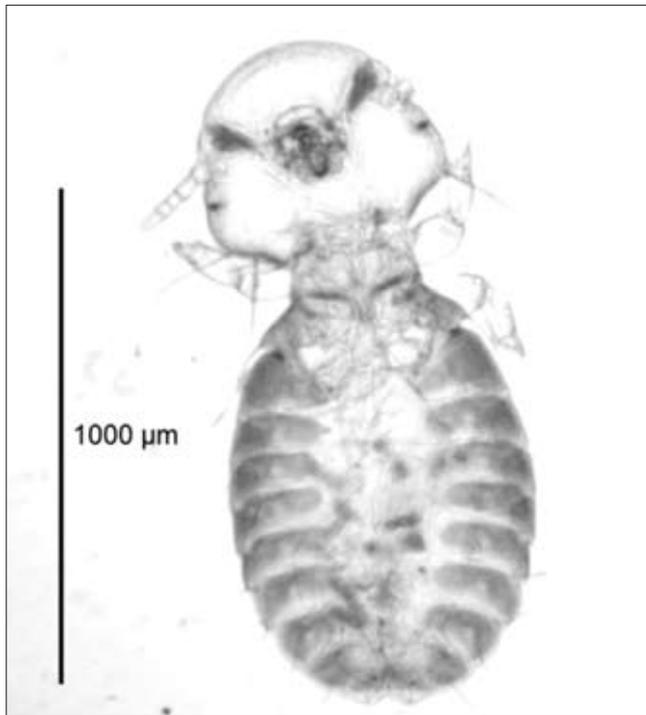


Fig 1. *Goniocotes megalcephalus*, female, original
Şekil 1. *Goniocotes megalcephalus*, dişi, orijinal



Fig 2. *Actornitophilus piceus lari*, female, original
Şekil 2. *Actornitophilus piceus lari*, dişi, orijinal

Laemobothrion tinnunculi (Linnaeus, 1758): Studied material: 1 ♀, July, 2014, Van. Host: Lesser Kestrel (*Falco naumanni*).

Kurodaia fulvofasciata (Piaget, 1880): Studied material: 1 ♂, Van; 2 ♀, 9 ♂, 8 N, July, 2014, Van. Host: Long-legged Buzzard (*Buteo rufinus*). It was recorded for the first time on Long-legged Buzzard (*Buteo rufinus*) in Turkey.

Meromenopon meropis (Clay & Meinertzhagen, 1941): Studied material: 2 N, September, 2014, Erciş, Van. Host: European Bee-eater (*Merops apiaster*).

Trinoton anserinum (Fabricius [J.C.], 1805): Studied material: 2 ♀, December, 2013, Özalp, Van. Host: Greylag Goose (*Anser anser*). It was recorded from Greylag Goose (*Anser anser*) for the first time in Turkey.

Trinoton querquedulae (Linnaeus, 1758): Studied material: 3 ♀, December, 2013, Özalp, Van. Host: Mallard (*Anas platyrhynchos*).

DISCUSSION

Studies on the louse of birds and mammals in Turkey has not been completed. A total of 109 lice species belonging to 50 genera have recorded from animals and

humans in Turkey up to date ^[19]. Although approximately 500 bird species were recorded from Turkey, all of the louse fauna infested these birds are still unknown. Up to this time, more than 100 chewing louse species have been reported from birds in Turkey ^[16].

