



EGYPTIAN ACADEMIC JOURNAL OF  
BIOLOGICAL SCIENCES  
ZOOLOGY

B

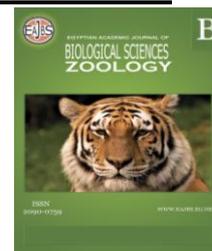


ISSN  
2090-0759

WWW.EAJBS.EG.NET

Vol. 14 No. 2 (2022)

[www.eajbs.eg.net](http://www.eajbs.eg.net)



## Ectoparasites Associated with Migratory Birds, Eastern Desert, Red Sea, Egypt

Saber A. Riad

Ecology Lab., Department of Zoology and Entomology, Faculty of Science, Al-Azhar University, Cairo, Egypt.

E-mail\*: [Saberriad60@azhar.edu.eg](mailto:Saberriad60@azhar.edu.eg)

### ARTICLE INFO

#### Article History

Received:21/5/2022

Accepted:15/7/2022

Available:18/7/2022

#### Keywords:

Chewing lice,  
Ectoparasite,  
Mites, Migratory  
Birds, ticks.

### ABSTRACT

Chewing lice, ticks, mites, and other ectoparasites can infect migratory birds and transmit to resident birds. Ectoparasites cause allergic reactions, irritation, anorexia, decrease in economic income, and may transmit some pathogens between birds. Our current study examined and detected ectoparasites on migratory birds in the Eastern Desert and Gabel El Zeit area, Red Sea, Egypt. During this study, we examined eighty-two migratory birds to detect ectoparasites between March 2019 and May 2022. In this period, we collect 82 newly dead migratory birds belonging to 7 orders; 36 birds of Ciconiiformes, 35 birds of Accipitriformes, four birds of Coraciiformes, two birds of Falconiformes, two birds of Pteroclitiformes, two birds of Suliformes, and one bird of Columbiformes were examined for ectoparasites. The collected ectoparasites from the migratory birds were preserved freezing or in 70% ethanol until identified as species in the laboratory examination. A total of twenty-six ectoparasite species were collected, belonging to 16 lice, four ticks, four flies, and two mites on migratory birds. Concluded that more studies should be conducted aimed at studying ectoparasites on all species of soaring birds migrating through Egypt.

### INTRODUCTION

Egypt is a region rich in biodiversity and is considered one of the most important bird migration routes between Africa and Europe. During migration, some Migratory soaring birds are injured in nature due to Car accidents, collisions with powerlines and turbines and poisoning. Wild and domestic birds can be infested with ticks, mites, bugs, fleas, chewing lice, etc., especially feather mites and chewing lice. some ectoparasites species such as mites, ticks, and some flies as larval or adult stages parasitizing on wild and domestic birds (Chege *et al.*, 2014). These ectoparasites cause allergic reactions, irritation, anorexia, a decrease in animal products, and myiasis, these ectoparasites transmit some parasitic, rickettsial, bacterial and viral diseases to domestic and migratory birds (Zumt, 1965; Bartlett and Anderson, 1989). Ectoparasites are one of the most important causes of poor health conditions, growth retardation and low production of domestic birds (Chege *et al.*, 2014). The Poultry industry occupies an important part in the provision of protein (egg and meat) to man and generally plays an important role in the national economy as a revenue supply (Ebrahimi *et al.*, 2016).

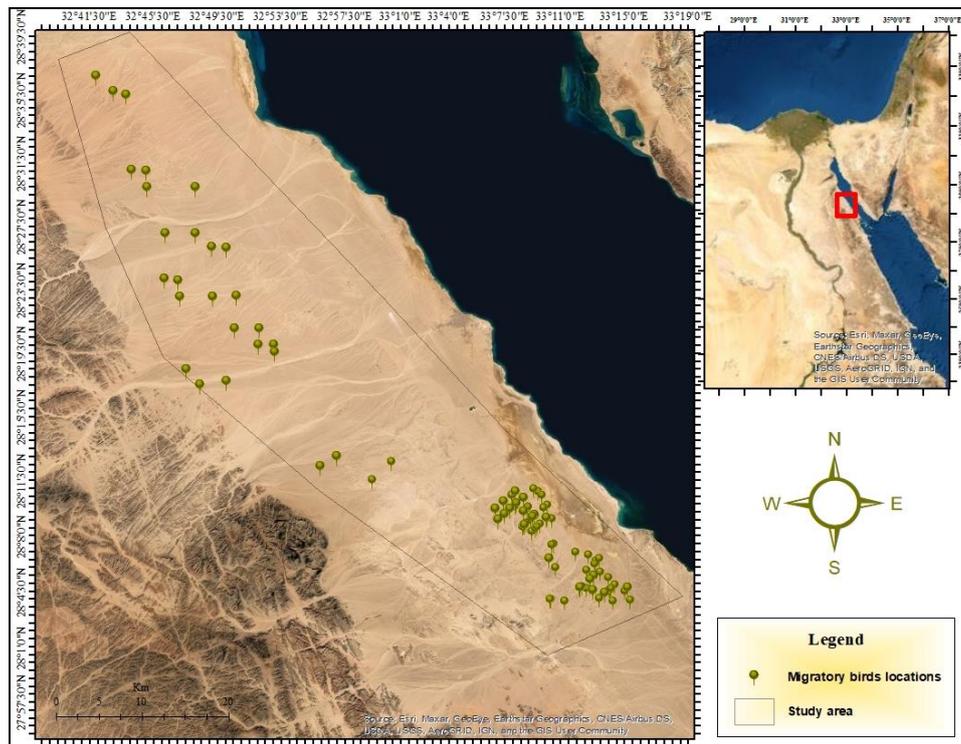
Until now, around 900 tick species have been classified around the world (Petney *et al.*, 2017). Many viral diseases are transmitted by ticks such as parasites and rickettsial diseases (Estrada-Pena *et al.*, 2004; Santos-Silva *et al.*, 2006; Bursali *et al.*, 2012; Hornok *et al.*, 2013; Keskin and Erciyas-Yavuz, 2016; Orkun, 2018; Keskin and Erciyas-Yavuz, 2019). The adults of numerous tick species in the family Ixodidae be parasitic commonly in mammals. Also, tick's larvae and nymphs live in birds, mammals, and reptiles (Karaer *et al.*, 1994). The studies in various countries in Europe reported many tick's species in the wild birds (Santos-Silva *et al.*, 2006; Coipan *et al.*, 2012; Hornok *et al.*, 2013; Diakou *et al.*, 2016). Lice are commonly seen in wild birds, especially migratory birds such as Pelecaniformes, Accipitriformes, Ciconiiformes, Anseriformes, and Strigiformes bird's orders. Yet, lice infestation was found at lower rates in smaller birds of Passeriformes order (Dik *et al.*, 2013; Dik *et al.*, 2015; Dik *et al.*, 2017).

