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Checklist of the louse flies or keds (Diptera: Hippoboscidae) of Türkiye

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Abstract

Hippoboscids, known as 'louse flies' or 'keds', are obligate and permanent bloodsucking flies that infest mammals and birds. The Hippoboscidae family includes more than 210 described species worldwide. In studies conducted in Türkiye, a total of eight Hippoboscid species have been reported: five species on mammalian hosts and three species on bird hosts. In this review, a checklist of Hippoboscid flies (Diptera: Hippoboscidae) identified as a result of faunistic studies conducted in Türkiye is given.

Keywords: faunistic review, host-parasite associations, literature review

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Türkiye bit sineklerinin (Diptera: Hippoboscidae) kontrol listesi

Özet

Bit sinekleri olarak da bilinen Hippoboscidler, memeli ve kuşlarda enfestasyona neden olan zorunlu-kalıcı kan emici sineklerdir. Hippoboscidae ailesi dünya genelinde 210'dan fazla tanımlanmış türü içerir. Türkiye'de yapılan çalışmalarda memelilerde beş tür, kuşlarda üç tür olmak üzere toplamda sekiz Hippoboscid türü rapor edilmiştir. Bu derlemede Türkiye'de yapılan faunistik çalışmalar sonucunda tespit edilen Hippoboscid sineklerinin (Diptera: Hippoboscidae) bir kontrol listesi verilmektedir.

Anahtar kelimeler: faunistik inceleme, konak-parazit ilişkileri, literatür taraması

1. Introduction

Members of the Hippoboscidae family, also known as louse flies or keds, are obligate and permanent bloodsucking ectoparasites of avian and mammalian hosts. The average length of these flies is between 2.5-10 mm, and their bodies are generally dorsoventrally flattened [1]. Taxonomically, hippoboscid flies are classified into three subfamilies: Hippoboscinae, Lipopteninae, and Ornithomyinae [2]. In addition to their parasitic effects, such as through bloodsucking that harms birds or mammals, hippoboscid species are also important from an epidemiological perspective because they serve as vectors for agents of protozoal (*Anaplasma* spp., *Haemoproteus* spp., *Theileria* spp., and *Trypanossoma* spp.), bacterial (*Acinetobacter* spp., *Arsenophonus* spp., *Bacillus* spp., *Bartonella* spp., *Borrelia* spp., *Corynebacterium* spp., *Enterobacter* spp., *Halomonas* spp., *Rickettsia* spp., *Shewenella* spp., *Staphylococcus* spp., and *Wolbachia* spp.), viral (Blue-tongue virus, Border disease virus, and West Nile virus), and helminthic (*Acanthocheilonema* spp.) diseases [3,4]. Occasional human cases caused by *Hippobosca* spp., *Lipoptena* spp., *Melophagus* spp., and *Pseudolynchia canariensis* increase these species' importance in both veterinary and medical parasitology [5-8]. In the present review, it has been provided an updated checklist of Hippoboscid fly species reported from Türkiye so far, with their also geographical locations and host-parasite associations.

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2. Materials and methods

Throughout the study, academic search engines such as ResearchGate, PubMed, DergiPark and Google Scholar and a published book containing checklists of ectoparasites detected in Türkiye [9] were used to access studies on louse flies or keds in Türkiye [9-11,14,19,21-27,30,31]. As a result of the literature research, notifications of Hippoboscid flies were detected in 14 academic studies conducted in Türkiye. Original photographs of 5 of the 8 Hippoboscid species reported in Türkiye were taken by me using the integrated camera under a stereo microscope (Nikon SMZ1500, Nikon, Tokyo, Japan) using museum specimens of the relevant species in the Laboratory of the Department of Veterinary Parasitology, Faculty of Veterinary Medicine, Ondokuz Mayıs University (Samsun, Türkiye).

3. Results

Order Diptera Linnaeus, 1758

Family Hippoboscidae Samouelle, 1819

Subfamily Hippoboscinae Samouelle, 1819

Genus *Hippobosca* Linnaeus, 1758

***Hippobosca equina* Linnaeus, 1758** (Figure 1.A)

Hosts: Domestic cattle *Bos taurus* Linnaeus, 1758 (Artiodactyla: Bovidae), domestic donkey *Equus asinus* Linnaeus, 1758 (Perissodactyla: Equidae), domestic horses *Equus ferus caballus* Linnaeus, 1758 (Perissodactyla: Equidae).

Reported locations. It is widely seen throughout Türkiye [9]. Karaman and Konya [10].

***Hippobosca longipennis* Fabricius, 1805**

Host: Domestic dog *Canis familiaris* Linnaeus, 1758 (Carnivora: Canidae) and the red fox *Vulpes vulpes* (Linnaeus, 1758) (Carnivora: Canidae).

Reported locations. Iğdır and Marmara region [9], Hatay [11].

***Hippobosca rufipes* von Olfers, 1816**

Hosts: Domestic cattle *Bos taurus* Linnaeus, 1758 (Artiodactyla: Bovidae), camel *Camelus bactrianus* or *Camelus dromedarius* (Artiodactyla: Camelidae), and domestic horses *Equus ferus caballus* Linnaeus, 1758 (Perissodactyla: Equidae).

