

Description of dog flea, *Ctenocephalides canis* (Curtis) (Siphonoptera: Pulicidae) from Erbil Governorate -Kurdistan Region –Iraq

Nabeel A. Mawlood^{1*} and Abbas M. Faraj²

¹College of Agricultural Engineering Science, Salahaddin University College of Pharmacy, Erbil, Iraq

²Hawler Medical University, Erbil-Iraq

*Corresponding author email: nabeel.mawlood@su.edu.krd

Abstract

The present study includes a detailed description of dog flea, *Ctenocephalides canis* (Curtis, 1826) as ectoparasites infesting sheep. The specimens were collected during February to July 2021 from different localities at Erbil Governorate Kurdistan Region – Iraq. The species identified according to same diagnosed characters, wingless and bilaterally compressed. The genal comb consists of 7-8 spines. The antennae are short, nearly club like, and consist of multiarticulate segments positioned in antennal fossae. Pronotal comb consists of a row of 16-17 spines. Hind legs long, strong and adapted for leaping, dorsal margins bear 6-7 short-long spines, hind tibia lacks an outer apical tooth. The habitus of male and female with important parts were photographed. Some ecological data such as geographical distribution and date of collection were also mentioned.

Keywords: Description; *Ctenocephalides canis*; Siphonoptera, Pulicidae; Iraq.

Introduction

Fleas are among the most important ectoparasites of mammals in that several species are the natural vectors of several important infectious diseases (Markell *et al.*, 1999; Bay and Harris, 1988). Durden and Hinkle(2009), indicated that the fleas, includes small insects that survive as external parasites of mammals and birds, 15 families with a total of about 220 genera and about 2,500 species of fleas can be distinguished. These ectoparasitic infestation cause serious economic losses to the domestically animals. The causing agents have a direct and indirect impact on the hosts. The direct impact could be a result of blood loss, inflammation and skin irritation, toxic effect and an allergic reaction. The indirect impact could cause restlessness and disruption of the normal feeding, as well as self-mutilation brought by the itch they cause (Saleh, 2004; Taylor *et al.*, 2007). Many species of ectoparasites infesting the sheep and feed on body tissue such as blood, skin hair and the wounds and skin irritation produced by these parasites result in discomfort and irritation to the animal, and these can transmit many diseases from sick to healthy animals (Abo - Hab, 1979). They can reduce weight gain and milk production (Service, 1980; Ofukwn and Akwuobu, 2010). All ectoparasites causes intense irritation to the skin and skin damage, blood loss and severe anemia, moreover they are important vectors of protozoan, bacterial, viral and rickettsial diseases (Abo-Hab, 1979; Soulsby, 1982). Many species of fleas are listed to cause a wide range of health problems in goats and sheep such as mechanical tissue damage, inflammation, irritation, , hypersensitivity, weight loss, anemia and in severe cases death of

infested animals (Radostits *et al.*, 2007). The fleas feed on host blood and play a role in the spread of diseases, such as epidemics, typhus, tularemia, skin irritation, anxiety, and anemia (Yeruham *et al.*, 1996; Arijo *et al.*, 2007). The fleas are obligate blood-sucking ectoparasites, they act as vectors to transmit pathogens and play a role as intermediate hosts of parasites and can be an ectoparasitic nuisance in animals and humans which may cause allergic reactions and annoyance caused by their bites (Molan *et al.*, 2012). Also fleas are vectors for viral, bacterial and rickettsial diseases, protozoan and helminthes parasites (Krasnov, 2008). A few fleas during infesting dogs or cats cause little harm unless the host becomes allergic to substances in the fleas saliva (Paterson, 2009). The most severe infection spread by fleas is plague, caused by *Y. pestis* (Stenseth *et al.*, 2008). Currently, this family has 181 species in 27 genera (Triplehorn and Johnson, 2005). Dogs and cats fleas transmit murine typhus which caused by *Rickettsia typhi* (Service, 1980). Members of the genus *Ctenocephalides* [Stiles](#) and [Collins](#), 1930 occurs worldwide and is the predominant flea, thought to be originated in Africa, but have been introduced to countries around the world, and is the predominant flea found infesting dogs in Greece (Koutinas *et al.*, 1995), Albania (Xhaxhui *et al.*, 2009), Hungary (Farkas *et al.*, 2009), Korea (Chee *et al.*, 2008) and Argentina (González *et al.*, 2004). Dog flea, *Ctenocephalides canis* (Curtis) is an important ectoparasite of both wild and domestic canids around the world (Mullen and Durden, 2009). This species lives as an ectoparasite on a wide variety of mammals, including dogs, cats, rabbits, rats, gray foxes, red foxes, woodchucks, and humans (Taylor *et al.*, 2007). The species may be responsible for transmission of many diseases, filarial nematode, *Acanthocheilonema reconditum* (Durden and Hinkle, 2009) and can serve as an intermediate host for the rodent tapeworm (*Hymenolepis diminuta*), dog tapeworm (*Dipylidium caninum*), and dwarf tapeworm (*Hymenolepis nana*) (Guzman, 1984).