Catts and Mullen (2002) stated that myiasis infests living vertebrates by dipterous larvae that can or cannot be related to the tissues of the host. According to Zumpt (1965), myiasis is an invasion of live humans and vertebrate animals with dipterous larvae which, at least for a certain period, feed on the host's tissue "dead or living", ingested food or liquid substances. Traumatic myiasis caused in birds was reported by Sarcophagidae and Calliphoridae families, and traumatic myiasis agents were recorded in birds of Falconiformes, Accipitriformes, and Strigiformes orders (Little, 2008). The present study aims to detect and identify the ectoparasites that infect migratory birds migrating seasonally through the eastern desert in Egypt.

## MATERIALS AND METHODS

This study was conducted on the freshly dead birds that were discovered in Gabel El Zeit area and the western Gulf of Suez (an area designated for wind farm projects, Fig. 1) between March 2019 to May 2022. In this period, eighty-two specimens of fresh bird carcasses colliding with wind turbines and powerlines were examined, these bird carcasses belonged to 14 species of birds. In this study, all migratory bird carcasses were systematically examined to detect the ectoparasites by the author and a group of volunteers from the Egyptian Environmental Affairs Agency and students of the Faculty of Science, Al-Azhar University. By spacing their feathers, the birds were morphologically examined, and the mouth cavities of the white stork were also examined for the chewing lice, *Piagetiella titan* (Piaget, 1880). Ectoparasites were collected using forceps, stored in tubes with alcohol 70%, and sent to the laboratory of the Zoology Department of the Faculty of Science at Al-Azhar University and the Plant Protection Research Institute for identification. larvae, Lice, and mites were moved from a 70% alcohol solution to a 10% potassium hydroxide (KOH) solution, stayed for 24-48 hours until they appear transparent, by distilled water was washed, through 70-99% alcohol series passed, then mounted on Slides using Canada Balsam. They were examined with a microscope, while flies and adult ticks were examined using a stereo zoom microscope. Gill *et al.* (2021) were followed in nomenclature and taxonomy of birds and the diagnosis and identification of birds were performed by an ornithologist expert. The identification of collected ectoparasites depended on Price *et al.* (2003) in the identification of lice, Hutson (1984) in diagnosing the identification of *Pseudolynchia canariensis* Macquart, 1839, Zumpt (1965) in the identification of larvae of Diptera, Pfaffle *et al.* (2017) in the identification of ticks, Bhowmick *et al.* (2019) and Takehara *et al.* (2019) in the identification of *Ornithonyssus bursa* Berlese, 1888 and others; Clayton (1990), Clay (1958), Nelson and Price (1965), Bequaert (1954), Price and Beer

(1963), Estrada-Pena *et al.* (2004), Pfaffle *et al.* (2017). Analyses of percentages were performed with the help of Microsoft excel program.



**Fig. 1.** Study area and migratory bird carcass's locations used in the current study, Gabel El Zeit, Egypt.

## RESULTS

Eighty-two out of hundreds of thousands of birds migrating annually through Egypt between March 2019 to May 2022 were examined for ectoparasites. During this study, 36 (43.90% of all samples) migratory birds belonging to Ciconiiformes and 35 (42.68% of all samples) birds in Accipitriformes, also samples of Falconiformes (2 birds), Columbiformes (1 bird), Coraciiformes (4 birds), Pterocliiformes (2 birds), and Suliformes (2 birds) orders were examined. The most dominant species of ectoparasites (nine species) were collected from White storks, followed by eight species from Western Marsh harriers, seven from Steppe Eagle, and six from Cattle egrets. The results show the chewing lice were most seen and 16 as the following: 9 *Amblyceran* and 7 *Ischnoceran* in migratory birds. but *Laemobothrion maximum* and *Colpocephalum nanum* were more in Steppe eagle and buzzards, on the other hand, *Piagetiella titan* was the most abundant in Kingfisher and cormorant, *Pectinopygus forficulatus* and *Colpocephalum heterosoma* were encountered in low rates and numbers (Table 1).

**Table 1.** Order, family, and common and scientific names of ectoparasites were detected during the study.

| Class     | Order        | Common Name  | Suborder or Family | Ectoparasite Scientific name  |
|-----------|--------------|--------------|--------------------|---|
| Arachnida | Mesostigmata | Mites        | Macronyssidae      | <i>Ornithonyssus bursa</i><br><i>Ornithonyssus sylviarum</i>  |
|           | Ixodida      | Ticks        | Ixodidae           | <i>Haemaphysalis parva</i><br><i>Hyalomma spp.</i><br><i>Ixodes frontalis</i><br><i>Ixodes spp.</i>   |
| Insecta   | Diptera      | Flies        | Calliphoridae      | <i>Calliphora vicina</i> (second instar larva)<br><i>Calliphora spp.</i> (third instar larva)<br><i>Lucilia sericata</i> (third instar larva)   |
|           |              |              | Hippoboscidae      | <i>Pseudolynchia canariensis</i>  |
|           | Psocodea     | Chewing lice | Ischnocera         | <i>Anaticola phoenicopterid</i><br><i>Ardeicola ciconiae</i><br><i>Craspedorrhynchus platystomus</i><br><i>Degeeriella fulva</i><br><i>Degeeriella spp.</i><br><i>Neophilopterus incompletus</i><br><i>Pectinopygus forficulatus</i>  |
|           |              |              | Amblycera          | <i>Ciconiphilus quadripustulatus</i><br><i>Colpocephalum heterosoma</i><br><i>Colpocephalum nanum</i><br><i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i><br><i>Laemobothrion spp.</i><br><i>Laemobothrion tinnunculi</i><br><i>Piagetiella titan</i><br><i>Trinoton femoratum</i> |

**Ectoparasites Associated with Migratory Bird Species:****Ectoparasites Associated with Steppe Buzzard, *Buteo buteo*:**

The results show the presence of one species of tick belonging to the family Ixodidae, and four species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Steppe Buzzard (Table 2).

