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RESEARCH ARTICLE

Chewing Lice (Phthiraptera) Species Found On Birds Along the Aras River, Iğdır, Eastern Turkey

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Summary

Chewing lice were sampled from the birds captured and ringed between September-October 2009 at the Aras River (Yukarı Çıyrıklı, Tuzluca, Iğdır) bird ringing station in eastern Turkey. Eighty-one bird specimens of 23 species were examined for lice infestation. All lice collected from the birds were placed in separate tubes with 70% alcohol. Louse specimens were cleared in 10% KOH, mounted in Canada balsam on glass slides and identified under a binocular light microscope. Sixteen out of 81 birds examined (19.75%) were infested with at least one chewing louse specimens. A total of 14 louse species were found on birds. These were: *Austromenopon durisetosum* (Blagoveshtchensky, 1948), *Actornithophilus multisetosus* (Blagoveshtchensky, 1940), *Anaticola crassicornis* (Scopoli, 1763), *Cummingsiella ambigua* (Burmeister, 1838), *Menacanthus alaudae* (Schrank, 1776), *Menacanthus curuccae* (Schrank, 1776), *Menacanthus eurysternus* (Burmeister, 1838), *Menacanthus pusillus* (Niztsch, 1866), *Meromenopon meropis* (Clay&Meinertzhagen, 1941), *Myrsidea picae* (Linnaeus, 1758), *Pseudomenopon scopulacorne* (Denny, 1842), *Rhynonirmus scolopacis* (Denny, 1842), and *Trinoton querquedulae* (Linnaeus, 1758). Four specimens of *Holomenopon* sp. collected from Nortern Pintail *(Anas acuta),* one specimen of *Menacanthus* sp. collected from European Robin *(Erithacus rubeculae)*, and *Menacanthus* sp. collected from Eurasian Blackbird *(Turdus merula)* were not identified. Seven louse species; *A. multisetosus, C. ambigua, M. alaudae, M. curuccae, M. eurysternus, M. picae,* and *P. scopulacorne* are first records for Turkey.

Keywords: *Anatolia, Avian ecology, Biodiversity, Bird ringing (banding), Cryptic species, Entomology, Invertebrate, Insect, Monitoring, Ornithology, Palearctic, Parasitology, Systematics, Taxonomy*

Doğu Anadolu'da Aras Nehri Kuşlarında Bulunan Bit (Phthiraptera) Türleri

Özet

Doğu Anadolu bölgesinde, Aras Nehri Kuş Araştırma ve Eğitim Merkezi (Yukarı Çıyrıklı, Tuzluca, Iğdır) kuş halkalama istasyonunda Eylül-Ekim 2009 döneminde yakalanan kuş örnekleri üzerindeki bit örnekleri toplandı. Yirmi üç kuş türüne ait 81 kuş örneği bit yönünden incelendi. Kuşlardan toplanan tüm bit örnekleri %70'lik alkol bulunan ayrı tüplere konuldu. Bit örnekleri %10'luk KOH'da saydamlaştırılarak Kanada Balsamı ile lam üzerine yapıştırıldı ve binoküler ışık mikroskobunda teşhis edildi. İncelenen 81 kuş örneğinden 16 tanesi (%19.75) en azından bir bitle enfeste bulundu. İncelenen kuşlarda toplam olarak 14 bit türü tespit edildi. Bu türler; *Austromenopon durisetosum* (Blagoveshtchensky, 1948), *Actornithophilus multisetosus* (Blagoveshtchensky, 1940), *Anaticola crassicornis* (Scopoli, 1763), *Cummingsiella ambigua* (Burmeister, 1838), *Menacanthus alaudae* (Schrank, 1776), *Menacanthus curuccae* (Schrank, 1776), *Menacanthus eurysternus* (Burmeister, 1838), *Menacanthus pusillus* (Niztsch, 1866), *Meromenopon meropis* (Clay and Meinertzhagen, 1941), *Myrsidea picae* (Linnaeus, 1758), *Pseudomenopon scopulacorne* (Denny, 1842), *Rhynonirmus scolopacis* (Denny, 1842) ve *Trinoton querquedulae* (Linnaeus, 1758) olarak belirlendi. Kılkuyruk *(Anas acuta)* üzerinden toplanan dört *Holomenopon*, Kızılgerdan *(Erithacus rubeculae)* ve Karatavuk *(Turdus mercula)* üzerinden toplanan birer adet *Menacanthus* örneğinin tür teşhisleri ise yapılamadı. Bit türlerinden yedisi; *A. multisetosus, C. ambigua, M. alaudae, M. curuccae, M. eurysternus, M. picae* ve *P. scopulacorne* Türkiye'den ilk kez bildirilmektedir.

