Kafkas Univ Vet Fak Derg
19 (4): 553-560, 2013
DOI: 10.9775/kvfd.2012.8207

Journal Home-Page: http://vetdergi.kafkas.edu.tr
Online Submission: http://vetdergikafkas.org

RESEARCH ARTICLE

Studies on Chewing Lice (Phthiraptera: Amblycera, Ischnocera) Species from Domestic and Wild Birds in Turkey [1] [2]

Bilal DİK [1] Elif YAMAÇ [2] Uğur USLU [1]

[1] *This study was supported by Selçuk University Research Fund (BAP Project number: 11401042)*
[2] *This study has been presented as poster at the 21th National Biology Congress, Ege University, Science Faculty, İzmir, 2-7 September 2012*

[1] Selçuk University, Veterinary Faculty, Department of Parasitology, Alaeddin Keykubat Campus, TR-42250 Konya - TURKEY
[2] Anadolu University, Faculty of Science, Department of Biology, TR-26470 Eskişehir - TURKEY

Makale Kodu (Article Code): KVFD-2012-8207

Summary

This study was performed to detect chewing lice species occurring on domestic and wild birds in Turkey between October 2010 and May 2012. For this aim, the birds were brought to Veterinary Faculty of Selçuk University and Biology Department of Science Faculty of Anadolu University were examined for their lice. The louse specimens collected from the birds were preserved in eppendorf tubes contains ethyl alcohol 70%. They were cleared in Potassium Hydroxide (KOH) 10% for a day, washed within distilled water for a day and transferred to alcohol 70%, 80%, 90% and 99% at consecutive days. Then, they were mounted on the slides in Canada balsam and identified to species. Among studied 26 bird species in 24 genera and 17 families belonging to 9 orders, seventeen species (65.38%) were found to be infested with lice and no louse specimen was found in 9 bird species (34.62%). The forty-one specimens (48.23%) of examined 85 birds were found to be infested with the lice, and 32 lice species were detected. Besides, the genera *Falcolipeurus, Coloceras* and *Struthiolipeurus*, the species; *Brueelia apiastri* (Denny, 1842); *Brueelia munda* (Nitzsch, 1866); *Coloceras piageti* (Johnston ve Harrison, 1912); *Coloceras israelensis* (Tendeiro, 1974); *Degeeriella nisus* (Giebel, 1866); *Degeeriella phylctopygus* (Nitzsch, 1861); *Degeeriella rufa* (Burmeister, 1838); *Falcolipeurus quadripustulatus* (Burmeister, 1838); *Laemobothrion vulturis* (Fabricius, J.C., 1775); *Menacanthus orioli* (Blagovestchensky, 1951); *Philopterus fringillae* (Scopoli, 1772); *Struthiolipeurus struthionis* (Gervais, 1844) were recorded for the first time from the birds in Turkey. *Columbicola columbae* was found on the Long-eared Owl as a first record.

Keywords: *Ardeicola, Falcolipeurus, Brueelia, Ciconophilus, Coloceras, Colpocephalum, Laemobothrion, Piagetiella, Struthiolipeurus, Philopterus*

Türkiye'deki Evcil ve Yabani Kuşlarda Bulunan Çiğneyici Bit (Phthiraptera: Amblycera, Ischnocera) Türleri Üzerine Araştırmalar

Özet

Bu araştırma Türkiye'deki evcil ve yabani kuşlarda görülen bit türlerini belirlemek amacıyla Ekim 2010 -Mayıs 2012 tarihleri arasında yapılmıştır. Bu amaçla Selçuk Üniversitesi Veteriner Fakültesi Kliniklerine ve Anadolu Üniversitesi Fen Fakültesi Biyoloji Bölümü'ne getirilen hasta, yaralı veya ölü kuşlarla, karayollarında ölü olarak bulunan kuşlar laboratuvar ortamında bit yönünden incelenmiştir. Toplanan bitler, içinde %70 alkol bulunan eppendorf tüplerde saklanmıştır. Bitler %10'luk Potasyum Hidroksit (KOH) içinde bir gün süreyle saydamlaştırılmış, 24 saat süreyle distile suda yıkanmış ve birer gün süreyle %70, %80, %90 ve %99'luk alkol serilerinden geçirildikten sonra, Kanada balsamı ile lam üzerine yapıştırılmış ve tür seviyesinde teşhis edilmişlerdir. İncelenen 9 takım, 17 aile, 24 cinse ait 26 kuş türünden 17'si (%65.38) bitlerle enfeste bulunmuş, 9 kuş (%34.62) türünde ise herhangi bir bite tesadüf edilmemiştir. Muayene edilen 85 kuşun 41'i (%48.23) bitlerle enfeste bulunmuş ve 32 bit türü saptanmıştır. *Falcolipeurus, Coloceras* ve *Struthiolipeurus* cinsleri ile; *Brueelia apiastri* (Denny, 1842); *Brueelia munda* (Nitzsch, 1866); *Coloceras piageti* (Johnston ve Harrison, 1912); *Coloceras israelensis* (Tendeiro, 1974); *Degeeriella nisus* (Giebel, 1866); *Degeeriella phylctopygus* (Nitzsch, 1861); *Degeeriella rufa* (Burmeister, 1838); *Falcolipeurus quadripustulatus* (Burmeister, 1838); *Laemobothrion vulturis* (Fabricius, J.C., 1775); *Menacanthus orioli* (Blagovestchensky, 1951); *Philopterus fringillae* (Scopoli, 1772); *Struthiolipeurus struthionis* (Gervais, 1844) Türkiye'deki kuşlardan ilk kez bildirilmiştir. Ayrıca, Kulaklı Orman Baykuşunda *C. columbae*'ye ilk kez rastlanmıştır.