This study is the first comprehensive study conducted on wild birds in Van region. In a previous study conducted on chewing lice on birds in Van, two species; *S. lari* and *Q. punctatus* had been reported from Yellow-legged Gull (*Larus michahellis*) ^[15]. In the present study, a total of 108 wild birds were examined for chewing lice fauna and 15 out of these (14.95%) were found to be infested with at least one chewing louse species and 19 lice species belonging to 15 genera were identified on the infested birds. Lice species detected in our study also have been reported from several hosts, previously, such that *Anaticola anseris* from Greylag Goose ^[12], *Anaticola crassicornis* from some duck species ^[9,22,31], *Chelopistes meleagridis* from Turkey ^[31], *Degeeriella fusca* from Marsh Harrier ^[13], *Degeeriella rufa* from Common Kestrel ^[16], *Meropoecus meropis* from European Bee-eater ^[10], *Meropsiella apiastri* from European Bee-eater ^[10], *Neophilopterus incompletus* from White Stork ^[10,16,17], *Quadriceps punctatus* from Yellow-legged Gull ^[15], *Saemundsonia lari* from Slenderbilled Gull ^[10] and Yellow-legged Gull ^[15], *Laemobothrion tinnunculi* from Kestrel ^[18], *Meromenopon meropis* from European Bee-eater ^[10], *Trinoton anserinum* from Wild Swans ^[21], *Trinoton querquedulae* from Ruddy Shelduck, Teal, Garganey, Northern Shoveller and Pintail ^[30].

In terms of host-parasite relationship, six new host records was reported in this study. One of the species found in this study is the new host record from Helmeted Guineafowl for both Turkey and the World. *G. megalcephalus* on Helmeted Guineafowl which is a new host record for the lice fauna of the World, is recorded for the first time in Turkey. The data in the previous study, reported only Hazelgrouse (*Tetrastes bonasia*) ^[32].

Other new host record was *A. piceus lari* which is one of the species identified in Armenian Gull. This new host record from Armenian Gull is recorded for the first time both in Turkey and in the World. This species has been previously reported from Yellow-legged Gull in Red Sea ^[33], Kelp gull (*Larus dominicus*) and Franklin's gull (*Larus pipixcan*) in Chile ^[34].

Kurodaia fulvofasciata is an amblyceran louse infesting some raptor species such as Common Buzzard, Little Banded Goshawk (Shikra), Short-toed Snake Eagle, Rough-legged Buzzard, Bald Eagle etc ^[7]. In addition, a study conducted in Israel reported that *Kurodaia fulvofasciata* was identified from Long-legged Buzzard (*Buteo rufinus*) in Israel ^[35]. This species has been reported from Common buzzard in Konya, Turkey, previously ^[20]. *K. fulvofasciata* recorded from Long-legged Buzzard, is recorded for the first time in Turkey as a new host. This species was

also detected in Marsh Harrier (*Circus aeruginosus*) in this study.

There is no study on chewing louse species found on Golden Eagle in Turkey. For this reason, *Laemobothrion* sp.collected from Golden Eagle was one of the louse species detected for the first time in Turkey.

Trinoton anserinum was recorded from Greylag Goose (*Anser anser*) for the first time in this study, in Turkey. This species serve as intermediate host *Sarconema eurycerca* in Swans ^[2] and have been reported from Wild Swans in Samsun, Turkey ^[21].

Two *Holomenopon* specimens from Greyland Goose and one *Holomenopon* specimen from Mallard were collected in this study. It has been stated that *Holomenopon leucoxanthum* (Burmeister, 1838) was found on Greylag Goose, Mallard and some other ducks ^[7,36]. In addition, *Holomenopon maxbeirei* (Eichler, 1954) and *Holomenopon transvaalense* (Bedford, 1920) are found on Mallard ^[7]. Nevertheless, some morphological characters such as metasternal plate, shapes of the seta in the ventral anal fringe of *Holomenopon* specimens collected from Greylag Goose and Mallard in this study were different from those species. For these reasons, the specimens were not identified to species.

In conclusion, more information on chewing lice species infested wild bird will may be obtained with the extensive new studies that will be performed around the Van Lake basin that hosts approximately half of the Turkey's bird species.