Anahtar sözcükler: *Anadolu, Kuş ekolojisi, Biyoçeşitlilik, Halkalama, Kriptik türler, Entomoloji, Omurgasız, Böcek, Ekolojik takip, Ornitoloji, Palearktik, Parazitoloji, Sistematik, Taksonomi*

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INTRODUCTION

Approximately 4.000 species of chewing lice (Phthiraptera) have been recorded on birds worldwide [1]. There are 465 bird species so far recorded in Turkey [2] and the actual total is likely to exceed 500 species. However, the Phthiraptera fauna of these birds is little known. In Turkey, approximately 100 bird species were examined for lice infestation and about 100 louse species were found on these birds until now [3]. There have been two studies about the Phthiraptera fauna of the birds at Kuyucuk Lake of Kars (40º 45' N, 043º 27' E), 70 km from the Aras River Research Station (40º07' N, 43º35') [4]. In these studies, 89 individuals from 28 bird species were examined for lice infestation. Twenty louse species on waders and five louse species on songbirds were observed [5,6]. These were the first studies on the chewing lice fauna of the birds in northeastern Turkey. The current study was carried out to document additional chewing lice on the birds ringed at the Aras River (Yukarı Çıyrıklı, Tuzluca, Iğdır) research station in eastern Turkey.

MATERIAL and METHODS

The field work was carried out between September-October 2009 at the Aras River (40º07' N, 43º35') bird ringing station in eastern Turkey. We examined 81 birds of 23 species. The birds belonged to 21 genera, 14 families and six orders *(Table 1)*. Birds were caught in mistnets, ringed with the rings of the Turkey National Ringing Program [7], measured, examined for ectoparasites, and released unharmed. To sample chewing lice, the feathers of each bird were carefully rubbed, over a white piece of paper, with synthetic pyrethroid (tetramethrin) dust (Avispray, Biyoteknik, Turkey) at doses recommended by the manufacturer. Birds were then placed in breathable paper bags for five minutes. All lice were collected and placed in tubes with 70% alcohol. Lice specimens were cleared in 10% KOH for one day, washed in distilled water, stored in consecutive days in increasing alcohol concentrations of 70%, 80%, 90%, and 99%, mounted in Canada balsam on slides, and identified under a light microscope. The identification of the lice was carried out based on relevant literature [8-18].

RESULTS

Of the birds examined, 16 out of 81 (19.75%) were infested with at least one chewing louse species *(Table 2)*. A total of 14 louse species were found on the birds. These are: *Austromenopon durisetosum* (Blagoveshtchensky, 1948), *Actornithophilus multisetosus* (Blagoveshtchensky, 1940), *Anaticola crassicornis* (Scopoli, 1763), *Cummingsiella ambigua* (Burmeister, 1838), *Menacanthus alaudae* (Schrank, 1776), *Menacanthus curuccae* (Schrank, 1776), *Menacanthus eurysternus* (Burmeister, 1838), *Menacanthus pusillus* (Niztsch, 1866), *Meromenopon meropis* (Clay and Meinertzhagen, 1941), *Myrsidea picae* (Linnaeus, 1758), *Pseudomenopon scopulacorne* (Denny, 1842), *Rhynonirmus scolopacis* (Denny, 1842), and *Trinoton querquedulae* (Linnaeus, 1758). Four specimens of *Holomenopon* sp. collected from Northern Pintail *(Anas acuta)*, one specimen of *Menacanthus* sp. collected from European Robin *(Erithacus rubeculae)* and *Menacanthus* sp. collected from Eurasian Blackbird *(Turdus merula)* were not identified.