Anahtar sözcükler: *Ardeicola, Falcolipeurus, Brueelia, Ciconophilus, Coloceras, Colpocephalum, Laemobothrion, Piagetiella, Struthiolipeurus, Philopterus*

İletişim (Correspondence)
+90 332 2232736
bdik2004@yahoo.com

INTRODUCTION

One of the most common bird diseases is parasitic ones which are mostly caused by ectoparasites. Lice and mites are known as common ectoparasites of the birds. Although parasitic lice species on birds were previously considered order or suborder Mallophaga, according to recent classification, bird lice are belonging to the suborders Ischnocera and Amblycera in the order Phthiraptera. More than 250 genera and 6.000 lice species were described until now; about 4.500 species are valid species [1].

Although, Turkey has 468 species of bird [2], there is limited number of investigations about the lice species found on the birds in Turkey [3-6]. The number of lice species reported from the birds in Turkey has been reached about 100 species [7-38]. Although, most of the studies about lice species have been focused on only chickens [3,7,9,11,39-41].

As a result of the published studies, some information has been obtained with regard to the lice fauna found on bird species in Turkey. On the other hand, existing information has included 20% of known bird species in Turkey. Thus, it can be argued that our knowledge is not sufficient and we need to perform much more studies on the lice fauna of birds in Turkey. This study was performed to detect chewing lice species occurring on domestic and wild birds in Turkey.

MATERIAL and METHODS

This study was carried out to detect the lice species on the birds in Turkey between October 2010 and May 2012. The chewing lice were collected from 85 domestic and wild bird specimens that were found to be injured or died in the field or obtained from hunters during legal bird hunting seasons. The feathers of each bird were carefully examined and lice were removed with forceps. After visual examination, Bolfo (1% (w/w) 2-Isopropoxyphenyl N-methyl-carbamate) or Biyo Avispray (0.09% (v/w) Tetramethrin and 0.45 (w/w) piperonyl butoxide) were applied to birds placed in a white basin and were kept at least 15 min. The collected lice specimens were fixed in 70% ethanol. After clearing in 10% KOH for 24 h, they were washed with distilled water for 24 h and passed in alcohol series 70%, 80%, 90% and 99% in four consecutive days. The lice specimens were mounted on the slides in Canada balsam by using stereo-zoom microscope, and they were kept for drying in an incubator 50ºC for a few weeks. The lice species were examined under light microscope and were identified to species according to the relevant literatures [42-47].

RESULTS

Only one bird individual in the orders Struthioniformes, Pelecaniformes, Ciconiiformes and Coraciiformes, two bird samples in the orders Columbiformes and Psittaciformes, three bird samples in the order Strigiformes and eight bird specimens in the orders Falconiformes and Passeriformes were examined. While, seventeen of twenty six bird species (65.38%) were found to be infested, no louse was found on studied nine bird species (34.62%). It was determined that forty one of a total of eighty five birds (48.23%) has one louse species on their body, at least. A total of 32 lice species were determined, which of 11 and 21 species belongs to the suborders Amblycera and Ischnocera, respectively. The comprehensive information about the lice species found on the birds was presented in *Table 1*.

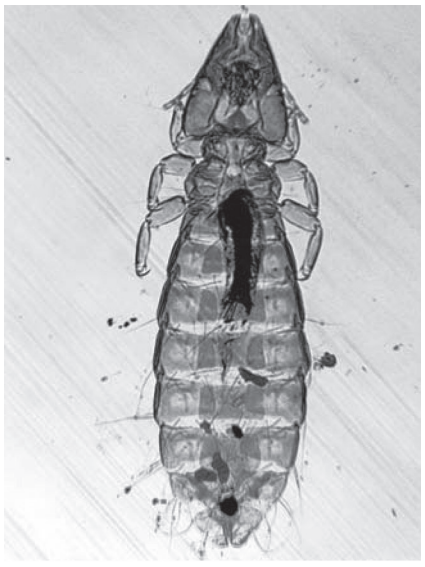

Fig 1. *Brueelia apiastri*, female, original
Şekil 1. *Brueelia apiastri,* dişi, orijinal

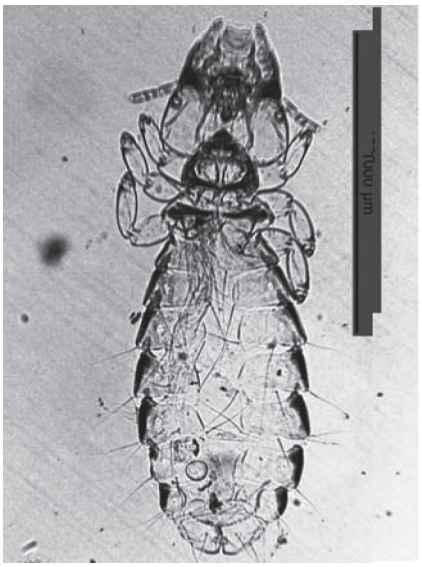

Fig 2. *Brueelia munda,* female, original
Şekil 2. *Brueelia munda,* dişi, orijinal

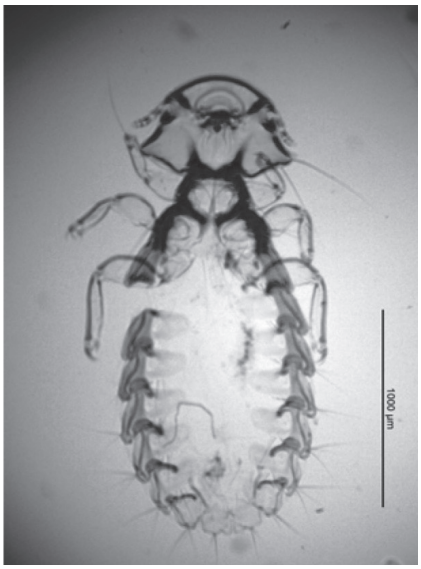

Fig 3. *Coloceras israelensis,* female, original
Şekil 3. *Coloceras israelensis,* dişi, orijinal

Table 1. *Studied bird species and detected lice species*
Tablo 1. *İncelenen kuş türleri ve tespit edilen bit türleri*