The main objectives of the current study are a compressive survey and description of the dog flea, *Ctenocephalides canis* encountered in sheep with photographing the important parts and mentions the distribution in different localities at Erbil Governorate-Kurdistan Region of Iraq.

Materials and Methods

The specimens were collected from the hair and skin of the sheep in many localities of Erbil Governorate: Shaqlawa; Khabat; Koya; Kasnazan and Koshtapa from the period, February till July 2021. A survey of sheep ectoparasites was conducted weekly. The specimens were collected from the hair and skin of the sheep in many localities of Erbil Governorate: Shaqlawa; Khabat; Koya; Kasnazan and Koshtapa from the period, February till July 2021. The specimens were removed from the body of the host with the help of fine and smooth forceps and/or by brushing the hair. The collected specimens placed in bottles and preserved in freeze till studied. The specimens were examined by using dissecting binocular microscope, compound microscope and digital computerized microscope for describing the parts of the body, after that the habitus photographing by using a digital camera (Ucmas series microscope camera), and the length of the part are measured by using a linear micrometer. For preparation of slides for microscopic examination, the specimens placed in 10% KOH then in water bath for 10-15 minutes for dissolving of fatty bodies. After that placed in distilled water for two minutes for 2-3 times in order

to neutralize the alkali. The specimens placed in ethyl alcohol 25%, 50%, 75% and 100% respectively for two minutes of each concentration for dehydration of water. For clearing, the parts were placed in a dish with xylene for 5 minutes after which they were fixed on slides with DPX solution and were covered with coverslip for subsequent examination (Lane and Crosskey, 1993; Polse *et al.*, 2021). The species were identified with the help of available keys and literatures of (Part, 1956; Stojanovich and Pratt, 1965; Tuff, 1977; Furman and Catts, 1982). Also, the species confirmed by Dr. Hanna Hani Al-safar in Iraqi Natural History Research Center and Museum - University of Baghdad, Baghdad-Iraq.

Results and Discussions

Genus: *Ctenocephalides* Stiles & Collins, 1930

Diagnostic characters

The head often bears 7-8 genal comb teeth; these are arranged almost parallel to the body long axis. Pronotal combs are present.

Ctenocephalides canis (Cutis, 1826) - Dog flea

Description

Body(Fig.1a&b): Small, Reddish-brown, more rounded, laterally compressed covered with hard sclerites, the sclerites are covered with many hairs and short spines directed backward. Length of males is 1.6-2.8 mm and the females 1.8 - 3.1 mm.