REFERENCES

1. Clayton DH, Adams RJ, Bush SH: Phthiraptera, the Chewing lice. In, Atkinson CT, Thomas NJ, Bruce Hunter D (Eds): Parasitic Diseases of Wild Birds. Wiley-Blackwell Publication, Ames, Iowa, USA, 2008.
2. Cohen M, Greenwood T, Fowler JA: The louse *Trinoton anserinum* (Amblycera: Phthiraptera), an intermediate host of *Sarconema eurycerca* (Filarioidea: Nematoda), a heartworm of swans. *Med Vet Entomol*, 5, 101-110, 1991.
3. Şekerciođlu ÇH: A birder's guide to Turkey. *Living Bird*, 26 (1): 14-23, 2006
4. Diyarbakır Olay Gazetesi: Van Gölü Kuş Cenneti. <http://www.byegm.gov.tr/25/12/2013>.
5. Özdemir A, Durmuş A: A study on bird species under threat and avifauna of Erçek Lake. *Sci Res Essays*, 4 (10): 1006-1011, 2009.
6. Yazar M, Magnin G: Türkiye'nin Önemli Kuş Alanları. Doğal Hayatı Koruma Derneđi, İstanbul, 1997.
7. Price RD, Hellenenthal RA, Palma RL, Johnson KP, Clayton DH: The Chewing Lice: World Checklist and Biological Overview. *Illinois Natural History Survey Special Publication*, 24, 2003.
8. Açıcı M, Adam C, Gürler AT, Erciyas K, Bölükbaş CS, Umur Ş: Chewing lice (Phthiraptera: Amblycera, Ischnocera) from some wild birds in the Kızılırmak Delta (Turkey). *Travaux du Muséum National d'Histoire Naturelle*, 54 (2): 395-407, 2011.
9. Dik B, Şekerciođlu ÇH, Kırpık MA: Chewing lice (Phthiraptera) species found on birds along the Aras River, İğdir, Eastern Turkey. *Kafkas Univ Vet Fak Derg*, 17, 567-573, 2011. DOI: 10.9775/kvfd.2011.4075
10. Dik B, Erdođdu Yamaç E, Uslu U: Chewing lice (Phthiraptera) found

in wild birds in Turkey. *Kafkas Univ Vet Fak Derg*, 17, 787-794, 2011. DOI: 10.9775/kvfd.2011.4469

11. Dik B: New records of Chewing lice (Phthiraptera) from some bird species in Turkey. *Türkiye Parazitoloj Derg*, 38, 168-173, 2010.

12. İnci A, Dik B, Kibar M, Yıldırım A, Düzlü Ö: Chewing lice (Phthiraptera) species in wild birds in Cappadocia Region, Turkey. *Türkiye Parazitoloj Derg*, 34, 174-178, 2010. DOI: 10.5152/tpd.2010.07

13. Dik B, Uslu U: Konya Hayvanat Bahçesi'ndeki kanatlı hayvanlarda görülen çiğneyici bit (Phthiraptera: Amblycera, Ischnocera) türleri. *Türkiye Parazitoloj Derg*, 33, 43-49, 2009.

14. Aksın N: Elazığ yöresinde yabancı kazlarda bit infestasyonu. *Türk J Vet Anim Sci*, 28, 87-90, 2004.

15. Kılınç ÖO, Biçek K, Özdal N, Oğuz B: Van Gölü çevresinde yaşayan martılarda (*Larus michahellis*, Naumann 1840) bulunan çiğneyici bit (Phthiraptera) türleri. *YYU Vet Fak Derg*, 24 (3): 117-121, 2013.

16. Dik B, Yamaç E, Uslu U: Studies of chewing lice (Phthiraptera: Amblycera, Ischnocera) species from domestic and wild birds in Turkey. *Kafkas Univ Vet Fak Derg*, 19, 553-560, 2013. DOI: 10.9775/kvfd.2012.8207

17. Dik B, Uslu U: Mallophaga (Insecta) species occurring on storks (*Ciconia ciconia* Linnaeus, 1758). *Türkiye Parazitoloj Derg*, 30 (3): 220-225, 2006.

18. Esatgil MU, Efil İİ, Tüzer E: Two chewing lice species, *Colcocephalum subzerafae* and *Laemobothrion tinnunculi*, on a kestrel (*Falco naumanni*) in İstanbul: Two new records from Turkey. *Kafkas Univ Vet Fak Derg*, 18 (Suppl-A): A241-A244, 2012. DOI: 10.9775/kvfd.2012.6313

19. İnci A, Yıldırım A, Dik B, Düzlü Ö: Current knowledge of Turkey's louse fauna. *Türkiye Parazitoloj Derg*, 34, 212-220, 2010. DOI: 10.5152/tpd.2010.17

20. Dik B: Türkiye'deki evcil ve yabancı kanatlılarda bulunan çiğneyici bit (Phthiraptera) türleri. *Türkiye Parazitoloj Derg*, 34, 55-60, 2010.