Order	Family	Genus	Species	Examined Bird Number	Infested Bird Number	Lice Species
Struthioniformes	Struthionidae	*Struthio*	*S. camelus* Ostrich	1	1	*Struthiolipeurus struthionis* *
Pelecaniformes	Pelecanidae	*Pelecanus*	*P. onocrotalus* Great White Pelican	2	2	*Colpocephalum eucarenum* *Pectinopygus forficulatus* *Piagetiella titan*
Ciconiiformes	Ciconiidae	*Ciconia*	*C. ciconia* White Stork	1	1	*Ardeicola ciconiae* *Ciconophilus quadripustulatus* *Colpocephalum zebra* *Neophilopterus incompletus*
Falconiformes	Accipitridae	*Aegypius*	*A. monachus* Eurasian Black Vulture	1	1	*Falcolipeurus quadripustulatus* * *Laemobothrion vulturis* * *Colpocephalum trachelioti*
		Circus	*C. aeruginosus* WesternMarsh-harrier	2	1	*Colpocephalum turbinatum* ** *Degeeriella fusca*
		Accipiter	*A. nisus* Eurasian Sparrowhawk	3	2	*Colpocephalum nanum* *Degeeriella nisus* *
			A. brevipes Levant Sparrowhawk	1	-	-
		Buteo	*B. buteo* Common Buzzard	2	2	*Degeeriella fulva* *Kurodaia fulvofasciata*
			B. rufinus Long-legged Buzzard	13	11	*Colpocephalum nanum* *Craspedorrhynchus platystomus* *Degeeriella fulva* *Laemobothrion maximum*
	Falconidae	*Pernis*	*P. apivorus* European Honey-buzzard	1	1	*Degeeriella phlyctopygus* *
		Falco	*F. tinnunculus* Common Kestrel	1	1	*Degeeriella rufa* *
Columbiformes	Columbidae	*Columba*	*C. livia* Rock Pigeon	4	4	*Columbicola columbae* *Coloceras israelensis* *
		Streptopelia	*S. decaocto* Eurasian Collared-dove	2	1	*Coloceras piageti* *
Psittaciformes	Psittacidae	*Melopsittacus*	*M. undulatus* Budgerigar	8	-	-
	Cacatuidae	*Nymphicus*	*N. hollandicus* Cockatiel	1	-	-
Strigiformes	Strigidae	*Athene*	*A. noctua* Little Owl	2	-	-
		Asio	*A. otus* Long-eared Owl	4	4	*Strigiphilus barbatus* *Columbicola columbae* **
Coraciiformes	Meropidae	*Merops*	*M. apiaster* European Bee-eater	1	1	*Brueelia apiastri* * *Meropoecus sp*
Passeriformes	Motacillidae	*Motacilla*	*M. alba* White Wagtail	1	-	-
	Sylviidae	*Sylvia*	*S. atricapilla* Blackcap	1	-	-
	Corvidae	*Pica*	*P. pica* Eurasian Magpie	1	-	-
	Oriolidae	*Oriolus*	*O. oriolus* Eurasian Golden Oriole	1	1	*Brueelia munda* * *Menacanthus orioli* *
	Sturnidae	*Sturnus*	*S. vulgaris* Common Starling	4	4	*Brueelia nebulosa* *Menacanthus eurysternus* **
	Passeridae	*Passer*	*P. domesticus* House Sparrow	22	3	*Menacanthus eurysternus* ** *Philopterus fringillae* *
	Fringillidae	*Fringilla*	*F. coelebs* Eurasian Chaffinch	1	-	-
		Carduelis	*C. cannabina* Eurasian Linnet	4	-	-
Total				85	41	

** First record in Turkey, ** First record from this host in Turkey*

Brueelia apiastri (Denny, 1842) *(Fig. 1); Brueelia munda* (Nitzsch, 1866) *(Fig. 2); Coloceras israelensis* (Tendeiro, 1974) *(Fig. 3); Coloceras piageti* (Johnston ve Harrison, 1912) *(Fig. 4); Degeeriella nisus* (Giebel, 1866) *(Fig. 5); Degeeriella phylctopygus* (Nitzsch, 1861) *(Fig. 6); Degeeriella rufa* (Burmeister, 1838) *(Fig. 7); Falcolipeurus quadripustulatus* (Burmeister, 1838) *(Fig. 8); Laemobothrion vulturis* (Fabricius, J.C., 1775) *(Fig. 9), Menacanthus orioli* (Blagovestchensky, 1951) *(Fig. 10); Philopterus fringillae* (Scopoli, 1772) *(Fig. 11); Struthiolipeurus struthionis* (Gervais, 1844) *(Fig. 12)* were reported for the first time in Turkey.

DISCUSSION

It was stated that, 3910 out of 5642 described lice species from birds had been approved as valid species about ten years ago. Among them, 2737 and 1173 species are belonging to the suborders Ischnocera and Amblycera, respectively [1]. In spite of increased number of investigations about lice fauna found on bird species; the numbers of investigated bird and reported lice species are still insufficient in Turkey. Approximately, 20% of total bird species have been examined for their lice species and no louse was found on some of them. The results of the studies carried out on chewing lice fauna in the birds in Turkey until now have showed that, the numbers of the lice species recorded have been reached about 100.