Reported location. Antalya [9].

Remarks. The genus *Hippobosca* consists of 7 currently described species that cause infestation on mammal species in the orders Artiodactyla (even-toed ungulates), Perissodactyla (odd-toed ungulates) and Carnivora [1,2]. Many studies have shown that *Hippobosca* species generally show low host specificity. For example, although the primary hosts of *Hippobosca equina* are equids such as horses, donkeys and mules, it has also been reported in camels, deer, dogs, rabbits, hares, goats, roe deer (*Capreolus capreolus*), grey heron (*Ardea cinerea*), northern goshawks, pigeons, and even humans [8,12]. Similarly, *Hippobosca rufipes* has been reported from many hosts, including hartebeest (*Alcelaphus buselaphus*), springbuck (*Antidorcas marsupialis*), white-tailed gnu (*Connochaetes gnou*), corrigum (*Damaliscus korrigum*), Gemsbok (*Oryx gazella*), Steinbok (*Raphicerus campestris*), common eland (*Taurotragus oryx*), giraffes (*Giraffa camelopardalis*), plains zebra (*Equus quagga*), cattle, horses, donkeys, dogs and even humans [8]. *Hippobosca longipennis*, whose primary host is domestic and wild carnivores, has been reported in many hosts from the order Carnivora (Canidae, Viverridae, Hyaenidae, and Felidae) and incidentally in antelopes, birds, and even humans [6,13]. *Hippobosca* notifications and host diversity in Türkiye also support the low host specificity of these species.

Subfamily Ornithomyinae

Genus *Ornithomya* Latreille, 1802

***Ornithomya avicularia* (Linnaeus, 1758)** (Figure 1.D)

Hosts: The rock dove *Columba livia* Gmelin, 1789 (Columbiformes: Columbidae) and the long-eared owl *Asio otus* (Linnaeus, 1758) (Strigiformes: Strigidae).

Reported locations. İstanbul [9] and Samsun [14].

Remarks. The genus *Ornithomya* consists of 29 currently described species that cause infestation on bird species belonging to orders Accipitriformes, Anseriformes, Columbiformes, Coraciformes, Piciformes, Falconiformes, Passeriformes, Pelecaniformes, and Strigiformes [15-17]. *Ornithomya avicularia* is a polyxenous parasitic louse fly that infests birds in the orders Passeriformes, Accipitriformes, Anseriformes, Falconiformes, and Strigiformes, distributed in the Palaearctic, Oriental, and Afrotropical regions [8,18].

Genus *Ornithophila* Rondoni, 1879

***Ornithophila metallica* (Schiner, 1864)**

Host: The Eurasian magpie *Pica pica* (Linnaeus, 1758) (Passeriformes: Corvidae).

Reported location. Bursa [19].

Remarks. The genus *Ornithophila* includes two described species that are distributed in Europe, Asia and Africa and have a wide host diversity [2]. *Ornithophila metallica* has been reported to infest birds in the orders Accipitriformes, Apodiformes, Bucerotiformes, Charadriiformes, Coliiformes, Coraciiformes, Cuculiformes, Galliformes, Falconiformes, Passeriformes, Pelecaniformes, Piciformes, Psittaciformes, Strigiformes and Trogoniformes, distributed in warm and temperate countries of Europe, Asia, Africa, and Australia [8,20].

Genus *Pseudolynchia* Bequaert, 1926

***Pseudolynchia canariensis* (Macquart, 1840)** (Figure 1.E)

Hosts: The rock dove *Columba livia* Gmelin, 1789 (Columbiformes: Columbidae), The Eurasian eagle-owl *Bubo bubo* (Linnaeus, 1758) (Strigiformes: Strigidae), and *Rodentia* sp (Mammalia) (?).

Reported locations. Ankara [9,21], Bursa [19], Elazığ [22], Hatay [23,24], İstanbul [9,25], Konya [26], and Van [27].

Remarks. The genus *Pseudolynchia* consists of five currently described species that cause infestation, on bird species belonging to orders Accipitriformes, Columbiformes, Falconiformes, as well as many other orders (Caprimulgiformes Cuculiformes, Galliformes, Piciformes, and Passeriformes) [1,2,28]. Although *P. canariensis* primarily infests birds in the order Columbiformes, it has been reported in many bird orders, including Accipitriformes, Coraciiformes, Ciconiiformes, Cuculiformes, Falconiformes, Galliformes, Passeriformes and Strigiformes in the continents of Europe, Asia, Africa, and America [29].

Subfamily Lipopteninae

Genus *Lipoptena* Nitzsch, 1818

***Lipoptena cervi* (Linnaeus, 1758)** (Figure 1.B)

Hosts: Domestic goat *Capra hircus* Linnaeus, 1758 (Artiodactyla: Bovidae), the roe deer *Capreolus capreolus* (Linnaeus, 1758) (Artiodactyla: Cervidae), and the red deer *Cervus elaphus* Linnaeus, 1758 (Artiodactyla: Cervidae).

