

**A Morphological Study of Some Ectoparasites Infesting Sheep in Iraq**

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**Abstract**

The present study provides a brief morphological description of some ectoparasites infesting sheep in Abu Ghraib, Baghdad Province, and Kirdah Rasha, Erbil Province, Iraq, during April–June 2025. A general field survey was conducted to collect ectoparasite samples from sheep. Six species belonging to the class Insecta were identified: the chewing louse *Bovicola ovis* (Schrank), *Ctenocephalides canis* (Curtis), *Linognathus africanus* Kellogg & Paine, *Culex pipiens* Linnaeus, *Wohlfahrtia magnifica* (Schiner), and *Chrysomya bezziana* (Villeneuve). In addition, one hard tick species, *Rhipicephalus turanicus* Pomerantsev (Arachnida: Ixodidae), was recorded. Diagnostic morphological characters of each species were described. The habitus of male, female with some last larval instars of some species was photographed to support identification.

**Key Words:** Morphology, Ectoparasites, sheep, Iraq

**Introduction**

Ectoparasites are a taxonomically diverse group of organisms parasitizing the skin of their host in human and animal hosts without killing them at all. They feed or reside on the external surface of their hosts (Coles, 1986; Mullen and Durden, 2019). Most ectoparasites are hematophagous, while others feed on living cells and tissues of skin. Some species complete their entire life cycle on a single host, while others migrate between hosts, or simply pass between hosts briefly to feed (Durden and Musser, 1994; De León et al., 2020). Veterinary important ectoparasites include lice, fleas, flies, sheep keds, bed bugs, kissing bugs, ticks, and mange mites. Their parasitism may cause transmission of disease, allergic reaction, toxicosis, morbidity, and death of the host (Dinka et al., 2008; Sahito et al., 2017). The main clinical signs by ectoparasites are hypersensitivity, heavy loss of blood, systemic illness caused by allergens or toxin injected during the feeding, secondary infestation, excoriation, and, in the worst case, death (Kettle, 1995; Cortinas and Jones, 2006). Ectoparasites are responsible for mechanical damage, anemia, body condition loss, irritation, allergic response, toxicosis, morbidity, and mortality. Furthermore, ectoparasites have indirect effects by causing diseases transmitted by pathogens such as babesiosis, theileriosis, anaplasmosis, and other infections (Iqbal et al., 2014; Abbas et al., 2018). Lice are the most common ectoparasites of sheep and are classified into two groups; sucking lice (Anoplura) and chewing/biting lice (Mallophaga). Approximately 20 species infest domesticated mammals, typically in large numbers that may lead to irritation, anemia, and dermatitis (Durden and Musser, 1994). Three species infest sheep regularly; the chewing louse, *Bovicola ovis* (L.) and two blood-feeding lice species, *Linognathus ovillus* (Neumann) and *L. pedalis* (Osborn) (Fourie and Horak, 2000; Yakhchali and Hosseine, 2006; Zangana et al., 2013). Heavy infestations with sucking lice have been associated with blood loss, reduced newborn birth weights, anemia, and changes in hematological parameters, in some instances causing death (Otter et al., 2003). Certain ectoparasites are not host-specific, they are passed on to sheep when living in close contact with other domestic animals, for instance, carnivores. Fleas, *Ctenocephalides canis* (Curtis) and *Ctenocephalides felis* (Bouché) are a case in point (Obasaju and Otesile, 1980). Many dipteran species attacked the sheep and caused many affects, of these are; *Chrysomya bezziana* (Villeneuve) (Calliphoridae); *Culex pipiens* L. (Culicidae); *Tabanus* sp. (Tabanidae); *Wohlfahrtia magnifica* (Schiner) (Sarcophagidae) (Hall, 1997; Araujo et al., 1998; Sotiraki and Hall, 2012; Mawlood, 2001; Mawlood, 2025). Among all the ectoparasites, the most important are the ticks because blood-feeding acari that infest a wide range of hosts. They infect thin skin and feed on blood, and heavy infestation causes anemia, irritation, allergy, and paralysis (Walker et al., 2003). Ticks are also transmitters of numerous pathogens like viruses, bacteria, spirochetes, rickettsiae, protozoans, and helminths. These diseases are of severe medical, veterinary, as well as economic importance and cause enormous losses in livestock production all over the world (Duell et al., 2013; Rashid, 2018; Mullen, and Durden, 2019). Ectoparasite infestations have also been reported to alter the hematological parameters of their hosts, including lice (Abdallahman and Mustafa, 2018), flies (O'Brien et al., 2001), mosquitoes (Jones and Lloyd, 1987), fleas (Araujo et al., 1998), and ticks (Pfäffle et al., 2009; Reck et al., 2009). The objectives of the study are:

1. To survey and collect different species of ectoparasitic arthropods infesting sheep in Abu Ghraib city in Baghdad Province and Kirdah Rasha in Erbil Province of Iraq.
2. To provide short descriptions of some of the species encountered.

**Materials and Methods**

**First: Survey and collection of ectoparasitic arthropods infesting sheep:** A total of 200 sheep, aged 1–3 years, were randomly taken and inspected in Abu Ghraib city (Baghdad Province) and Kirdah Rasha (Erbil Province), Iraq, between April and June 2025. The sheep were randomly selected from three flocks. Ectoparasite samples were taken from various body regions, including the head, neck, flanks, forelegs, hind legs, and abdomen. For ticks, engorged specimens alone were selected directly from the body surface using fine tweezers in order to not cause harm. Lice were selected by carefully brushing the fleece using a fine-tooth comb (Yakhchali and Hosseine, 2006).

**Second: Identification and description of selected ectoparasite species :** The morphological identification and description of the selected ectoparasite species were conducted in the Department of Plant Protection, College of Agricultural Engineering Sciences, Erbil Province, Iraq. Four specimens were examined for detailed morphological study. The collected samples were first immersed in boiling water for 10–15 minutes to soften the body tissues. Dissection was carried out under a stereomicroscope using two fine entomological needles. The male abdomen and head were carefully separated and cleared in a 10% potassium hydroxide (KOH) solution. The specimens were then gently heated on a hot plate for 15–20 minutes, with intermittent shaking, to dissolve soft tissues such as lipids and muscle fibers, thereby enhancing the visibility of sclerotized structures. The specimens were rinsed in distilled water for 3–4 minutes to neutralize the alkaline solution. The specimens were subsequently transferred to 25% ethyl alcohol and dissected and examined with a stereomicroscope. To dehydrate the tissues, the parts were sequentially passed through increasing concentrations of ethanol (50%, 75%, and 100%), each for two minutes. For translucency, samples were placed in Xylene for two minutes. Lastly, the slides were mounted with body parts with Dibutylphthalate Polystyrene Xylene (DPX) as artificial non-aqueous natural mounting medium to observe under the microscope and had a coverslip over them for future observation. Various body parts were measured using an ocular micrometer Mawlood et al. (2022) and Sharif et al. (2023). Identification of species was conducted using standard taxonomic keys of (Tuff, 1977; Mawlood, 2001; Huang, 2001; Walker et al., 2003; Yakub et al., 2020).

**Results and Discussion**

**First: Survey and collection of ectoparasitic arthropods infesting sheep:** A total of 200 sheep were examined during the study, and seven species of ectoparasites were identified and classified into two major groups (Table 1). Class Insecta comprised six species: the chewing louse *Bovicola ovis* (Schrank); the sucking louse *Linognathus africanus* Kellogg & Paine; dog flea *Ctenocephalides canis* (Curtis); screw worm fly *Wohlfahrtia magnifica* (Schiner); blow fly *Chrysomya bezziana* (Villeneuve); and the common house mosquito *Culex pipiens* Linnaeus. Class Arachnida included one species of hard tick, *Rhipicephalus turanicus* Pomerantsev.

The results are consistent with previous studies reporting that sheep are commonly infested by these ectoparasitic species (Hall, 1997; Mullen and Durden, 2009; Zangana et al., 2013; Meseret et al., 2014).

Table: 1 Classification of ectoparasites species infesting sheep in Abogrib city / Iraq during April and June 2025.