In this study, 85 bird individuals of 26 species in 24 genera, 17 families belonging to the 9 orders were examined. Therefore we can argue that the presented study is the most comprehensive investigation on the lice species on birds in Turkey. Forty-one bird individuals

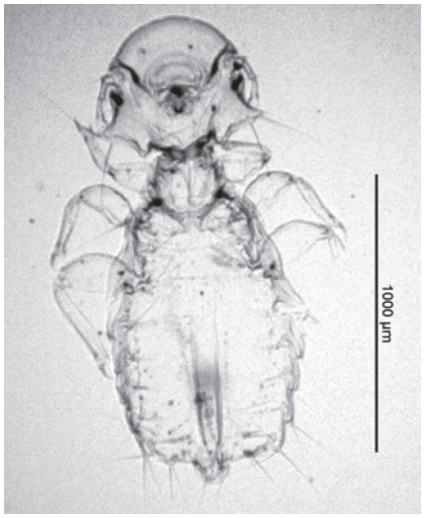

Fig 4. *Coloceras piageti*, male, original
Şekil 4. *Coloceras piageti*, erkek, orijinal

Fig 5. *Degeeriella nisus*, female, original
Şekil 5. *Degeeriella nisus,* dişi, orijinal

Fig 6. *Degeeriella phlyctopygus*, female, original
Şekil 6. *Degeeriella phlyctopygus*, dişi, orijinal

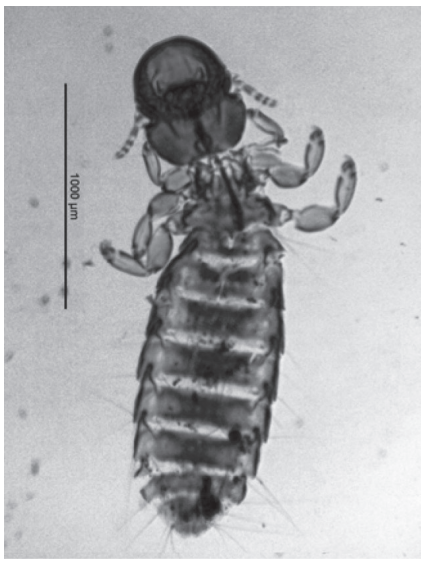

Fig 7. *Degeeriella rufa,* female, original
Şekil 7. *Degeeriella rufa,* dişi, orijinal

Fig 8. *Falcolipeurus quadripustulatus,* female, orig.
Şekil 8. *Falcolipeurus quadripustulatus,* dişi, orij.

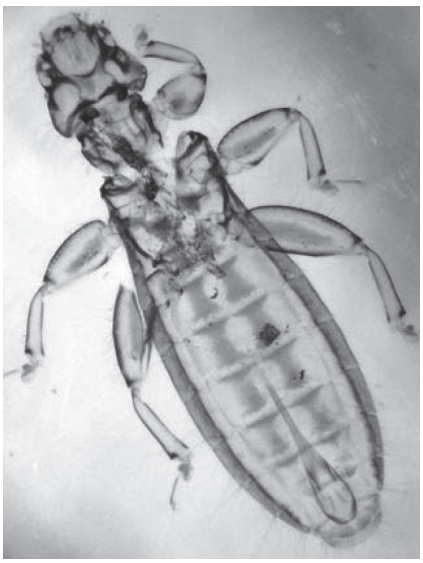

Fig 9. *Laemobothrion vulturis,* male, original
Şekil 9. *Laemobothrion vulturis*, erkek, orijinal

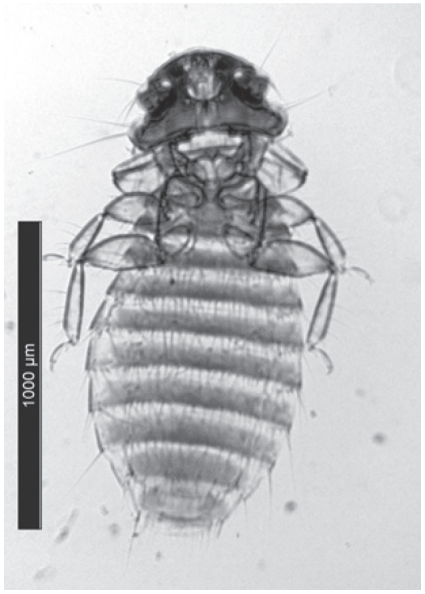

Fig 10. *Menacanthus orioli,* female, original
Şekil 10. *Menacanthus orioli,* dişi, orijinal

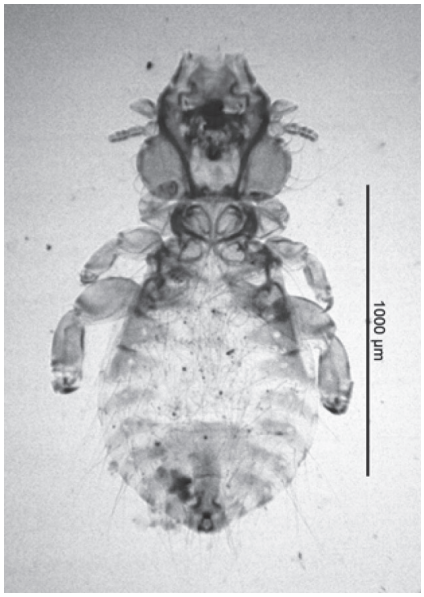

Fig 11. *Philopterus fringillae,* female, original
Şekil 11. *Philopterus fringillae,* dişi, orijinal

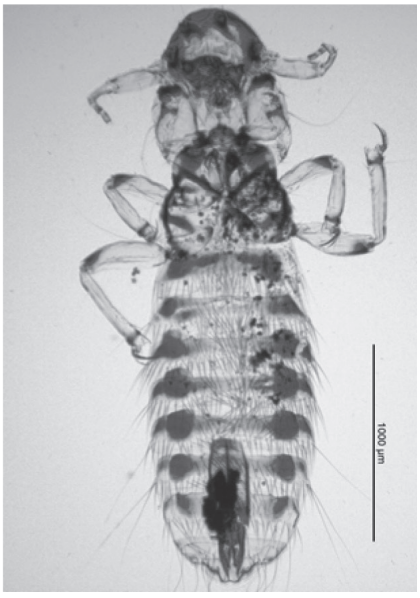

Fig 12. *Struthiolipeurus struthionis,* male, original
Şekil 12. *Struthiolipeurus struthionis,* erkek, orij.

belonging to seventeen species (65.38%) were found to be infested by the lice, while no louse was found on nine bird species (34.62%). Totally, 32 lice species, which of 11 species in six genera and 21 species in 13 genera are belonging to the suborders Amblycera and Ischnocera were detected, respectively. While the bird individuals and species numbers was not same for each order, infestation rates were 100% for Struthioniformes, Pelecaniformes, Ciconiiformes and Coraciiformes, 83.33% for Columbiformes, 79.17% for Falconiformes, 66.66% for Strigiformes and 22.86% for Passeriformes. But, it could not be detected any louse specimen on the order Psittaciformes.