Table 1. *Orders, families, genera and species of the bird specimens studied*
Tablo 1. *Çalışılan kuş örneklerinin, tür, cins, familya ve takımları*

Ordo	Families	Genera	Species
Anseriformes	Anatidae	*Anas*	*A. acuta*
Charadriiformes	Scolopacidae	*Gallinago*	*G. gallinago*
		Lymnocryptes	*L. minimus*
Coraciiformes	Meropidae	*Merops*	*M. apiaster*
Falconiformes	Accipitridae	*Accipiter*	*A. brevipes*
Gruiformes	Rallidae	*Porzana*	*P. parva*
		Rallus	*R. aquaticus*
Passeriformes	Alaudidae	*Melanocorypha*	*M. calandra*
	Emberizidae	*Emberiza*	*E. schoeniclus*
		Miliaria	*M. calandra*
	Corvidae	*Pica*	*P. pica*
	Motacillidae	*Anthus*	*A. spinoletta*
		Motacilla	*M. alba*
	Muscipapidae	*Erithacus*	*E. rubecula*
		Luscinia	*L. svecica*
	Passeridae	*Passer*	*P. montanus*
	Sylviidae	*Acrocephalus*	*A. melanopogon*
			A. scirpaceus
		Phylloscopus	*P. collybita*
			P. lorenzii
		Sylvia	*S. borin*
	Troglodytidae	*Troglodytes*	*T. troglodytes*
	Turdidae	*Turdus*	*T. merula*

Austromenopon durisetosum (Blagoveshtchensky, 1948): Studied material: 1 ♀, 22.10.2009, Aras River, Iğdır. Host: Common Snipe *(Gallinago gallinago)*. This species was previously found on Common Snipe at Lake Kuyucuk, Kars, Turkey [6] *(Fig. 1)*.

Actornithophilus multisetosus (Blagoveshtchensky, 1940): Studied material: 1 ♀ 6 ♂ 7 N, 26.10.2009, Aras River, Iğdır. Host: Jack Snipe *(Lymnocryptes minimus)*. This species is recorded for the first time in Turkey *(Fig. 2)*.

Anaticola crassicornis (Scopoli, 1763): Studied material: 9 ♀ 13 ♂ 15 N, 22.10.2009, Aras River, Iğdır. Host: Northern Pintail *(Anas acuta)*. This species was found on ducks (probably *Anas platyrhynchos*) in İstanbul, Turkey [19] *(Fig. 3)*.

Cummingsiella ambigua (Burmeister, 1838): Studied material: 1 ♂, 22.10.2009, Aras River, Iğdır. Host: Common Snipe *(Gallinago gallinago)*. This species is recorded for the first time in Turkey *(Fig. 4)*.

Table 2. *Bird species studied, infestation rates, and louse species found on the avian hosts*
Tablo 2. *Çalışılan göçmen kuşlarda bulunan bit türleri ve enfestasyon oranları*

Bird Species	Number of Examined Birds	Number of Infested Birds	Louse Species
Accipiter brevipes Levant Sparrowhawk	1	-	-
Acrocephalus melanopogon Moustached Warbler	5	-	-
Acrocephalus scirpaceus Eurasian Reed-warbler	1	-	-
Anas acuta Northern Pintail	1	1	*Trinoton querquedulae* 4 ♀ 4 ♂ 6 N *Anaticola crassicornis* 9 ♀ 13 ♂ 15 N *Holomenopon sp.* 2 ♀ 2 ♂
Anthus spinoletta Water Pipit	6	1	*Menacanthus pusillus* 1 ♀
Emberiza schoeniclus Reed Bunting	8	-	-
Erithacus rubecula *European Robin*	6	2	*Menacanthus eurysternus* 1 ♀ *Menacanthus* sp. 1 N
Gallinago gallinago Common Snipe	2	1	*Austromenopon durisetosum* 1 ♀ *Cummingsiella ambigua* 1 ♂ *Rhynonirmus scolopacis* 1 ♀ 1 ♂
Luscinia svecica *Bluethroat*	3	-	-
Lymnocryptes minimus *Jack Snipe*	1	1	*Actornithophilus multisetosus* 1 ♀ 6 ♂ 7 N
Melanocorypha calandra Calandra Lark	6	1	*Menacanthus alaudae* 1 ♀
Merops apiaster European Bee-eater	1	1	*Meromenopon meropis* 3 ♂
Miliaria calandra Corn Bunting	1	-	-
Motacilla alba White Wagtail	3	-	-
Passer montanus *Tree Sparrow*	1	-	-
Phylloscopus collybita Common Chiffchaff	25	2	*Menacanthus curuccae* 4 ♀
Phylloscopus (sindianus) lorenzii Caucasian Chiffchaff	1	-	-
Pica pica Eurasian Magpie	3	2	*Menacanthus eurysternus* 12 ♀ 4 ♂ 7 N *Myrsidea picae* 10 ♀ 6 ♂ 3 N
Porzana parva *Little Crake*	2	2	*Pseudomenopon scopulacorne* 4 ♀ 1 ♂
Rallus aquaticus *Water Rail*	1	1	*Pseudomenopon scopulacorne* 1 ♀ 1 ♂
Sylvia borin Garden Warbler	1	-	-
Troglodytes troglodytes *Wren*	1	-	-
Turdus merula *Eurasian Blackbird*	1	1	*Menacanthus* sp 2 N
Total	***81***	***16***	