**Table 2.** Order, family, the common and scientific name of ectoparasites collected from Steppe buzzard.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific name  |
|-----------|----------|--------------|--------------------|---|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Haemaphysalis parva</i>  |
| Insecta   | Psocodea | Chewing lice | Ischnocera         | <i>Degeeriella fulva</i>  |
|           |          |              | Amblycera          | <i>Colpocephalum nanum</i><br><i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i> |

**Ectoparasites Associated with Honey-buzzard, *Pernis apivorus*:**

The results show the presence of one species of tick belonging to the family Ixodidae, one species of Chewing lice belonging to Amblycera superfamily, and one maggot's species were collected from some samples of Honey-buzzard (Table 3).

**Table 3.** Order, family, and common and scientific name of ectoparasites collected from Honey buzzards.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name                     |
|-----------|----------|--------------|--------------------|--|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Haemaphysalis parva</i><br><i>Ixodes spp.</i> |
| Insecta   | Diptera  | Flies        | Calliphoridae      | <i>Calliphora spp. (third instar larva)</i>      |
|           | Psocodea | Chewing lice | Amblycera          | <i>Colpocephalum nanum</i>                       |

**Ectoparasites Associated with Steppe Eagle, *Aquila nipalensis*:**

The results show the presence of two species of tick belonging to the family Ixodidae, three species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies, and one maggot species were collected from some samples of Steppe Eagle (Table 4).

**Table 4.** Order, family, the common and scientific name of ectoparasites collected from Steppe Eagle.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific name  |
|-----------|----------|--------------|--------------------|---|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Haemaphysalis parva</i><br><i>Ixodes frontalis</i>                                       |
| Insecta   | Diptera  | Flies        | Calliphoridae      | <i>Calliphora vicina (second instar larva)</i>  |
|           | Psocodea | Chewing lice | Ischnocera         | <i>Degeeriella fulva</i>  |
|           |          |              | Amblycera          | <i>Colpocephalum nanum</i><br><i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i> |

**Ectoparasites Associated with Lesser Spotted Eagle, *Aquila pomarine*:**

The results show the presence of two species of tick belonging to the family Ixodidae, and three species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Lesser Spotted Eagle (Table 5).

**Table 5.** Order, family, the common and scientific name of ectoparasites collected from Lesser Spotted Eagles.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name  |
|-----------|----------|--------------|--------------------|---|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Ixodes frontalis</i><br><i>Ixodes spp.</i>   |
| Insecta   | Psocodea | Chewing lice | Ischnocera         | <i>Degeeriella fulva</i>  |
|           |          |              | Amblycera          | <i>Colpocephalum nanum</i><br><i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i> |

**Ectoparasites Associated with Montagu's Harrier, *Circus pygargus*:**

The results show the presence of two species of Chewing lice belonging to Ischnocera superfamily, and one maggot species were collected from some samples of Montagu's Harrier (Table 6).

**Table 6.** Order, family, the common and scientific name of ectoparasites collected from Montagu's Harrier.

| Class   | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific name                                     |
|---------|----------|--------------|--------------------|--|
| Insecta | Diptera  | Flies        | Calliphoridae      | <i>Calliphora vicina</i> (second instar larva)                   |
|         | Psocodea | Chewing lice | Ischnocera         | <i>Craspedorrhynchus platystomus</i><br><i>Degeeriella fulva</i> |

**Ectoparasites Associated with Western Marsh Harrier, *Circus aeruginosus*:**

The results show the presence of one species of tick belonging to the family Ixodidae, two species of Chewing lice belonging to Ischnocera superfamily, and two maggot species were collected from some samples of Western Marsh harrier (Table 7).

**Table 7.** Order, family, the common and scientific name of ectoparasites collected from Western Marsh harrier.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific name   |
|-----------|----------|--------------|--------------------|--|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Ixodes frontalis</i>  |
| Insecta   | Diptera  | Flies        | Calliphoridae      | <i>Calliphora vicina</i> (second instar larva)<br><i>Lucilia sericata</i> (third instar larva) |
|           | Psocodea | Chewing lice | Ischnocera         | <i>Craspedorrhynchus platystomus</i><br><i>Degeeriella fulva</i>                               |

**Ectoparasites Associated with Black Kite, *Milvus migrans***

The results show the presence of four species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Black Kite (Table 8).

**Table 8.** Order, family, the common and scientific name of ectoparasites collected from Black Kite.

| Class   | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific name                                     |
|---------|----------|--------------|--------------------|--|
| Insecta | Psocodea | Chewing lice | Ischnocera         | <i>Craspedorrhynchus platystomus</i><br><i>Degeeriella fulva</i> |
|         |          |              | Amblycera          | <i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i>    |

**Ectoparasites Associated with White Stork, *Ciconia ciconia***

The results show the presence of one species of tick belonging to the family Ixodidae, seven species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies, and one maggot species were collected from some samples of White stork (Table 9).