The numbers of recorded lice species on the orders Falconiformes and Passeriformes were more than the others, due to the bird samples examined in these orders were much more from the others. Twenty-four individuals belonging to the eight bird species in the order Falconiformes were examined and 13 lice species were detected. For the order Passeriformes, total 35 individuals belonging to eight bird species were examined and five lice species were identified. Although, the order Passeriformes was the second order for lice species; the numbers of lice species detected on the birds in this order were less than the others, compared to the examined bird numbers.

Chewing lice usually parasitise on their specific host, but some of them are cosmopolitan and can found on different bird species. Twenty-eight lice species were found on their normal host; *C. columbae, C. nanum, D. fulva* and *M. eurysternus* were occurred on different bird species, as well as their normal hosts, in this study. *Colpocephalum nanum* was collected from Eurasian Sparrow Hawk and Long-legged Buzzard in this study. This louse species has also been reported on common Buzzard and Long-legged Buzzard in Turkey [16,21,27], previously. *Menacanthus eurysternus* has been recorded from several bird species throughout the world [1], but not in Turkey until now. Dik et al.[41] recorded that, *Brueelia nebulosa, Sturnidoecus sturni* and *Myrsidea cucullaris*, but no found *Menacanthus eurysternus* on Eurasian Starlings *(Sturnus vulgaris)* in a previous study. Three European Starlings and two House Sparrows *(Passer domesticus)* were found to be infested by *M. eurysternus*. Thus, *M. eurysternus* is recorded from these hosts for the first time and this species a new record for Turkey lice fauna. *Columbicola columbae* is found on rock pigeon *(Columba livia)*. However, this species was found on a Long-eared Owl *(Asio otus)* as well as Rock Pigeon in this study.

In a previous study, no louse species was found on 13 house sparrows [31]. Seventy-two individuals from over 10 different bird species belonging to the order Passeriformes had been examined near Aras River in Kars and infestation rate was determined as 12.50% [35]. In another report for louse species found on the birds belonging to the order Passeriformes in Kuyucuk Lake in Kars, 51 bird specimens representing 22 genera were examined and five lice species were detected from 11 bird individuals, and infestation rate was detected as 21.57% [37]. In present study, 35 bird specimens belonging to the eight species in the order Passeriformes were examined, infestation rate was found as 22.86% and five lice species; *B. munda, B. nebulosa, M. eurysternus, M. orioli* and *P. fringillae* were detected. Infestation rate was relatively low in this study as well as the other studies [31,35,37], because of only three of examined 22 House Sparrows had been infested for the louse specimens. This result related House Sparrow in this study is similar with the results of Dik [31] and its reasons

have been discussed in a previous paper [37]. As a result, *B. munda, M. orioli* and *P. fringillae* detected on Passeriformes birds were recorded for the first time in Turkey.

The genera *Colpocephalum, Kurodaia, Laemobothrion, Craspedorrhynchus* and *Degeeriella* were reported from the Falconiformes birds, previously. *Laemobothrion maximum, C. nanum, Colpocephalum* sp, *D. fulva* and *C. platystomus* have been reported from Long legged Buzzard *(Buteo rufinus)* [16,20,21,24,27,31,34]. We have also confirmed the presence of *L. maximum, C. nanum, C. platystomus* and *D. fulva* on Long-legged Buzzard in this study. Besides, it was found that prevalence of *C. platystomus* and *D. fulva* were higher and of *L. maxiumum* was lower than the other species. Dik and Yamaç [24] have reported that, *C. trachelioti* was found on Eurasian Black Vulture *(Aegypius monachus)* in Turkey. *Colpocephalum trachelioti, F. quadripustulatus* and *L. vulturis* were found on the Eurasian Black Vulture in this study. The genus *Falcolipeurus* and the species *L. vulturis* were firstly reported from Turkey. *Kurodaia fulvofasciata* was found on Common Buzzard *(Buteo buteo)* and reported as a first record for Turkey in a previous study [31]. İnci et al.[34] determined that all of lice species, except *K. fulvofasciata,* found on Common Buzzards also has been detected on the Long-legged Buzzards. Two Common Buzzard samples examined and they were infested with *D. fulva* and *K. fulvofasciata* in this study. Besides, İnci et al.[34] have also recorded that, *D. fulva* and *Colpocephalum* sp. from European Honey-Buzzards in Middle Anatolia. Additionally, *D. phlyctopygus* had been found on European Honey-Buzzard as a first record for Turkey in that study [34]. In previously studies; the Western Marsh-Harrier *(Circus aeruginosus)*, Northern Goshawk *(Accipiter gentilis)* and Common Kestrel *(Falco tinnunculus)* were reported as hosts of *D. fusca* [27], *Colpocephalum polonum* [36], and *Colpocephalum subzerafae* and *Laemobothrion tinnunculi* [38], respectively in Turkey. There was no detected any louse species on the Northern Goshawk in present study, while the Common Kestrel was infested by *D. rufa* and one of the Western Marsh-Harrier by *C. turbinatum, D. fusca*. Thus, *D. rufa* was reported for the first time in Turkey. *Colpocephalum turbinatum* occurs on Rock Pigeon [4] and some raptor species [1]. However, this species was recorded for the first time on Western Marsh-Harrier in Turkey. But, *C. subzerafae* and *L. tinnunculi* reported from Common kestrel by Ulutaş Esatgil et al.[38] could not found in this study.

