



The first records of *Promyialges italicus* and *Myialges anchora* (Sarcoptiformes: Astigmata: Epidermoptidae) on the *Pseudolynchia canariensis* (Diptera: Hippoboscidae) in Türkiye

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ABSTRACT

The feather mites of the families Dermationidae and Epidermoptidae, collectively known as the Epidermoptid complex (skin mites) are permanent organisms that live on or in the skin of birds (Aves). Interestingly, members of some genera belonging to the Epidermoptidae family have developed phoretic associations with louse flies (Diptera: Hippoboscidae). The material of this study consisted of mites collected from the *Pseudolynchia canariensis* (Macquart 1840) found on three rock pigeons (*Columba livia*) during an ectoparasitic examination in 2024. During the study, six of the specimens twenty-five *P. canariensis* examined were detected to be infested with mites, and 19 mite specimens were collected. As a result of the microscopic examination carried out in the light of the relevant literature, the mite specimens were identified as *Ornithocheyletia hallae* (Smiley 1970) (Prostigmata: Cheyletidae), *Myialges anchora* (Trouessart 1907) and *Promyialges italicus* (Faradonbeh et al. 2019) (Astigmata: Epidermoptidae). Among these species, *Myialges anchora* and *Pr. italicus* are new records for the feather mites fauna in Türkiye. This paper aims to report the phoretic mites detected on *Pseudolynchia canariensis* collected from rock pigeons (*Columba livia*) in Türkiye and to evaluate them in the context of similar studies conducted worldwide.

Keywords: *Analgoidea*, Feather mites, Phoresy, Skin mites.

ÖZ

Promyialges italicus ve *Myialges anchora* (Sarcoptiformes: Astigmata: Epidermoptidae)'nın Türkiye'deki *Pseudolynchia canariensis* (Diptera: Hippoboscidae)'den ilk kayıtları

Dermationidae ve Epidermoptidae familyalarına ait tüy akarları, kısaca Epidermoptid kompleksi (deri akarları) olarak da bilinen ve kuşların (Aves) derisi üzerinde veya altında yaşayan kalıcı organizmalardır. İlginç bir şekilde, Epidermoptidae familyasına ait bazı cinslerin üyeleri, bit sinekleri (Diptera: Hippoboscidae) ile foretik ilişkiler geliştirmiştir. Bu çalışmanın materyali, 2024 yılı içerisinde iki kaya güvercini (*Columba livia*) üzerinde yapılan ektoparazitik inceleme sırasında bulunan *Pseudolynchia canariensis* (Macquart 1840) bireylerinden toplanan akar örneklerinden oluşmaktadır. Çalışma sırasında incelenen 25 *P. canariensis* örneğinin altısında akar enfestasyonu tespit edilmiş ve toplamda 19 akar örneği toplanmıştır. İlgili literatürler ışığında gerçekleştirilen mikroskopik inceleme sonucunda, akar örnekleri *Ornithocheyletia hallae* (Smiley 1970) (Prostigmata: Cheyletidae), *Myialges anchora* (Trouessart 1907) ve *Promyialges italicus* (Faradonbeh et al. 2019) (Astigmata: Epidermoptidae) olarak teşhis edilmiştir. Bu türler arasında *Myialges anchora* ve *Pr. italicus*, Türkiye tüy akarları faunası için yeni kayıt niteliğindedir. Bu kapsamda, çalışmada Türkiye'deki kaya güvercinlerinden (*Columba livia*) elde edilen *Pseudolynchia canariensis* üzerinde bulunan foretik akarların tanımlanması ve bu akar türlerinin literatürde yer alan çalışmalarla değerlendirilmesi amaçlanmıştır.

Anahtar Kelimeler: *Analgoidea*, Deri akarları, Forezis, Tüy akarları.

INTRODUCTION

Phoresis is common among members of the class Acarina, and sometimes these mites use as a host that parasitic arthropods such as fleas (Britt and Molyneux 1983; Fain and Beaucournu 1993), chewing lice (Fain 1965), flies

(especially Hippoboscid flies) (Faradonbeh et al. 2019; Matyukhin and Yatsuk 2022), and ticks (Karbowski et al. 2013; Hutcheson et al. 2015). In short, the phenomenon of phoresis is a temporary commensal, symbiotic relationship in which a smaller organism (phoretic)



attaches to a larger organism (carrier) in a life stage that is usually an adult (female) or deutonymph (Seeman and Walter 2023).