**Table 9.** Order, family, the common and scientific name of ectoparasites collected from the White stork.

| Class     | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name   |
|-----------|----------|--------------|--------------------|--|
| Arachnida | Ixodida  | Ticks        | Ixodidae           | <i>Hyalomma spp.</i>   |
| Insecta   | Diptera  | Flies        | Calliphoridae      | <i>Lucilia sericata (third instar larva)</i>   |
|           | Psocodea | Chewing lice | Ischnocera         | <i>Ardeicola ciconiae</i><br><i>Craspedorrhynchus platystomus</i><br><i>Degeeriella fulva</i><br><i>Neophilopterus incompletus</i> |
|           |          |              | Amblycera          | <i>Ciconiphilus quadripustulatus</i><br><i>Kurodaia fulvofasciata</i><br><i>Laemobothrion maximum</i>                              |

**Ectoparasites Associated with Grey Heron, *Ardea cinrea*:**

The results show the presence of three species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Grey Heron (Table 10).

**Table 10.** Order, family, the common and scientific name of ectoparasites collected from Grey Heron.

| Class   | Order    | Common Name  | Suborder Or Family | Ectoparasite Scientific Name                                 |
|---------|----------|--------------|--------------------|--|
| Insecta | Psocodea | Chewing lice | Ischnocera         | <i>Anaticola phoenicopterid</i>                              |
|         |          |              | Amblycera          | <i>Colpocephalum heterosoma</i><br><i>Trinoton femoratum</i> |

**Ectoparasites Associated with Cattle Egret, *Bubulcus ibis*:**

The results show the presence of one species of mite belonging to the family Macronyssidae, four species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies, and one maggot species were collected from some samples of Cattle Egret (Table 11).

**Table 11.** Order, family, the common and scientific name of ectoparasites collected from Cattle Egret.

| Class     | Order        | Common Name  | Suborder or Family | Ectoparasite Scientific name  |
|-----------|--------------|--------------|--------------------|---|
| Arachnida | Mesostigmata | Mites        | Macronyssidae      | <i>Ornithonyssus sylviarum</i>  |
| Insecta   | Diptera      | Flies        | Calliphoridae      | <i>Calliphora spp. (third instar larva)</i>   |
|           | Psocodea     | Chewing lice | Ischnocera         | <i>Anaticola phoenicopterid</i><br><i>Ardeicola ciconiae</i><br><i>Neophilopterus incompletus</i> |
|           |              |              | Amblycera          | <i>Ciconiphilus quadripustulatus</i>  |

**Ectoparasites Associated with European Turtle Dove, *Streptopelia turtur*:**

The results show the presence of two species of mite belonging to the family Macronyssidae, and one maggot species were collected from some samples of European Turtle Dove (Table 12).

**Table 12.** Order, family, the common and scientific name of ectoparasites collected from European Turtle Dove.

| Class     | Order        | Common Name | Suborder or Family | Ectoparasite Scientific Name                                 |
|-----------|--------------|-------------|--------------------|--|
| Arachnida | Mesostigmata | Mites       | Macronyssidae      | <i>Ornithonyssus bursa</i><br><i>Ornithonyssus sylviarum</i> |
| Insecta   | Diptera      | Flies       | Hippoboscidae      | <i>Pseudolynchia canariensis</i>                             |

**Ectoparasites associated with European Bee-eater *Merops apiaster*:**

The results show the presence of two species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of European Bee-eater (Table 13).

**Table 13.** Order, family, the common and scientific name of ectoparasites collected from European Bee-eater.

| Class   | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name     |
|---------|----------|--------------|--------------------|----------------------------------|
| Insecta | Psocodea | Chewing lice | Ischnocera         | <i>Pectinopygus forficulatus</i> |
|         |          |              | Amblycera          | <i>Piagetiella titan</i>         |

**Ectoparasites associated with Common kestrel *Falco tinnunculus*:**

The results show the presence of three species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Common kestrel (Table 14).

**Table 14.** Order, family, the common and scientific name of ectoparasites collected from Common kestrel.

| Class   | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name                                |
|---------|----------|--------------|--------------------|---|
| Insecta | Psocodea | Chewing lice | Ischnocera         | <i>Degeeriella ssp.</i><br><i>Pectinopygus forficulatus</i> |
|         |          |              | Amblycera          | <i>Laemobothrion tinnunculi</i>                             |

**Ectoparasites associated with Spotted Sandgrouse *Pterocles senegallus*:**

The results show the presence of two species of mite belonging to the family Macronyssidae, and one Hippoboscidae species were collected from some samples of Spotted Sandgrouse (Table 15).

**Table 15.** Order, family, common and scientific name of ectoparasites collected from Spotted Sandgrouse.

| Class     | Order        | Common Name | Suborder Or Family | Ectoparasite Scientific Name                                 |
|-----------|--------------|-------------|--------------------|--|
| Arachnida | Mesostigmata | Mites       | Macronyssidae      | <i>Ornithonyssus bursa</i><br><i>Ornithonyssus sylviarum</i> |
| Insecta   | Diptera      | Flies       | Hippoboscidae      | <i>Pseudolynchia canariensis</i>                             |

**Ectoparasites Associated with Cormorant, *Phalacrocorax carbo*:**

The results show the presence of three species of Chewing lice belonging to Ischnocera, and Amblycera superfamilies were collected from some samples of Cormorant (Table 16).

**Table 16.** Order, family, common and scientific name of ectoparasites collected from Cormorant.

| Class   | Order    | Common Name  | Suborder or Family | Ectoparasite Scientific Name  |
|---------|----------|--------------|--------------------|---|
| Insecta | Psocodea | Chewing lice | Ischnocera         | <i>Anaticola phoenicopterid</i><br><i>Pectinopygus forficulatus</i> |
|         |          |              | Amblycera          | <i>Piagetiella titan</i>  |

**Ectoparasites associated with Eurasian sparrowhawk *Accipiter nisus*:**

The results show the presence of one species of Chewing lice, *Craspedorrhynchus platystomus* belonging to Ischnocera superfamily was collected from some samples of Eurasian sparrowhawk.

## DISCUSSION

Few studies have been conducted so far in Egypt that has examined species of wild birds for the detecting of lice, mites, and/or ticks. Some ectoparasites can be detected in wild birds while others cannot be found. During the current study, 43.90% of all samples of migratory birds belonged to Ciconiiformes and 42.68% belonged to Accipitriformes, also samples of Falconiformes, Columbiformes, Coraciiformes, Pterocliiformes, and Suliformes orders were examined. The most dominant species of ectoparasites were collected from White storks, followed by Western Marsh harriers, Steppe Eagle, and Cattle egrets respectively. The results show the chewing lice were most seen and 16 as the following: 9 Amblyceran and 7 Ischnoceran in migratory birds.