Studies on the lice species occurring on the Owls (Strigiformes) are very limited in Turkey. Dik and Uslu [22] reported that, *Strigiphilus strigis* has been recorded from Eurasian Eagle-Owl *(Bubo bubo)* for the first time in Turkey. *Strigiphilus barbatus* has been firstly reported by Dik [31] and then by the other researchers [34,36] from Long-eared Owl *(Asio otus)* in Turkey. Two owl species were examined in this study and no louse species was found on the Little Owl *(Athene noctua),* while the four Long-eared Owl specimens were found to be infested with the lice. Three of them were infested by *S. barbatus* and the other was parasitized with *Columbicola columbae*, although this species is a specific for Rock Pigeon. As far as we know, this is the first record of this host-parasite association. This association can be explained by transferring of louse specimens from Rock Pigeon to Long-eared Owl while hunting. Louse individuals collected from the Owl was alive. Therefore, adaptation of *C. columbae* to owl as a new host could be another alternative explanation for this association.

Lice species in the genera *Bonomiella, Hohorstiella, Campanulates, Coloceras, Colpocephalum Columbicola* and *Physconelloides* occurs on the birds in the order Columbiformes [1]. *Hohorstiella lata, Colpocephalum turbinatum, Campanulates compar* and *C. columbae* have been recorded from Rock Pigeon in Turkey, previously [4,6,8,10,14,36,40]. The results of those studies showed that, the prevalence of *C. columbae* and *C. compar* were higher than the other species [4,6,8,10,14]. In a study, *Columbicola bacillus* was reported from Eurasian Collared Dove *(Streptopelia decaocto)* as a new record for this host in Turkey [32]. In this study, six bird specimens (4 Rock Pigeons and 2 Eurasian Collared Doves) in the order Columbiformes were examined and, all of the specimens with except of one Eurasian Collared Dove were infested by the lice species. As a result, *Columbicola columbae* and *Coloceras israelensis* on the Rock Pigeon and *Coloceras piageti* on the Eurasian Collared Dove were found. The last two species; *C. israelensis* and *C. piageti* were the first records for Turkey lice fauna. On the other hand, *C. compar, H. lata* and *C. bacillus* were not detected in the study.

Piagetiella titan, Pectinopygus forficulatus and *Colpocephalum eucarenum* have been recorded on Great White Pelican previously in Turkey [15,18,23]. According to results of those reports, *P. titan* and *P. forficulatus* were the most common lice species on Great White Pelican, but; *C. eucarenum* was found rarely on the pelicans. Two Great White Pelican specimens were examined in this study, and both of them were infested by *P. titan* and *P. forficulatus. Colpocephalum eucarenum* was detected only one pelican. While *P. titan* and *P. forficulatus* were obtained more numbers, only two male *C. eucarenum* specimens were found on the birds. These findings are similar to the results of the previous studies. Although, Dik [15] has reported that *P. titan* can cause erosive stomatitis in a white pelican, erosive stomatitis was not detected on the pelicans infested by *P. titan* in this study.

As far as we know, there is no study about the lice species on Struthioniformes in Turkey. Price et al.[1] reported that the genus *Struthiolipeurus* and the species *S. struthionis* in this genus has been occurred on Ostrich *(Struthio camelus).* In the present study, one Ostrich specimen was examined and a lot of lice specimens were collected from this bird, and they were identified as *S. struthionis,* as the first record for Turkey.

There is a little information about the lice species found on the birds belonging to the order Ciconiiformes in Turkey. Dik and Uslu [19] have reported that, presence of *Ardeicola ciconiae, Ciconophilus quadripustulatus, Colpocephalum zebra* and *Neophilopterus incompletus* from White Stork *(Ciconia ciconia)* in Konya. In addition to that, White Stork, Eurasian Bittern *(Botaurus stellaris)* and Great Egret *(Ardea alba)* samples have been examined for the louse, recently [31,34]. Although, there was no found any louse species on the Eurasian Bitter, *A. ciconiae, C. quadripustulatus, C. zebra* and *N. incompletus* were detected on the White Storks. Also, it was stated that, *Comatomenopon elongatum* was recorded as a first record on Great Egret for Turkey in that study [34]. In this study, all of the species reported from White Stork by Dik and Uslu [19] were detected from the White Stork specimen.

There is no any detailed study on the lice species of the order Psittaciformes in Turkey. Although, some of the bird samples belonging to this order were examined, but any louse specimen was found [31]. Dik [32] reported that *Afrimenopon waar* from budgerigar *(Melopsittacus undulatus)* as a new record for Turkey. In the current study, eight budgerigars and one cockatiel *(Nymphicus hollandicus)* were examined, but any louse specimen was obtained on all of them, probably they were pet animals and provided adequate living conditions by humans.

Among the bird species belonging to the order Coraciiformes; only European Bee-eater *(Merops apiaster)* has been examined for louse, previously in Turkey. *Meromenopon meropis* and *Meropoecus meropis* have been detected on the birds in those studies [35,36]. In this study, only one European Bee-eater was examined and *Meropoecus* sp. and *Brueelia apiastri* were detected on the bird while *Meromenopon meropis* was not found. *B. apiastri* was recorded for the first time from the Eurasian Bee-eater in Turkey in this study. *Meropoecus* specimens could not be identified to species; because all of them were nymph stages.

As a result, a total of 85 bird specimens belonging to the 26 species in the orders Struthioniformes, Pelecaniformes, Ciconiiformes, Coraciiformes, Columbiformes, Psittaciformes, Strigiformes, Falconiformes and Passeriformes were examined in this study. Seventeen (65.38%) of these species were infested with lice species and no louse specimen was found in nine bird species (34.62%). Forty-one of 85 bird specimens (48.23%) were found to be infested with lice specimens and a total of 32 lice species belonging to the suborders Amblycera (11 species) and Ischnocera (21 species) were recorded. The results of the study showed that, the genera Falcolipeurus, Colocerasand Struthiolipeurus, and the species; *Brueelia apiastri; Brueelia munda; Coloceras piageti; Coloceras israelensis; Degeeriella nisus; Degeeriella phylctopygus; Degeriella rufa; Falcolipeurus quadripustulatus; Laemobothrion vulturis; Menacanthus oriole; Philopterus fringillae; Struthiolipeurus struthionis* were reported for the first time in Turkey. Also, *C. columbae* was reported from Long-eared Owl, as a first record.