Holomenopon sp.: Studied material: 2 ♀ 2 ♂, 22.10.2009, Aras River, Iğdır. Host: Northern Pintail *(Anas acuta)* *(Fig. 5)*.

Menacanthus alaudae (Schrank, 1776): Studied material: 1♀, 22.10.2009, Aras River, Iğdır. Host: Calandra Lark *(Melanocorypha calandra)*. This species is recorded for the first time in Turkey. Calandra Lark is a new host for this species *(Fig. 6)*.

Menacanthus curuccae (Schrank, 1776): Studied

material: 4 ♀, 30.10.2009, Aras River, Iğdır. Host: Common Chiffchaff *(Phylloscopus collybita)*. This species is reported for the first time in Turkey *(Fig. 7)*.

Menacanthus eurysternus (Burmeister, 1838): Studied material: 1 ♀, 30.10.2009, Aras River, Iğdır; Host: *Erithacus rubecula;* 3 ♀ 2 ♂ 3 N, 30.10.2009, Aras River, Iğdır; 9 ♀ 2 ♂ 4 N, 31.10.2009, Host: Eurasian Magpie *(Pica pica)*. This species is recorded for the first time in Turkey *(Fig. 8)*.

Menacanthus pusillus (Niztsch, 1866): Studied material: 1 ♀, 22.10.2009, Aras River, Iğdır. Host: Water Pipit *(Anthus spinoletta)*. This species was previously found on Yellow Wagtail (*Motacilla flava*) and Water Pipit *(Anthus spinoletta)* at Lake Kuyucuk [6] *(Fig. 9)*.

Meromenopon meropis (Clay and Meinertzhagen, 1941): Studied material: 3 ♂, 25.09.2009, Aras River, Iğdır. Host: European Bee-eater (*Merops apiaster*). This species was previously recorded on European Bee-eater in Eskişehir, central Anatolia by Dik et al.[20] *(Fig.10)*.

Myrsidea picae (Linnaeus, 1758): Studied material: 10 ♀ 6 ♂ 3 N, 31.10.2009, Aras River, Iğdır. Host: Eurasian Magpie *(Pica pica)*. This species is recorded for the first time in Turkey *(Fig. 11)*.

Pseudomenopon scopulacorne (Denny, 1842): Studied material: 3 ♀ 1 ♂, 24.09.2009, Aras River, Iğdır; 1 ♀ 09.10.2009, Aras River, Iğdır. Host: Little Crake *(Porzana parva)*. 1 ♀ 1 ♂, 05.10.2009, Aras River, Iğdır. Host: Water Rail (*Rallus aquaticus*). This species is reported for the first time in Turkey *(Fig. 12)*.

Rhynonirmus scolopacis (Denny, 1842): Studied material: 1 ♀ 1 ♂, 22.10.2009, Aras River, Iğdır. Host: Common Snipe *(Gallinago gallinago)*. This species was previously found on Common Snipe at Lake Kuyucuk, Kars, Turkey [6] *(Fig. 13)*.

Trinoton querquedulae (Linnaeus, 1758): Studied material: 4 ♀ 4 ♂ 6 N, 22.10.2009, Aras River, Iğdır. Host: Northern Pintail *(Anas acuta)*. This species was found on ducks and geese (the bird species were not described in the paper) in the Black Sea region and the European part of Turkey [20] *(Fig. 14)*.