Dik and Kandir (2021) observed that almost all studied wild birds were infested with chewing lice, and 21 chewing lice species were classified. Also, during the studies performed in Turkey on migratory birds in the breeding sites, lice were commonly on migratory birds, especially Pelecaniformes, Accipitriformes, Strigiformes, Anseriformes, and Ciconiiformes orders, on the other hand, lice were found at lower rates in Passeriformes order (Dik *et al.*, 2013; Dik *et al.*, 2015; Dik *et al.*, 2017).

Chewing lice species *Kurodaia fulvofasciata*, *Colpocephalum nanum*, *Laemobothrion maximum*, *Craspedorrhynchus platystomus*, and *Degeeriella fulva* were collected from the buzzards in the previous studies carried out in the breeding areas of buzzards in Turkey (Dik, 2006; Dik and Aydenizoz-Ozkayhan, 2007; Dik and Uslu, 2009; Dik, 2010; Inci *et al.*, 2010; Dik *et al.*, 2013; Girisgin *et al.*, 2013) and other countries (Nelson and Price, 1965; Price *et al.*, 2003; Adam, 2003; Yosef *et al.*, 2019) were also encountered in our study on the Steppe and Honey buzzards. Also, during the previous studies, *Columbicola columbae* was the most common species in pigeons and *Campanulotes compar*, *Hohorstiella lata* and *Coloceras israelensis* were also reported (Tigin, 1973; Gicik, 1999; Koroglu and Şimsek, 2001; Şenlik *et al.*, 2005; Dik *et al.*, 2013), also, *Meropoecus meropis* and *Meromenopon meropis* detected in European Bee-eater (Dik *et al.*, 2011; Dik *et al.*, 2015; Goz *et al.*, 2015). No lice were recorded with the Turtle Dove examined during this study.

Numerous studies in several countries of Europe were reported *Argas persicus*, *Dermacentor marginatus*, *Argas reflexus*, *Haemaphysalis parva*, *Haemaphysalis punctata*, *Hyalomma marginatum*, *Hyalomma aegypticum*, *Ixodes frontalis*, *Ixodes acuminatus*, *Ixodes redikorzevi*, *Ixodes ventalloi*, *Ixodes Ricinus* and *Rhipicephalus turanicus* in different wild birds (Santos-Silva *et al.*, 2006; Coipan *et al.*, 2012; Hornok *et al.*, 2013; Diakou *et al.*, 2016). Some studies detected *Ciconiphilus quadripustulatus*, *Ardeicola ciconiae*, *Neophiloaterus incompletes*, and *Colpocephalum zebra* in white storks *Ciconia ciconia* (Dik and Uslu, 2007). during our study, we recorded five species of ticks *Haemaphysalis parva*, *Hyalomma sp.*, *Ixodes frontalis*, and *Ixodes sp.* from Buzzards, Eagles, and storks.

Traumatic myiasis caused by etiologic agents in birds was reported to be in Sarcophagidae and Calliphoridae families (Zumpt, 1965). Traumatic myiasis agents were recorded in birds of Falconiformes, Accipitriformes, and Strigiformes orders (Little, 2008). In the other study, the case of myiasis caused by *Challiphora sp.* in Peregrine falcon (*Falco peregrinus*) was emphasized, and traumatic myiasis cases due to *Lucilia sericata* in Carrion crow (*Corvus corone*) and a long-legged buzzard were reported (Dik *et al.*, 2012). During the current study, magots were collected from Steppe Eagles, white storks, Cattle Egrets, and Harrier species.

Hippoboscid flies are sometimes seen in birds, but extremely in pigeons. *Pseudolynchia canariensis* is usually seen in pigeons (Gicik, 1999; Koroglu and Şimsek, 2001; Gulanber *et al.*, 2002), and sometimes in some other migratory bird species (Erdem *et al.*, 2019). during our work were recorded the hippoboscids in European turtle dove and spotted sand grouse.

Mite species are extremely found in birds because mites are very small, they might be lost macroscopically, and hardly noticed even in classification with magnifiers by specialists. On the other hand, macronyssid mites such as *Dermanyssus gallinae*, *Ornithonyssus bursa*, and *Ornithonyssus sylviarum* (Santillan *et al.*, 2015; Lareschi *et al.*, 2017; Bhowmick *et al.*, 2019; Takehara *et al.*, 2019), and other feather mites are extremely seen in wild birds, especially passerine birds, however, there are few studies on feather mites of birds in the world (Aksin and Erdogmus, 2005; Aksin, 2007; Aksin, 2010; Per, 2014). Feather mites were found during this study in spotted sandgrouse, European turtle dove, and cattle egret. This situation might be relevant because mites were too small to be classified by a voluntary team.

Unfortunately, fewer numbers and species were discovered during the current study. This is related to the fact that the bird samples used for sampling them were selected from dead birds immediately after collision with the turbines and powerlines which reduced the overall sample used in the study. Also, the volunteers who participated in the collection of samples changed from time to time, and the other volunteers who replaced them needed more time to learn how to collect samples with great accuracy. Therefore, we could not calculate both the mean abundance and the mean intensity of ectoparasites in this study. This study was the first field study on ectoparasites on migratory birds in the Gulf of Suez and the Eastern Desert in Egypt and presented an experiment to shed light on ectoparasites on migratory birds in the second-largest migration routes globally over Egypt.

These types of studies with experts in the field are important for identifying more species of ectoparasites that cross between migratory and resident birds in seasonal migration pathways. Ultimately, more systematic studies and molecular genetics studies are needed to complement studies on this topic.