Reported locations. It is widely seen throughout Türkiye [9]. Bursa [30] and Samsun [31].

Remarks. The genus *Lipoptena* comprises 30 currently described species that cause infestation as blood-sucking on mammal species in the order Artiodactyla (families Cervidae and Bovidae), and may accidentally infest humans

[1,2,32]. *Lipoptena cervi* is distributed in Europe, the Middle and Far East, North Africa and North America, and infestations have been reported so far from the species *Alces alces*, *Capreolus capreolus*, *Cervus elaphus*, *C. canadensis*, *Dama dama*, *Odocoileus virginianus* and *Rangifer tarandus* in the order Artiodactyla, and also as accidental on humans [8,32].

Genus *Melophagus* Latreille, 1802

***Melophagus ovinus* (Linnaeus, 1758)** (Figure 1.C)

Host. Domestic sheep (*Ovis aries* Linnaeus, 1758) (Artiodactyla: Bovidae)

Reported locations. It is widely seen throughout Türkiye [9].

Remarks. The genus *Melophagus* comprises three currently described species that cause infestation as blood-sucking on mammal species in the order Artiodactyla (Bovidae) [1,2]. Unlike the other two species, *M. ovinus* is also distributed in Europe, North America, South Africa and Australia. Apart from the sheep, which are the definitive host, it has been reported on domesticated and wild goats, European bison (*Bison bonasus*), rabbit (*Oryctolagus cuniculus*), red fox (*Vulpes vulpes*), dogs (*Canis lupus familiaris*), and humans [5].

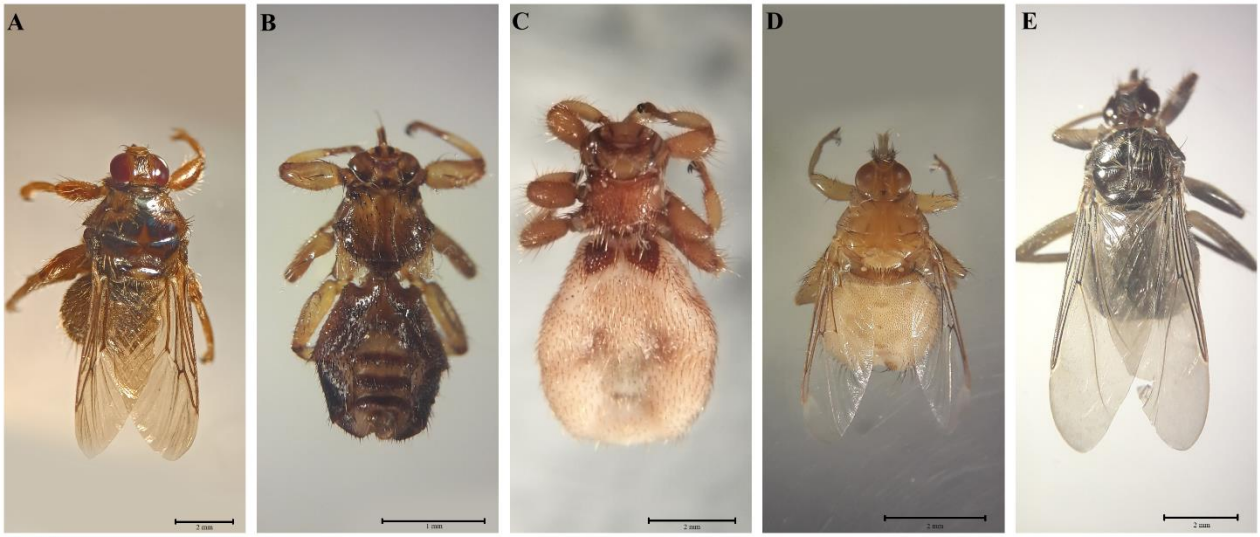

Figure 1. Original photographs of some Hippoboscid species reported in Türkiye: *Hippobosca equina* (A); *Lipoptena cervi* (B); *Melaphagius ovinus* (C); *Ornithomya avicularia* (D); *Pseudolynchia canariensis* (E)

4. Conclusions and discussion

It stands out in literature reviews that scientists working in the parasitology field in Türkiye have focused on ectoparasites of wild mammals and birds in recent years. However, these studies mainly focus on ectoparasites such as fleas, lice, ticks or feather mites [33,34,35], while Hippoboscid species are often ignored. In fact, Türkiye has a diverse and rich wildlife, including both mammals and birds. In countries like Türkiye, where wildlife diversity is richness, Hippoboscid flies are intensively investigated in parasitological studies [16,17,32]. On the other hand, in Türkiye, Hippoboscid fauna has not been adequately revealed due to the narrow scope of ectoparasitic studies and the fact that louse flies or keds were ignored in the studies.

This paper aims to draw attention to this parasitic fly group by preparing an updated checklist of louse flies or keds (Diptera: Hippoboscidae) of Türkiye.

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