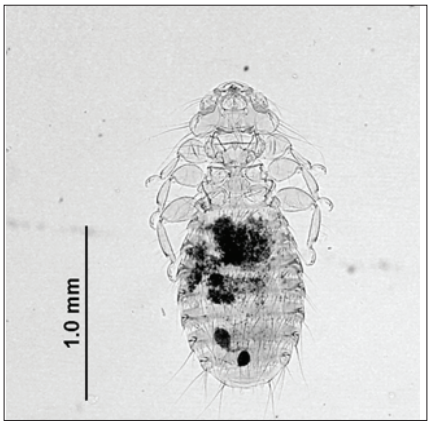
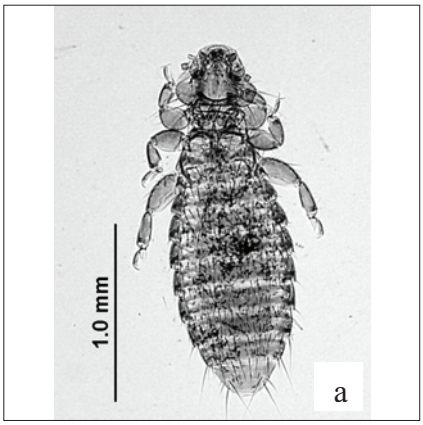


Fig 1. *Austromenopon durisetosum*, female, original
Şekil 1. *Austromenopon durisetosum*, dişi, orijinal



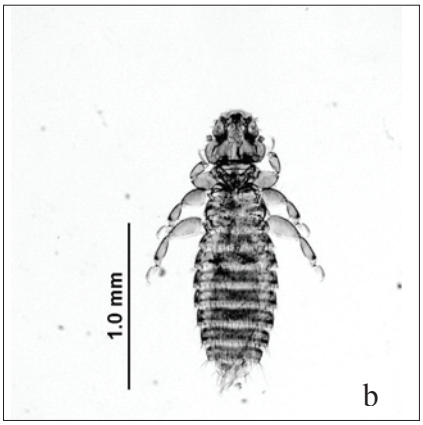


Fig 2. *Actornithophilus multisetosus* **a.** female, original; **b.** male, original
Şekil 2. *Actornithophilus multisetosus* **a.** dişi, orijinal; **b.** erkek, orijinal

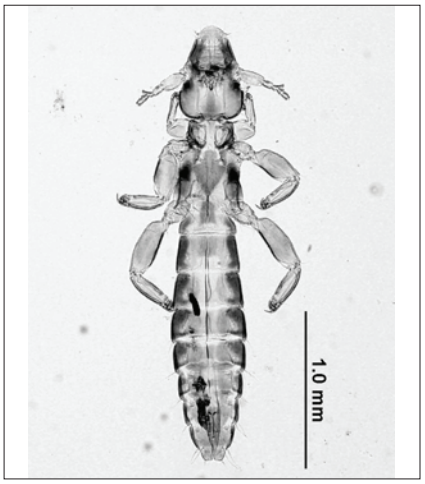


Fig 3. *Anaticola crassicornis*, male, original
Şekil 3. *Anaticola crassicornis*, erkek, orijinal

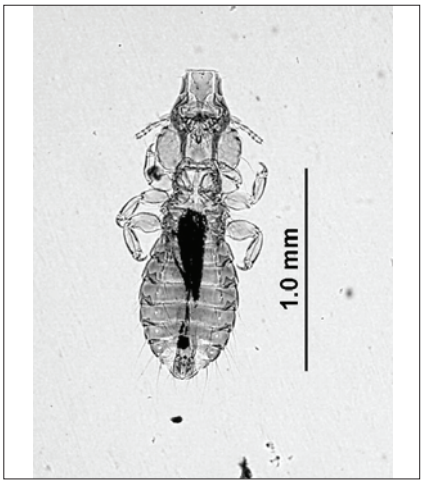


Fig 4. *Cummingsiella ambigua*, male, original
Şekil 4. *Cummingsiella ambigua*, erkek, orijinal

Fig 5. *Holomenopon* sp, female, original
Şekil 5. *Holomenopon* sp, dişi, orijinal

Fig 6. *Menacanthus alaudae*, female, original
Şekil 6. *Menacanthus alaudae*, dişi, orijinal

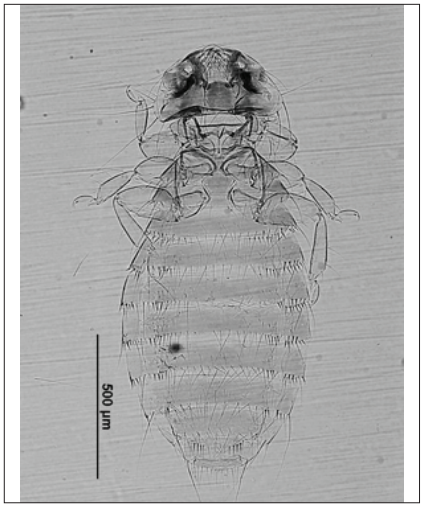


Fig 7. *Menacanthus curuccae*, female, original
Şekil 7. *Menacanthus curuccae*, dişi, orijinal