## CONCLUSION

Migratory birds through Egypt are infected with many ectoparasites that infect local species as well. During this study, the most dominant species of ectoparasites (nine species) were collected from White storks, followed by eight species from Western Marsh harriers, seven from Steppe Eagle, and six from Cattle egrets. Also, the results show the chewing lice were most seen and 16 as the following: 9 *Amblycera* and 7 *Ischnocera* in migratory birds. but *Laemobothrion maximum* and *Colpocephalum nanum* were more in Steppe eagle and buzzards, on the other hand, *Piagetiella titan* was the most abundant in Kingfisher and cormorant, *Pectinopygus forficulatus* and *Colpocephalum heterosoma* were encountered in low rates and numbers.

## Acknowledgment

I would like to express my gratitude to the volunteer students from the Faculty of Science, Al-Azhar University, and the members of the Egyptian Environmental Affairs Agency who voluntarily participated and contributed to the examination of birds and the collection of ectoparasites, the colleagues in the Parasitology Department of the Faculty of Veterinary Medicine, Zagazig University, for helping to identify some ticks, the researchers in the Acarus Department of the Plant Research Institute Zagazig Branch for helping to the identification of Mites species and researchers at the Animal Health Institute of the Egyptian Ministry of Agriculture for all forms of support.

## REFERENCES

- Adam, C. (2003): Chewing Lice (Phthiraptera: Amblycera, Ischnocera) collected on some bird species of Romania. *National Museum of Natural History*, 45, 159-172.
- Aksin, N. (2007): *Freyana anatina* (Koch, 1844). Feather mites (Acarina, Freyanoidea) recorded for the first time on wild ducks (Subfamily, Anatinae) in Turkey. *Türkiye Parazitol Derg*, 31, 302-305.
- Aksin, N. (2010): Chewing lice and feather mites on wild partridges. *Indian Veterinary Journal*, 87: 940–941.
- Aksin, N. and Erdogmus, Z. (2005): *Pseudolichus solutocurtus* Dubinin, 1956 (Acarina, Pterolichoidae) and *Harpyrhynchus* sp. (Acarina, Harpyrhynchidae Dubinin, 1957) species recorded for the first time on wild partridges in Turkey. *Turkish Journal of Vet Animals*, 29: 1149–1156.
- Bartlett, C. M. and Anderson, R. C. (1989): Some observations on *Pseudomenopon pilosum* (Amblycera: Menoponidae), the louse vector of *Pelecitus fulicaeatrae* (Nematoda: Filarioidea) of coots, *Fulica americana* (Aves: Gruiformes). *Canadian Journal of Zoology*, 67: 1328-1331.
- Bequaert, J. C. (1954): The Hippoboscidae or Louse-Flies (Diptera) of mammals and birds. Part II. Taxonomy, evolution and revision of American genera and species. *Entomological Americana*, 34: 1-232.
- Bhowmick, B.; Zhao, J.; Tianlin, B.; Liao, C. and Han, Q. (2019): Molecular characterization and genetic diversity of *Ornithonyssus sylviarum* in chickens (*Gallus gallus*) from Hainan Island, China. *Parasites & Vectors*, 12: 553. doi.org/10.1186/s13071-019-3809-9
- Bursali, A.; Keskin, A. and Tekin, S. (2012): A review of the ticks (Acari: Ixodida) of Turkey: species diversity, hosts, and geographical distribution. *Experimental and Applied Acarology*, 57: 91-104.

- Catts, E. P. and Mullen, G. R. (2002): Myiasis (Muscoidea, Oestroidea). *Medical and Veterinary Entomology*. pp. 317-348. Elsevier Sci. (USA).
- Clay, T. (1958): Revisions of Mallophaga Gen. *Degeeriella* from Falconiformes. *Bulletin of British Museum (National History) Entomology*, 7 (4): 123-207.
- Clayton, D. H. (1990): Host specificity of *Strigiphilus* owl lice (Ischnocera: Philopteridae), with the description of new species and host associations. *Journal of Medical Entomology*, 27: 257-265.
- Coipan, E. C.; Vladimirescu, A. F.; Ciolpan, O. and Teodorescu, I. (2012): Tick species (Acari: Ixodoidea) distribution, seasonality, and host associations in Romania. *National Museum of Natural History*, 154 (2): 301-317
- Diakou, A.; Norte, A. C. De Carvalho, I. L.; Nuncio, S.; Novakova, M.; Kautman, M.; Alivizatos, H.; Kazantzidis, S.; Sychra, O. and Literak, I. (2016); Ticks and tick-borne pathogens in wild birds in Greece. *Parasitology Research*, 115: 2011-2016. DOI 10.1007/s00436-016-4943-3
- Dik, B. (2006): Mallophaga species on Long-Legged Buzzards (*Buteo rufinus*) new records from Turkey. *Turkish Journal of Parasitology*, 30 (3): 226–230.
- Dik, B. (2010): Lice species in domestic and wild birds in Turkey. *Turkish Journal of Parasitology*, 34 (1): 55–60.
- Dik, B. and Aydenizoz-Ozkayhan, M. (2007): Mallophaga species on long-legged buzzards (*Buteo rufinus*) in Turkey. *Turkish Journal of Parasitology*, 31 (4): 298-301.
- Dik, B. and Uslu, U. (2007): Mallophaga species (Insecta) seen in White Storks (*Ciconia ciconia* Linnaeus, 1758). *Turkish Journal of Parasitology*, 30 (3): 220–225.
- Dik, B. and Uslu, U. (2009): Chewing lice (Amblycera, Ischnocera) species seen in poultry in Konya Zoo. *Turkish Journal of Parasitology*, 33 (1): 43 – 49.
- Dik, B.; Albayrak, T.; Adanır, R. and Uslu, U. (2013): Lice species (Phthiraptera; Ischnocera, Amblycera) found in some songbirds (Aves: Passeriformes). *Kafkas University Faculty of Veterinary Journal*, 19 (5): 755-760.
- Dik, B.; ErciyasYavuz, K. and Per, E. (2017); Chewing lice (Phthiraptera: Amblycera, Ischnocera) on birds in Kızılırmak Delta, Turkey. *Journal of Veterinary Medicine*, 167 (1-2): 53-62.
- Dik, B.; Kandir, E. H. (2021): Ectoparasites in Some Wild Birds (Aves) in Turkey. *Progress in Nutrition*, 23, 1-10.
- Dik, B.; Per, E.; Erciyas-Yavuz, K. and Yamaç, E. (2015): Chewing lice (Phthiraptera: Amblycera, Ischnocera) species found on some birds in Turkey, with new records and new host. *Turkish Journal of Parasitology*, 39: 790-798.
- Dik, B.; Uslu, U. and Işık, N. (2012): Myiasis in animals and human beings in Turkey. *Kafkas University Faculty of Veterinary Journal*, 18 (1): 37–42.
- Dik, B.; Yamaç, E. and Uslu, U. (2011): Chewing lice (Phthiraptera) found on wild birds in Turkey. *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, 17 (5): 787–794.
- Dik, B.; Yamaç, E. and Uslu, U. (2013): Studies on chewing lice (Phthiraptera: Amblycera, Ischnocera) species from domestic and wild birds in Turkey. *Kafkas University Faculty of Veterinary Journal*, 19 (4): 553–560.
- Erdem, I.; Zerek, A. and Yaman M. (2019): The first record *Pseudolynchia canariensis* (Diptera: Hippoboscidae) in a Eurasian eagle owl (*Bubo bubo* Linnaeus, 1758)