Head: High, narrow, cuneate and rounded. Length is generally less than twice of the height of head. The propleurosternum covers the head from lower part to the peristomal aperture, as a result of which it is immobile. Compound eyes are large and black. Simple eyes present. A groove between the frons and occiput is usually absent. The genal comb(Fig.1c) consists of 7-8 spines, 2nd spine two times as long as the 1st. Mouthparts piercing and sucking with proboscis which pointed down words and bear many dentes. Maxilla(Fig.1d) with fine serrate, maxillary palps four segmented, 2nd segment is the longest, and 1.2 times as long as the 3rd which is as long as the 4th. Laciniae have serrated, saw-like, sharp surfaces. Mouthparts bear dents and cilia-like projections. Labrum is very small, needle like. Epipharynx is long slender and blade like. Labial palps are small, 5-segmented. The genal comb on the cheek (gena) consists of 7-8 spines. The labrum and hypopharynx are vestigial and mandibles are absent. The labium is represented by a proximal prementum and a pair of labial palps, each with three segments. Antennae are short, nearly club like, and consist of multiarticulate segments positioned in antennal fossae. The terminal nine or so articles are short, wide, and appear to form a single large, club like article, known, appropriately, as the club. 1st segment of antenna is 1.2 times as long as the 2nd. The two proximal articles are large and distinct. The antenna is in an unusual position on the side. The antennal fossa divides the head into anterior and posterior parts.

Thorax: Consists of three modified segments, each one with dorsal plate. Posterior margin of pronotum with pronotal comb(Fig.1e) consists of a row of 17-18 spines. Metepisternum bear two bristles. First row of the setae on the metaepimeron consists of 7 -11 setae, while the second row consists of 7 -9 setae. The wings are absent. Fore legs (Fig.1f) are brown and strong, fore coxae elongated oval, fore trochanter oval, fore femur are large, cylindrical, inner margin without setae,

fore tibia tubular shaped, slightly shorter than the femur, dorsal margins bears 8-9 of short-long spines, protarsus five segmented, 2nd segment 1.1 times as long as the 1st. 3rd segment 1.2 times as long as the 4th, 5th segment is the longest, 2.1 times as long as the 1st, each tarsal segment with sparsely bristles. Claws are long and slightly curved adapted to grasp a host. Middle legs (Fig.1g) resemble to the fore legs except, the coxa rectangular shape, the 2nd segment of the tarsus 1.3 times as long as the 1st. Hind legs (Fig.1h) resemble to the fore legs except it is longest legs, the coxa conical shaped, inner margin of femur with 10 – 13 setae, tibia triangular shaped (Fig.1i), in both sexes with eight notches bearing stout setae, 2nd segment of tarsus 0.7 times as long as the 1st.

Abdomen(Fig. 1j): Oval, laterally pressed, composed of 10 segments with the most terga overlapping the sterna at the sides. The pygidial pin cushion like structure plate with moderate dense of short setae. The lateral plates are absent. 9th segment carrying a pair of parameres (clasper) and the dorsal surface of this segment in both sexes bears a sensory area called the sensillum. 10th segment is very small and inconspicuous. Lateral surface of the tergal 1st_8th bear a pair of spiracles. Abdominal tip in female is more rounded than in male. Spermatheca is brown, lying in about position of 6th to 8th segments.

Male genitalia: The genital parts of male are chitinous, snail shaped consists of the aedeagus (parameres and penis). The Parameres long, not expanded apically with many lobes, a pair of narrow rod-like shaped found in 9th sternite. The penis is thin and an immensely long wispy ribbon-like structure, kept coiled up inside the abdomen when not in use.

Female genitalia: Spermatheca brown, nearly U- shaped contains short tail. Bursa copulatrix.

Conclusions: Fleas are clinically important ectoparasites for animal and human health, since they may play a role as parasites by themselves causing allergic dermatitis or other conditions. Sometimes they serve as vectors, intermediate hosts and transmitting important disease-causing pathogens. Fleas have a global distribution. As far as data are known from different countries worldwide, fleas are also found to infest dogs in all over the world. Dog flea, *Ctenocephalides canis* (Curtis, 1826) is a species of [fleas](#) that lives as an [ectoparasite](#) on a wide variety of [mammals](#), particularly the domestic [dog](#) and [cat](#). The species has been reported on many mammalian hosts, including dogs, cats, rabbits, rats, gray foxes, red foxes, woodchucks and humans. The species may be responsible for transmission of many diseases. It is easy to identify this species by laterally compressed bodies; wingless; composed of a blunt head; a genal and pronotal combs are present; hind legs long and adapted for jumping.