Fig 8. *Menacanthus eurysternus*, female, original
Şekil 8. *Menacanthus eurysternus*, dişi, orijinal

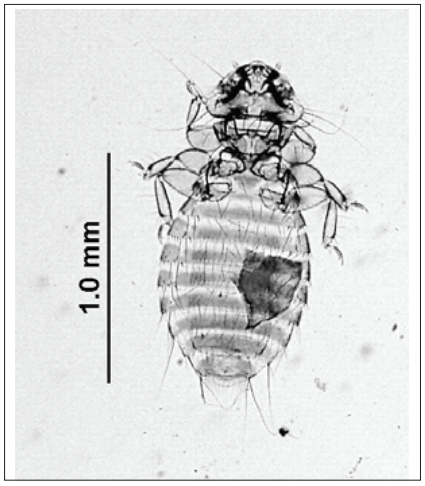


Fig 9. *Menacanthus pusillus*, female, original
Şekil 9. *Menacanthus pusillus*, dişi, orijinal

Fig10. *Meromenopon meropis*, male, original
Şekil 10. *Meromenopon meropis*, erkek, orijinal

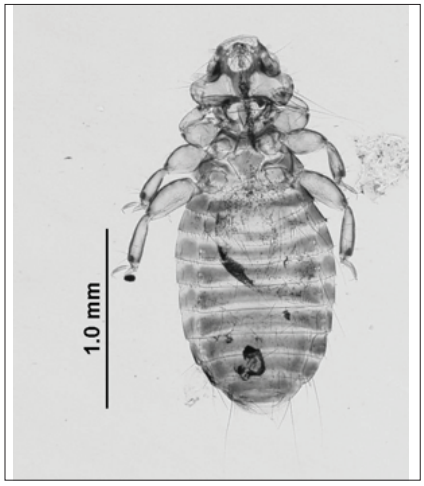


Fig 11. *Myrsidea picae*, female, original
Şekil 11. *Myrsidea picae*, dişi, orijinal

Fig 12. *Pseudomenopon scopulacorne*, female, original
Şekil 12. *Pseudomenopon scopulacorne*, dişi, orijinal

Fig 13. *Rhynonirmus scolopacis*, female, original
Şekil 13. *Rhynonirmus scolopacis*, dişi, orijinal

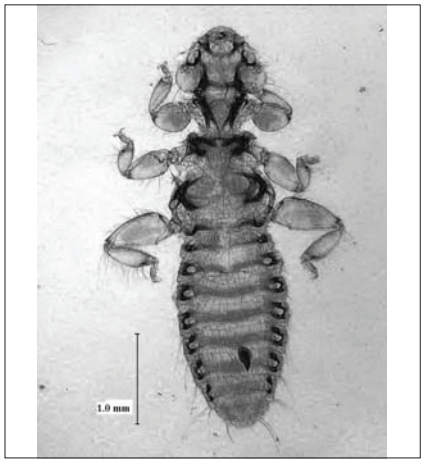


Fig 14. *Trinoton querquedulae*, female, original
Fig 14. *Trinoton querquedulae*, female, original

DISCUSSION

To the authors current knowledge there is no record or study on the lice infestations of birds along the Aras River. In two studies [5,6] on the Phthiraptera fauna of the birds of Lake Kuyucuk (Kars province, Turkey), located 70 km northwest of the Aras River Research Station, 89 bird specimens from 28 bird species were examined for lice infestation and 25 louse species were detected on those birds. In the present study, 81 individuals of 23 bird species were examined for lice infestation and fourteen louse species were detected on these birds. Twelve bird species, Northern Pintail *(A. acuta)*, Levant Sparrowhawk *(Accipiter brevipes)*, *Water Rail (R. aquaticus), Little Crake (P. parva),* Jack Snipe *(L. minimus)*, White Wagtail *(Motacilla alba)*, *Winter Wren (Troglodytes troglodytes), Eurasian Blackbird (Turdus merula),* Eurasian Reed-warbler *(Acrocephalus scirpaceus),* Caucasian Chiffchaff *(Phylloscopus (sindianus) lorenzii)*, *European Robin (Erithacus rubecula)*, and Eurasian Magpie *(P. pica)* were examined for louse for the first time in Turkey. Fourteen louse species, eleven of them in the order Amblycera and three species in the order Ischnocera were collected on the birds examined in this study.