- in Turkey. *Kafkas University Faculty of Veterinary Journal*, 25 (6): 887-888. DOI: 10.9775/kvfd.2019.22882
- Estrada-Pena, A.; Bouattour, A.; Camicas, J. L. and Walker, A. R. (2004): Ticks of domestic animals in the Mediterranean region: a guide to identification of species. *University of Zaragoza Press*, 50001-Zaragoza, Spain.
- Gicik, Y. (1999): Ectoparasites in wild pigeons in Ankara and its surroundings. *Kafkas University Faculty of Veterinary Journal*, 5 (1): 71–74.
- Gill, F. D.; Donsker, and Rasmussen, P. (2021): IOC World Bird List (v11.1). doi: 10.14344/IOC.ML.11.1. <http://www.worldbirdnames.org/> (accessed 30 May 2021)
- Girisgin, A. O.; Dik, B. and Girişgin, O. (2013): Chewing lice (Phthiraptera) species of wild birds in northwestern turkey, with new records. *International Journal for Parasitology: Parasites and Wildlife*, 2: 217–221.
- Goz, Y.; Dik, B.; Oruç-Kılınç, O.; Yılmaz, A. B. and Aslan, L. (2015): Chewing lice (Phthiraptera: Amblycera, Ischnocera) on several species of wild birds around the Lake Van Basin, Van, Eastern Turkey. *Kafkas University Faculty of Veterinary Journal*, 21 (3): 333-338.
- Gulanber, A.; Tuzer, E. and Getinkaya, H. (2002): Prevalence of *Haemoproteus columbae* and *Pseudolynchia canariensis* in pigeons in Istanbul. *Istanbul University Faculty of Veterinary Journal*, 28 (1): 227-229.
- Hornok, S.; Csorgo, T.; de la Fuente, J.; Gyuranecz, M.; Privigyei, C.; Meli, M. L.; Kreizinger, Z.; Gonczi, E.; Fernández de Mera, I. G. and Hofmann-Lehmann, R. (2013): Synanthropic birds associated with high prevalence of Tick-Borne Rickettsiae and with the first detection of *Rickettsia aeschlimannii* in Hungary. *Vector-borne and Zoonotic Diseases*, 13 (2): 77-83. DOI: 10.1089/vbz.2012.1032
- Hutson, A. M. (1984): Keds, flat-flies and bat-flies. Diptera, Hippoboscidae and Nycteribiidae. In “Handbooks for the identification of British insects, Ed. MG Fitton”. Vol. 10, Part 7. Royal Entomological Society of London. Dramrite Printers Limited, Southwark, London SE1, 1984: 40p.
- Inci, A.; Dik, B; Kibar, M.; Yıldırım, A. and Duzlu, O. (2010): Chewing lice (Phthiraptera) species on wild birds in Cappadocia Region, Turkey. *Turkish Journal of Parasitology*, 34: 174–178.
- Karaer, Z.; Yukarı, B. A. and Aydın, L. (1994): Turkey ticks and vectors. Arthropod diseases and vectors in Parasitology, Ed. Ozel MA, Daldal N”, pp 363-434. Turkish Parasitology Association 1997, Publication No: 13, Ege University Press, İzmir.
- Keskin, A. and Erciyas-Yavuz, K. (2019): Ticks (Acari: Ixodidae) parasitizing Passerine birds in Turkey with new records and new tick-host associations. *Journal of Medical Entomology*, 56 (1): 156-161. DOI: 10.1093/jme/tjy151
- Keskin, A. K. and Erciyas-Yavuz, A. (2016): preliminary investigation on ticks (Acari: Ixodidae) infesting birds in Kizilirmak delta, *Turkey Journal of Medical Entomology*, 53: 217–220.
- Koroglu, E. and Şimsek, S. (2001): Ectoparasites and their distribution rates in pigeons (*Columba livia*) from Elazig region. *Firat University Journal of Health Sciences*, 15, 195-198.