Ackkowledgements

We thank to Selçuk University Research Fund for supporting this study as titled of "Türkiye'deki evcil ve yabani kuşlarda bulunan çiğneyici bit (Phthiraptera: Amblycera, Ischnocera) türleri üzerine araştırmalar" (BAP Project number: 11401042)

REFERENCES

1. Price RD, Hellenthal RA, Palma RL, Johnson KP, Clayton DH: The Chewing Lice: World checklist and biological overview. Illinois Natural History Survey Special Publication, 24. x + 501 pp, 2003.

2. Şekercioğlu ÇH, Anderson S, Akçay E, Bilgin R, Can ÖE, Semiz G, Tavşanoğlu Ç, Yokeş MB, Soyumert A, İpekdal K, Sağlam İK, Yücel M, Dalfes HN: Turkey's globally important biodiversity in crisis. Biological Conservation, 2011.

3. Mimioğlu MM: Türkiye'de tavuklarda Mallophaga'lar (tavuk bitleri) ve en uygun mücadele metotları üzerine araştırmalar. Ankara Üniv Vet Fak Yayın: 32, Çalışmalar: 16, *Doçentlik tezi,* Ankara Üniversitesi Basımevi, Ankara, 60 s., 1952.

4. Merdivenci A: Türkiye'nin Entomolojik Coğrafyası. Unat EK, Yaşarol Ş, Merdivenci A (Eds): Türkiye'nin Parazitolojik Coğrafyası. s.114-154. Ege Üniversitesi Tıp Fakültesi Yayınları No: 42, Ege Üniversitesi Basımevi, İzmir, 1965.

5. Güralp N, Mayılmayıl A: Samsun'da sülünlerde *(Phasianus colchicus)* görülen sekal Trichostrongylose ile Mallophaga enfeksiyonlarinin etken ve sağaltimlari. *Ankara Üniv Vet Fak Derg*, 18 (2): 271-275, 1971.

6. Tiğin Y: Ehli güvercinlerde *(Columba livia)* bulunan ektoparazitler. *Ankara Üniv Vet Fak Derg,* 20 (2-3): 372-390, 1973.

7. Dik B, Yaman M, Köse M, Gülbahçe S: Konya'da tavuklarda bulunan Mallophaga türleri. *Türkiye Parazitol Derg*, 23 (3): 327-330, 1999.

8. Gıcık Y: Ankara ve çevresinde yaban güvercinlerinde ektoparazitler. *Kafkas Univ Vet Fak Derg,* 5 (1): 71-74, 1999.

9. Köroğlu E, Şaki CE, Aktaş M, Dumanlı N, Angın M: Elazığ ve yöresinde tavuklarda bulunan bit (Mallophaga) türleri ve bunların yayılışı. *Fırat Üniv Sağlık Bil Derg*, 13 (2): 57-60, 1999.

10. Köroğlu E, Şimşek S: Elazığ yöresi güvercinlerinde *(Columba livia)* bulunan ektoparazitler ve yayılış oranları. *Fırat Üniv Sağlık Bil Dergisi,* 15 (1): 195-198, 2001.

11. Okursoy S, Yılmaz F: Bursa yöresinde tavuklarda görülen bit türleri ve bunların dağılımı. *Türkiye Parazitol Derg*, 26 (1): 71-75, 2002.

12. Aksin N: Elazığ yöresi yabani kekliklerde bulunan Mallophaga türleri. *Turk J Vet Anim Sci,* 27, 559-565, 2003.

13. Aksin N: Elazığ yöresinde yabani kazlarda bit enfestasyonu. *Turk J Vet Anim Sci,* 28, 87-90, 2004.

14. Şenlik B, Güleğen E, Akyol V: Bursa yöresindeki evcil güvercinlerin *(Columba livia domestica)* ektoparazitleri. *Türkiye Parazitol Derg*, 29 (2): 100-102, 2005.

15. Dik B: Erosive stomatitis in a white pelican *(Pelecanus onocrotalus)* caused by *Piagetiella titan* (Mallophaga: Menoponidae). *J Vet Med B*, 53, 153-154, 2006.

16. Dik B: Mallophaga species on long-legged buzzards *(Buteo rufinus).* New records from Turkey. *Türkiye Parazitol Derg*, 30 (3): 226-230, 2006.

17. Dik B, Uslu U: Konya'da Halkalı sülünlerde *(Phasianus colchicus) Cuclotogaster heterographus* (Mallophaga: Lipeuridae) enfestasyonu. *Türkiye Parazitol Derg*, 30 (2): 125-127, 2006.

18. Dik B, Uslu U: The first recording of *Piagetiella titan* (Menoponidae: Mallophaga) on a white pelican (*Pelecanus onocrotalus*, Linneaus) in Turkey.

Türkiye Parazitol Derg, 30 (2): 128-131, 2006.

19. Dik B, Uslu U: Beyaz Leyleklerde (*Ciconia ciconia* Linnaeus, 1758) görülen Mallophaga (Insecta) türleri. *Türkiye Parazitol Derg*, 30 (3): 220-225, 2006.

20. Gülanber A, Kaya Ü, Vaassen EWAM, Yavuz E: Chewing-lice on long- legged Buzzard. *Indian Vet J,* 83 (11): 1238-1239, 2006.

21. Dik B, Aydenizöz-Özkayhan M: Mallophaga species on long-legged buzzards *(Buteo rufinus)* in Turkey. *Türkiye Parazitol Derg*, 31 (4): 298-301, 2007.