Phoretic associations between epidermoptid mites (*Myialges anchora*, *M. falconis*, *M. lophortyx*, *M. macdonaldi*, *Promyialges italicus*, and *Pr. lophortyx*) (Valim and Gazêta 2007; Faradonbeh et al. 2019; Matyukhin and Yatsuk 2022), cheyletid mites (*Ornithocheyletia hallae*) (Valim and Gazêta 2007; Dik 2012; Faradonbeh et al. 2019), and rarely chewing lice (*Columbicola columbae*, *Campanulotes compar*, and *Hohorstiella lata*) (Macchioni et al. 2005; Bartlow et al. 2016; Matyukhin 2016; da Cunha Amaral et al. 2024) with the *Pseudolynchia canariensis* have been reported in geographical regions, including Europe (Cyprus, Italy, and Türkiye), Africa (Kenya, South Africa), Asia (Iran and Philippines), and South America (Brazil and Ecuador). To date, only *Ornithocheyletia hallae* has been reported as a phoretic species on *P. canariensis* from Türkiye (Dik 2012).

This study reports *M. anchora* and *Pr. italicus* in Türkiye for the first time and also evaluate previously reported phoretic relationships of the *P. canariensis*.

CASE DESCRIPTION

The material of this study consists of mites collected from *Ps. canariensis* captured from three individual rock pigeons (feral) (*C. livia*) subjected to ectoparasitic examination in the İstanbul province of Türkiye in September and December 2024. Specimens of *P. canariensis* collected from pigeons were stored in 1.5 ml eppendorf tubes containing 70% ethanol. Then, all specimens were carefully examined for mites under a stereo microscope (Nikon SMZ 745T, Tokyo, Japan) in the laboratory, and phoretic mites were detected in six individual *Ps. canariensis*.

After the phoretic mite specimens were collected with fine-tipped forceps, they were kept in lactophenol for 24 hours to make them transparent. In the continuation, the specimens were taken into Hoyer's solution, and permanent glass slides were prepared. Finally, mite specimens were identified by comparing them with the relevant literature (Fain 1965; Smiley 1970; Faradonbeh et al. 2019) under a light microscope (CX23 Binocular Microscope, Olympus Corporation, Tokyo, Japan). In addition, hippoboscid fly specimens and permanent glass slides of mites are deposited in G. Eren's personal collection.



Figure 1: A) *Myialges anchora* (♀), B) *Promyialges italicus* (♀), C) *Ornithocheyletia hallae* (♀), D and E) phoretic mites on the abdomen of *Ps. canariensis*.

Twenty-five flies of *Ps. canariensis* were collected from three pigeons, and mite infestation was detected in six of these fly specimens. As a result of microscopic examination, the mite specimens were identified as *Myialges anchora* (Trouessart 1907) (Figure 1. A),

Promyialges italicus (Faradonbeh et al. 2019) (Acariformes: Astigmata: Epidermoptidae) (Figure 1. B), and *Ornithocheyletia hallae* (Smiley 1970) (Prostigmata: Cheyletidae) (Figure 1. C) (Table 1).

Table 1: Specimen number of by mite species detected on the *Ps. canariensis* in the present study.

Numbers of mite-positive specimens of <i>Ps. canariensis</i>	<i>Ornithocheyletia hallae</i> (n)	<i>Myialges anchora</i> (n)	<i>Promyialges italicus</i> (n)
Specimen I	-	1	-
Specimen II	-	3	1
Specimen III	2	4	-
Specimen IV	1	3	1
Specimen V	-	1	-
Specimen VI	2	-	-

All identified specimens were female, and the number of specimens by species is given in Table 1. Mite specimens were collected from the dorsal and ventral of the abdomen, between the thorax and abdomen, and from under the wings of *Ps. canariensis* (Figure 1. D and E).