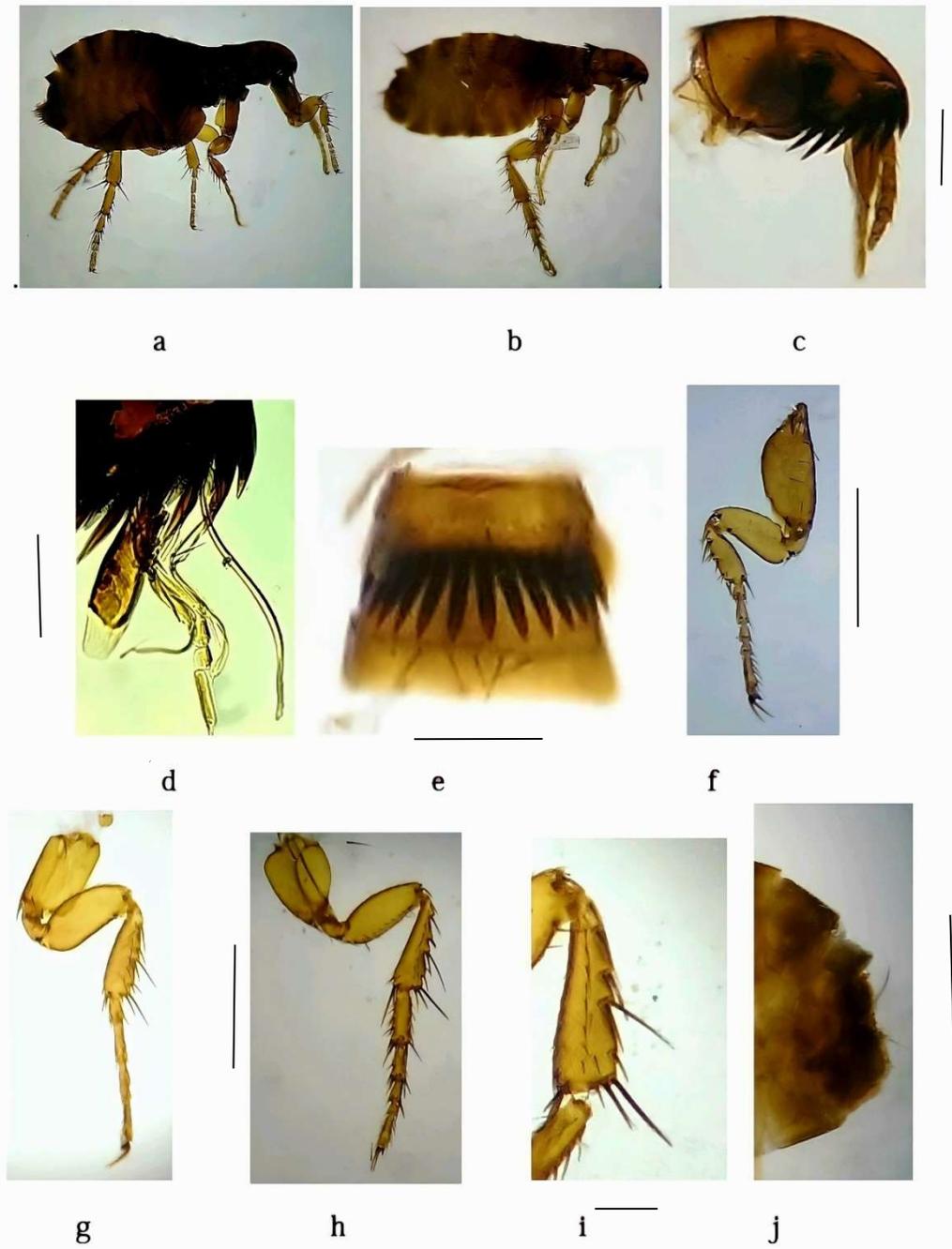


Fig.1 *Ctenocephalides canis* a. Male (Magnification: 15X) b. Female (15X) c. Genal comb d. Mouthparts e. Pronotal comb f. Fore leg g. Middle leg h. Hind leg i. Hind tibia j. 8th - 10th abdominal segments ; Scale bars c, d and e = 0.2mm; f, g and j = 0.5mm.

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