22. Dik B, Uslu U: Türkiye'de bir Puhu'da *(Bubo bubo interpositus) Strigiphilus strigis* (Mallophaga: Philopteridae). *Türkiye Parazitol Derg*, 31 (1): 69-71, 2007.

23. Dik B, Uslu U: Türkiye'de, Beyaz Pelikanlarda (*Pelecanus onocrotalus*, Linneaus) görülen Mallophaga türleri. *Türkiye Parazitol Derg,* 32 (1): 71-76, 2008.

24. Dik B, Yamaç E: Türkiye'de bir Kara Akbaba'da (*Aegypius monachus* L.) ilk *Colpocephalum trachelioti* (Amblycera: Menoponidae). *Türkiye Parazitol Derg*, 32 (2): 149-152, 2008.

25. Karataş A, Göçmen B, Karataş A: A new record for Turkish lice fauna: *Dennyus hirundinis* (Linnaes, 1761) (Mallophaga: Menoponidae). *Türkiye Parazitol Derg*, 32 (1): 77-78, 2008.

26. Dik B: Türkiye'de, Çobanaldatanlarda (*Caprimulgus europaeus* L.)'da ilk *Mulcticola hypoleucus* (Denny, 1842) (Phthiraptera: Ischnocera) olgusu. *Türkiye Parazitol Derg*, 33 (3): 212-214, 2009.

27. Dik B, Uslu U: Konya Hayvanat Bahçesi'ndeki Kanatlı Hayvanlarda Görülen Çiğneyici Bit (Phthiraptera: Amblycera, Ischnocera) Türleri. *Türkiye Parazitol Derg*, 33 (1): 43-49, 2009.

28. Aksin N: Chewing lice and feather mites on wild partridges. *Indian Vet J*, 87, 940-941, 2010.

29. Aksin N: The presence of Chewing-lice (Insecta: Phthiraptera) on Wild Quails. *J Anim Vet Adv*, 9 (9): 1377-1379, 2010.

30. Dik B, Şekercioglu ÇH, Kirpik MA, İnak S, Uslu U: Chewing lice (Phthiraptera) species found on Turkish Shorebirds (Charadriiformes). *Kafkas Univ Vet Fak Derg,* 16 (5): 867-874, 2010.

31. Dik B. Türkiye'deki evcil ve yabani kanatlılarda bulunan Çiğneyici bit (Phthiraptera) türler. *Türkiye Parazitol Derg*, 34 (1): 55-60, 2010.

32. Dik B: New records of chewing lice (Phthiraptera) from some bird species in Turkey. *Türkiye Parazitol Derg,* 34, 168-173, 2010.

33. İnci A, Yıldırım A, Dik B, Düzlü Ö: Current knowledge of Turkey's louse fauna. *Türkiye Parazitol Derg*, 34, 212-220, 2010.

34. İnci A, Dik B, Kibar M, Yıldırım A, Düzlü Ö: Chewing Lice (Phthiraptera) Species on Wild Birds in Cappadocia Region, Turkey. *Türkiye Parazitol Derg*, 34, 174-178, 2010.

35. Dik B, Şekercioğlu CH, Kirpik MA: Chewing lice (Phthiraptera) species found on birds along the Aras river, Iğdır, Eastern Turkey. *Kafkas Univ Vet Fak Derg,* 17 (4): 567-573, 2011.

36. Dik B, Yamaç E, Uslu U: Chewing lice (Phthiraptera) found on wild birds in Turkey. *Kafkas Univ Vet Fak Derg*, 17 (5): 787-794, 2011.

37. Dik B, Kirpik MA, Şekercioglu ÇH, Şaşmaz Y: Chewing lice (Phthiraptera) found on songbirds (Passeriformes) in Turkey. *Türkiye Parazitol Derg*, 35 (1): 34-39, 2011.

38. Ulutaş-Esatgil M, Efil İ, Tüzer E: Two chewing lice sepcies, *Colpocephalum subzerafae* and *Laemobothrion tinnunculi*, on a Kestrel *(Falco tinnunculus)* in Istanbul: Two new records from Turkey. *Kafkas Univ Vet Fak Derg*, 18 (Suppl-A): A241-A244, 2012.

39. Aldemir O: Kars ilinde tavuklarda bulunan ektoparazitler. *Türkiye Parazitol Derg,* 28 (3): 154-157, 2004.

40. Gülanber A, Tüzer E, Çetinkaya H: A survey on lice infestations of pigeons in İstanbul, Turkey. *İstanbul Univ Vet Fak Derg*, 28 (1): 231-234, 2002.

41. Dik B, Uslu U, Derinbay-Ekici Ö, Işık N: Türkiye'de, sığırcıklarda (*Sturnus vulgaris*, L.) görülen bit (Phthiraptera; Ischnocera Amblycera) türleri. *Türkiye Parazitol Derg,* 33 (4): 316-320, 2009.

42. Clay T: Revisions of Mallophaga Genera. *Degeeriella* from Falconiformes. *Bull Brit Mus (Nat Hist) Ent,* 7, 123-207, 1958.

43. Clay T, Hopkins GHE: The early literature on Mallophaga. *Bull Brit Mus (Nat Hist) Ent,* 3, 221-266, 1954.

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

45. Tandan BK: Mallophaga from birds of the Indian subregion. Part VI. *Falcolipeurus* Bedford. *Proc R Ent Soc Lond (B)*, 33, 173-180, 1964.

46. Tendeiro J: Estudos Sobreos Goniodideos (Mallophaga, Ischnocera) dos Columbiformes. XIV. Género *Coloceras* Taschenberg, 1882. *Rev Ciênc Vet,* 6, 199-524, 1973.

47. Tendeiro J: Estudos Sobreos Goniodideos (Mallophaga, Ischnocera) dos Columbiformes. XIVI. Observacões cedicionais sobre o género *Nitzschiella* Kéler, 1939, com descrição de cinco species novas. *Rev Ciênc Vet*, 7, 144-236, 1974.