DISCUSSION AND CONCLUSION

Hippoboscid flies are known for their parasitic effects (e.g. sucking blood, itching on the skin, and causing secondary infections on heavy infestations) on birds and their vector potential (e.g. West Nile virus, *Haemoproteus* spp., and *Trypanosoma* spp.) in many parts of the world. (Reeves and Lloyd 2019). In addition, it has been documented in many studies that they serve as potential carriers for parasitic arthropods such as chewing lice and mites that infest birds (Fain 1965). As a result of this behaviour (i.e. by phoresis), parasitic arthropods can infest new hosts and may even use this path to escape competition with other species or interspecies (Bartlow et al. 2016; White et al. 2017).

Pseudolynchia canariensis has been reported to show high prevalence and high specificity for *C. livia* in many studies conducted in various parts of the world (Radfar et al. 2012; da Cunha Amaral et al. 2013). This species is also the most frequently reported hippoboscid fly in Türkiye (Eren 2025). The intense interaction between these two species has also allowed for frequent reports of pigeon-specific phoretic mites on *Ps. canariensis* (Fain 1965; Matyukhin and Yatsuk 2022). There are also studies where the infestation rate is very low (Alkharigy et al. 2018; Elmacıoğlu et al. 2018), but according to our observations, this may be due to the method of the study, the fact that hippoboscid flies were not taken into account as other ectoparasites or the difficulty of collecting hippoboscid flies from birds.

The Cheyletidae family is the most species-rich family within the Cheyletoidea superfamily, and this family includes nearly 400 species classified under 72 genera, 14 tribes, and two subfamilies (Cheyletinae and Cheyletiellinae) in light of recent taxonomic data (Skoracki et al. 2012). This family has free-living predatory mites (in broad-spectrum biotopes such as soil, vegetable debris, and nests of insects or vertebrates) and permanent parasitic mites (on birds and mammals) (Bochkov and Fain 2001; Bochkov 2009). Among the 14 tribes described, only tribes of Cheletosomatini (Volgin 1969), Ornithocheyletiini (Volgin 1969), and Metacheyletiini Fain, 1980 have mites associated with birds (Skoracki et al. 2012). When we look at the studies conducted in various parts of the world (Africa, Asia, Australasia, Eurasia, Europe, North America, and South America), while over 80 parasitic cheyletid mites have been reported in birds so far (Skoracki et al. 2012), only *Ornithocheyletia hallae* has

been reported from *Ps. canariensis* collected on the *Columba livia* in Türkiye (Dik 2012). In fact, there is another published report (Merdivenci 1963), but in this paper, *Apodicheles heteropalpus* (Mégnin, 1878) (as syn in the study: *Cheyletiella heteropalpa*) has been detected in rock pigeons (*Columba livia*) by the author. Since there is no picture (including characteristic structures in species identification) of the species detected in the relevant publication and since the species under the genus *Apodicheles* are associated with the species of swifts (Apodidae) belonging to the order Apodiformes (Skoracki et al. 2012), mites detected in this report is a species of doubtful that is species inquirenda. Including free-living predatory mites and parasitic mites, 35 species in the family of Cheyletidae have been reported from Türkiye so far (Doğan 2022). Four of all these reported species have parasitic importance (*Cheyletiella blakei*, *C. hallae*, *C. parasitivorax*, and *C. yasguri*), but this number is quite insufficient in terms of mammal and bird diversity in Türkiye. *Cheyletiella* species cause mange-like symptoms such as pruritus, alopecia, dermatitis, erythema, and scaling on domestic animals. In cases of heavy infestation in domestic animals such as cats and dogs, transmission to humans is also possible (Cohen 1980; Curtis 2004; Arther 2009).