- Lareschi, M.; Cicuttin, G. L.; De Salvo, M. N.; Ibar, L. and Montalti, D. (2017): The tropical fowl mite *Ornithonyssus bursa* (Acari: Mesostigmata: Macronyssidae) parasitizing the European starling *Sturnus vulgaris* (Aves: Passeriformes: Sturnidae), an invasive bird in central Argentina. An approach to the bacterial fauna of this mite. *Revista Mexicana de Biodiversidad*, 88, 454–458. <http://dx.doi.org/10.1016/j.rmb.2017.03.022>
- Little, S. E. (2008): Myiasis in wild birds. In “Parasitic diseases of wild birds. Atkinson CT, Thomas NJ, Hunter DB (Eds.), pp. 546-556”, John Wiley&Sons, Inc., Iowa, USA.
- Nelson, R. C. and Price, R. D. (1965): The Laemobothrion (Mallophaga: Laemobothridae) of the Falconiformes. *Journal of Medical Entomology*, 2:249-257.
- Orkun, O. (2018): Molecular characterization based on 16S rDNA phylogeny of some ixodid ticks in Turkey. *Turkish Journal of Parasitology*, 42: 122-129.
- Per, E. (2014): Feather mites of Sylviidae species in Samsun Kızılırmak Delta, Gazi University, Institute of Science, Department of Biology, PhD Thesis, Ankara.
- Petney, T. N.; Pfaffle, M. P.; Sprong, H.; Mihalca, A. D. and EstradaPeña A. (2017): How to collect ticks and interpret these collections. In “Ticks of Europe and North Africa. A Guide to Species Identification. Estrada-Peña, A, Mihalca AD, Petney TN (eds), pp. 5-10”, Springer International Publishing, Cham, Switzerland.
- Pfaffle, M. P.; Madder, M.; Santos-Silva, M. M. and Petney, T. N. (2017): *Ixodes frontalis* (Panzer, 1798). “In “Ticks of Europe and North Africa. A guide to species identification. EstradaPeña A, Mihalca AD, Petney TN, Eds” pp. 91-96, *International Publishing, Cham, Switzerland*.
- Price, R. D. and Beer, J. R. (1963): Species of Colpocephalum (Mallophaga: Menoponidae) parasitic upon the Falconiformes. *The Canadian Entomologist*, 95: 731-763.
- Price, R. D.; Hellenthal, R. A.; Palma, R. L.; Johnson, K. P. and Clayton, D. H. (2003): The Chewing Lice: World checklist and biological overview. Illinois Natural History Survey Special Publicaion, 24 x + 501 p.
- Santillan, M. A.; Grande, J. M.; Liebana, M. S.; Martinez, P.; Díaz, L. A.; Bragagnolo, L. A.; Solaro, C.; Galmes, M. A. and Sarasola, J. H. (2015): New hosts for the mite *Ornithonyssus bursa* in Argentina. *Medical and Veterinary Entomology*, 29: 439–443. doi: 10.1111/mve.12129
- Santos-Silva, M. M.; Sousa, R.; Santos, A. S.; Melo, P.; Encarnaçao, V. and Bacellar, F. (2006): Ticks parasitizing wild birds in Portugal: detection of *Rickettsia aeschlimannii*, *R. helvetica* and *R. massiliae*. *Experimental and Applied Acarology*, 39: 331-338.
- Şenlik, B.; Güleğen, E. and Akyol, V. (2005): Ectoparasites of domestic pigeons (*Columba livia domestica*) in Bursa region. *Turkey Parasitology Journal*, 29 (2): 100-102.
- Takehara, M.; Murata, M.; Katakura, K.; Fujisawa, S; Hmoon, M. M.; Win, S. Y.; Bawm, S.; Htun, L. L.; Aung, Y. H.; Win, M. M.; Isezaki, M.; Maekawa, N.; Okagawa, T.; Konnai, S. and Ohashi, K. (2019): Haematophagous mites on

- poultry farms in the Republic of the Union of Myanmar. *Heliyon*, e01544. doi: 10.1016/j.heliyon. 2019.e01544
- Tigin, Y. (1973): Ectoparasites in domestic pigeons (*Columba livia*). *Ankara University Faculty of Veterinary Journal*, 20: 372-390.
- Yosef, R.; Strutzer, O.; Tabibi, R. and Róssa, R. (2019): Infestations of Lice of Steppe Buzzards (*Buteo buteo vulpinus*) differ from those of Common Buzzards (*Buteo buteo buteo*). *Journal of Raptor Research*, 53:102-108.
- Zumpt, F. (1965): Myiasis in man and animals in the old world. Butterwoths & Co. Ltd., London.

## ARABIC SUMMARY

الطفيليات الخارجية المرتبطة بالطيور المهاجرة، الصحراء الشرقية، البحر الأحمر، مصر

صابر عبد المنعم رياض

معمل البيئة، قسم علم الحيوان والحشرات - كلية العلوم - جامعة الأزهر - القاهرة - مصر.

يمكن أن يصيب القمل القارض والقراد والحلم والطفيليات الخارجية الأخرى الطيور المهاجرة وينتقل إلى الطيور المقيمة. تسبب الطفيليات الخارجية ردود فعل تحسسية والتهيج وفقدان الشهية وانخفاض في الدخل الاقتصادي وقد تنقل بعض مسببات الأمراض بين الطيور. قامت دراستنا الحالية بفحص واكتشاف الطفيليات الخارجية على الطيور المهاجرة في الصحراء الشرقية ومنطقة جبل الزيت، البحر الأحمر، مصر. خلال هذه الدراسة، قمنا بفحص اثنين وثمانين طائرًا مهاجرًا للكشف عن الطفيليات الخارجية بين مارس 2019 ومايو 2022. في هذه الفترة، قمنا بجمع 82 طائرًا مهاجرًا مبيئًا حديثًا تنتمي إلى 7 رتب؛ تم فحص 36 طائرًا من (Ciconiiformes)، و 35 طائرًا من (Accipitriformes)، وأربعة طيور من (Coraciiformes)، وطائران من (Falconiformes)، وطائران من (Pterocliiformes)، وطائران من (Suliformes)، وطائر واحد من (Columbiformes) للبحث عن الطفيليات الخارجية. تم حفظ الطفيليات الخارجية التي تم جمعها من الطيور المهاجرة مجمدة أو في كحول 70٪ حتى يتم تصنيفها كأنواع في الفحص المعمل. تم جمع ما مجموعه ستة وعشرون نوعًا من الطفيليات الخارجية، تنتمي إلى 16 نوع من القمل، وأربعة أنواع القراد، وأربعة أنواع من الذباب، واثنان من الحلم من على الطيور المهاجرة. وخلصت الدراسة إلى ضرورة إجراء المزيد من الدراسات الهادفة إلى دراسة الطفيليات الخارجية على جميع أنواع الطيور الحوامة المهاجرة عبر مصر.