21. Açıç M, Umur Ş, Gürsoy A: Yabani bir kuğuda *Trinoton anserium* olgusu. *XIV. Ulusal Parazitoloji Kongresi*, İzmir, 18-25 Eylül, 225-226, 2005.

22. Dik B, Uslu U: Studies on chewing lice (Phthiraptera) species on some duck (Anseriformes: Anatidae) species at Lake Akşehir, Turkey. *Kafkas Univ Vet Fak Derg*, 18, 1055-1060, 2012. DOI: 10.9775/kvfd.2012.7020

23. Clay T: A key to the species of *Actornithophilus* Ferris with notes and descriptions of new species. *Bull Brit Mus (Nat Hist), Entomology*, 11, 189-244, 1962.

24. Stranger RH, Palma RL: Lice (Insecta:Phthiraptera) from some Australian birds. *Rec Aust Mus*, 19, 169-186, 1998.

25. Nelson RC, Price RD: The *Laemobothrion* (Mallophaga: Laemobothridae) of the Falconiformes. *J Med Entomol*, 2, 249-257, 1965.

26. Price RD, Beer JR: Species of *Colpocephalum* (Mallophaga: Menoponidae) parasitic upon the Falconiformes. *Can Entomol*, 95, 731-763, 1963.

27. Price RD, Beer JR: The genus *Kurodaia* (Mallophaga: Menoponidae) from the Falconiformes, elevation of the subgenus *Falcomenopon* to generic rank. *Ann Entomol Soc Am*, 56, 379-385, 1963. DOI: 10.1093/aesa/56.3.379

28. Timmermann G: Revision der bei Seeschwalben schmarotzenden Kletterfederlinge der Gattung *Quadreps* (Clay u. Meinertzhagen). *Zool Anz*, 148 (3/4): 71-87, 1952.

29. Timmermann G: Studien über Mallophagan aus den sammlungen des Britishchen Museums (Nat. Hist.), London. *Ann Mag Nat Hist*, 12, 513-534, 1955.

30. Uchida S: Bird-infesting Mallophaga of Japan (II). (Genera *Goniodes* and *Goniocotes*). *Annot Zool Japon*, 9 (2): 82-88, 1916.

31. Merdivenci A: Türkiye'nin Entomolojik Coğrafyası. **İn, Unat EK, Yaşarol Ş, Merdivenci A** (Eds): Türkiye'nin Parazitolojik Coğrafyası. 114-152, Ege Üniversitesi Matbası, İzmir, 1965.

32. Porkert J: Massenvermehrung von *Goniocotes megalcephalus* auf einem traumagesch. *Angew Parasitol*, 19 (4): 213-219, 1978.

33. Al-Ahmed A, Shobrak M, Mohammed GE, Nasser D: Chewing lice (Phthiraptera: Amblycera, Ischnocera) from Red Sea gulls with new host-parasite records. *Zootaxa*, 3790, 567-576, 2014. DOI: 10.11646/zootaxa.3790.4.5

34. González-Acuña D, Corvalan F, Barrientos C, Doussang D, Mathieu C, Nilsson L, Casanueva ME, Palma RL: Community structure of lice (Insecta: Phthiraptera) from two Sympatric gull species: Kelp gull (*Larus dominicus*) and Franklin's gull (*Larus pipixcan*) in Talcahuana, Chile. *Neotrop Entomol*, 40 (3): 300-304, 2011.

35. Teodor O, Costa M: A survey of the parasites of wild mammals and birds in Israel. Part I. Ectoparasites. 117, Israel Academy of Sciences and Humanities Publication, Jerusalem, 1967.

36. Price RD: A review of the genus *Holomenopon* (Mallophaga: Menoponidae) from the Anseriformes. *Ann Entomol Soc Am*, 64 (3): 633-646, 1971.