In traditional taxonomy, the epidermoptid complex (skin mites) consisted of the families Epidermoptidae, Dermationidae, and Knemidocoptidae (Dabert and Mironov 1999; Fain and Bochkov 2003); however, there has now been reclassified as the subfamilies Epidermoptinae, Myialginae, Lukoschusoptinae, Otocoptoidinae, and Knemidocoptinae under the family Epidermoptidae, and the subfamilies Apocnemidocoptinae and Dermationinae under the family Dermationidae, after the last published taxonomic revision (Mironov et al. 2005). These mites are permanent parasites that live on or in the skin of birds. Some species may also penetrate deeply under the epidermis and cause symptoms of mange-like on hosts (Fain 1965). In previous studies, six epidermoptid mite species were reported in Türkiye: *Knemidokoptes mutans* (Robin and Lanquetin, 1859) on the common pheasant (*Phasianus colchicus*), domestic chicken (*Gallus gallus domesticus*) and turkey (*Meleagris gallopavo domesticus*) (Merdivenci 1970; Celep and Açıcı 1996); *Knemidokoptes pilae* (Lavoipierre and Griffiths 1951), on the budgerigar (*Melopsittacus undulatus*) (Toparlak et al. 1999); *Myialges bombycillae* (Fain 1965) and *Microlichus turdicola* (Fain et al. 1987) on the *Ornithomya avicularia* (from ex *Turdus merula*) (Philips and Fain 1991); *Neocnemidocoptes gallinae* (Railliet 1887) (Knemidocoptidae) on the domestic chicken and turkey (Merdivenci 1970); and *Promyialges pari* (Fain 1965) on the *Ornithophila metallica* (from ex *Ammoperdix* sp.) (Fain et al. 1987). The epidermoptid mites detected in the present study take place into two different subfamilies, Epidermoptinae (*Promyialges italicus*) and Myialginae (*Myialges anchora*), in the current taxonomy. Both species are new records for the feather mite fauna of Türkiye. *Promyialges italicus* was first described from specimens collected from *Pseudolynchia canariensis* captured from pigeons (*Columba livia*) in Italy (Faradonbeh et al. 2019) and was subsequently also reported from *Ps. canariensis* captured from the same host in Russia (Matyukhin and Yatsuk 2022). The last notification of this species was made in mite specimens collected from *Ornithomya avicularia* caught from the barn swallow (*Hirundo rustica*) in Slovakia (Hromada et al. 2024), but when the photographs (structure of hysteronotal shield) in the

relevant paper are examined, it is seen these specimens were misidentified. Anterior parts of the hysteronotal shield in the *Pr. italicus* should be fused (see Faradonbeh et al. 2019), but in the photograph in this paper, because the structure of the hysteronotal shield is completely split into two pieces, this species is certainly *Pr. unicus* (see Fain 1965). *Myialges anchora* was first described in 1907 from mite specimens collected from *Pseudolynchia canariensis* captured from pigeons (*Columba livia*) in Algeria (Sergent and Trouessart 1907). In conducted studies up to now, it has been reported many times from the *Pseudolynchia canariensis* captured on the same host in Argentina (Bequaert 1953), Brazil (Valim and Gazêta 2007; Marcelino et al. 2009; da Cunha Amaral et al. 2013), Congo (Bequaert 1953), India (Hiregaudar 1956), Iran (Rahimi et al. 2017; Faradonbeh et al. 2019), Italy (Macchioni et al. 2005; Faradonbeh et al. 2019), Mauritius (Thompson 1936), and South Africa (Thompson 1936; Bequaert 1953). This species has also been reported on different hippoboscids species infesting other bird hosts, except pigeons: *Icosta americana* (= *Lynchia fusca*) and *Icosta hirsuta* (= *Lynchia hirsuta*) (respectively, from *Bubo virginianus* and *Callipepla californica* in United States of America) (Furman and Tarshis 1953), *Ornithoica philippinensis* (from an unknown host in Philippines) (Ferris 1928), *Ornithoica pusilla* (from an unknown host in Philippines) (Ferris 1928), *Ornithoica vicina* (from an unknown host in North America) (Ferris 1928), and *Ornithomya fringillina* (from *Dryocopus martius* in Estonia (Thompson 1936), and from *Tetrastes bonasia* in Russia/formerly USSR) (Thompson 1936; Dubinin 1950).

In conclusion, this study reports two new epidermoptid mite species for the feather mite fauna of Türkiye: *Myialges anchora* and *Promyialges italicus*. Although studies on feather mite fauna in Türkiye have increased in recent years, they remain insufficient. Therefore, comprehensive studies are needed to reveal the diversity of feather mites and other parasitic feather mites and their host-parasite associations within the ornithofauna of Türkiye.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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AUTHOR CONTRIBUTIONS

Idea / Concept: GE, EB, ACÖ
 Supervision / Consultancy: GE
 Data Collection and / or Processing: EB, ACÖ
 Analysis and / or Interpretation: GE, EB, ACÖ
 Writing the Article: GE
 Critical Review: GE, EB, ACÖ

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