Only nine out of 72 (12.5%) songbirds examined in this study were found to be infested with lice. From the infested birds, 135 lice were collected, of which 55 were from Northern Pintail *(A. acuta)*, 42 from Eurasian Magpie *(P. pica)*, and 14 from Jack Snipe *(L. minimus)*. Few lice were found on other bird species. While two out of the three charadriiform specimens examined and all specimens in the orders Gruiformes, Coraciiformes, and Anseriformes were infested with lice, no lice were found on the falconiform Levant Sparrowhawk *(A. brevipes)*. Overall, few lice were found on Passeriformes (six lice), Charadriiformes (four), Anseriformes (three), Coraciiformes (one) and Gruiformes (one). Two females and two male *Holomenopon* sp. collected on Northern Pintail *(A. acuta)*, two *Menacanthus* nymphs collected on Eurasian Blackbird *(T. merula)*, and one female *Menacanthus* collected on European Robin *(E. rubecula)* could not be identified to species.

In a previous study at Lake Kuyucuk of Kars [6], 70 km northwest of the Aras River Research Station, four out of nine Common Snipe *(G. gallinago)* specimens examined were infested with the louse species *A. durisetosum*, *Actornithophilus stictus* (Kellogg and Chapman, 1899) and *R. scolopacis*. In this study, one of the two Common Snipe *(G. gallinago)* examined was infested with the louse species *A. durisetosum*, *R. scolopacis*, and *C. ambigua*, the last of which was recorded for the first time in Turkey. Three louse species, *Meropoecus meropis* (Denny, 1842), *Brueelia apiasteri* (Denny, 1842), and *Meromenopon meropis* (Clay and Meinertzhagen, 1941), were previously recorded on European Bee-eaters [1]. Dik et al.[20] found the louse species *Meropoecus meropis* (Denny, 1842) and *Meromenopon meropis* (Clay and Meinertzhagen, 1941) on European Bee-eaters *(Merops apiaster)* for the first time in Turkey. In this study, however, only *Meromenopon meropis* was found on the one European Bee-eater examined, and *Meropoecus meropis* and *Brueelia apiasteri*, previously reported on European Bee-eaters, were not found.

In another study at Lake Kuyucuk, Kars [5], all Reed Bunting *(Emberiza schoeniclus)* specimens examined were found to be infested with the louse *Menacanthus chrysophaeus* (Kellogg, 1896). However, no lice were found on any of the eight Reed Bunting specimens examined in this study. Until now, the louse species *Brueelia tristris* (Giebel, 1874), *Philopterus rubeculae* (Denny, 1842), and *Ricinus rubeculae* (Schrank, 1776) have been reported from European Robins *(Erithacus rubeculae)*, but no lice in the genus *Menacanthus* were found on this bird species [1]. In this study, however, two of the six European Robin specimens examined were infested with lice from the genus *Menacanthus* and not with the louse species previously reported from European Robins. Of the lice collected from this bird species in this study, one was identified as *M. eurysternus*, but the other *Menacanthus* specimen could not be identified to species. Previously, the louse species *Menacanthus agilis* (Nitzsch, 1866) and *Penenirmus rarus* (Zlotorzycka, 1976) have been reported from Common Chiffchaff *(P. collybita)* by Price *et al.* [1], and *P. rarus* was also recorded in Turkey previously [5]. On Common Chiffchaff, Ilieva [21] previously found *M. agilis* and, for the first time, *M. curuccae*. Of the 25 Common Chiffchaff examined in this study, two were infested with lice and all the four louse specimens collected were identified as *M. curuccae*.

In conclusion, in this study, fourteen louse species were detected on the birds examined. Seven louse species, namely *A. multisetosus, C. ambigua, M. alaudae, M. curuccae, M. eurysternus, M. picae,* and *P. scopulacorne* were reported for the first time in Turkey. In addition, *M. curuccae* on European Robin and *M. alaudae* on Calandra Lark were recorded for the first time worldwide from these hosts.

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