Common name	Scientific name	Family	Order	Class
Chewing lice	<i>Bovicola ovis</i> (L.)	Bovicolidae	Mallophaga	Insecta
sucking lice	<i>Linognathus africanus</i> Kellogg & Paine	Linognathidae	Anoplura	Insecta
Fleas	<i>Ctenocephalides canis</i> (Curtis)	Ctenocephalidae	Siphonoptera	Insecta
Common house mosquito	<i>Culex pipiens</i> L.	Culicidae	Diptera	Insecta
Screw worm fly	<i>Wohlfahrtia magnifica</i> (Schiner)	Sarcophagidae	Diptera	Insecta
Blow fly	<i>Chrysomya bezziana</i> (Villeneuve)	Calliphoridae	Diptera	Insecta
Hard tick	<i>Rhipicephalus turanicus</i> Pomerantsev	Ixodidae	Ixodida	Archnida

**Second: Morphological identification and description**

**A: Class Insecta**

**1. Order Siphonaptera (Fleas); Family: Pulicidae*****Ctenocephalides canis* (Curtis, 1826) - Dog flea****Description**

**Body:** Reddish-brown, laterally compressed, and covered with hard sclerites. Males length (Fig. 1a), 1.4–2.6 mm and the females (Fig. 1b), 1.6–2.9 mm.

**Head:** Strongly narrow. Eyes absent. Antennae filiform, composed of five segments. Mouthparts piercing-sucking, with a downward-directed proboscis. A genal comb consists of 7–8 spines. **Thorax:** Dark brown. Posterior margin of pronotum bearing a pronotal comb of 9–10 spines. Wings absent. Legs long and strong and jumping type. Claws large, curved, and adapted for grasping the host. Hindlegs much longer than forelegs. **Abdomen:** Oval and laterally compressed, consisting of eight visible segments.



Fig. 1 *Ctenocephalides canis* a. Male (23X) b. Female

**2. Order: Anoplura (Sucking lice); Family: Linognathidae*****Linognathus africanus* Kellogg and Paine, 1911; Sucking louse**

**Body:** Oval, brown, dorsoventrally flattened, and wingless, covered with a moderate density of brown setae. Male length 1.3–1.9 mm (Fig. 2a) and the female length 1.8–2.7 mm (Fig. 2b) and **Head:** Brown, rounded, narrower than the prothorax. Eyes absent. Antennae brown, filiform, 5-segmented. Mouthparts piercing-sucking, with a protruding, stylet-like structure at the anterior of the head. **Thorax:** Brown. Prothorax larger than the head. Wings absent. Legs clinging type, Fore leg short, bear a moderate density of fine, short brown bristles; fore tarsus single-segmented ending with a pincer-like claw. Mid and hindlegs resemble to the forelegs except larger. **Abdomen:** Elongate-oval, dark brown and dorsal-ventral consisting of nine visible segments.



Fig. 2 *Linognathus africanus* a. Male (25X) b. Female (38X)

**3. Order: Mallophaga (Chewing lice); Family: Trichodectidae*****Bovicola ovis* (Schrank, 1781); Chewing louse**

**Body:** Oval, brownish to yellow, dorsoventrally flattened. Male length 1.3–1.8 mm (Fig. 3a) and the female length 1.0–1.6 mm (Fig. 3b). **Head:** Reddish-brown, nearly rounded, width greater than length. Eyes absent. Mouthparts chewing. Antennae brown, filiform, 5-segmented. **Thorax:** Brown. Prothorax narrower than the head with two marginal setae. Legs brown, clinging type. Forelegs short, claw opposing a thumb-like structure. Middle legs similar to the fore legs except, the femora broader. Hindlegs similar to the fore legs except, longer. **Abdomen:** Yellow, elongate-oval, consisting of eight visible segmented.



Fig. 3 *Bovicola ovis* a. Male (45X)

b. Female (55X)

**4. Order Diptera ; a. Family Culicidae*****Culex pipiens* Linnaeus, 1758 - Common house mosquito**

**Female**

**Body (Fig.4a):** Small, slender and pale to dark brown, entirely covered with mainly dark brown scales. Length 4.0 – 5.4 mm. **Head:** Globular, dark brown and covered with high density of dark scales. Eyes black. Ocelli absent. Mouthparts piercing sucking. Maxillary palps short. Antenna filiform, pilose consists of 13 segments. **Thorax:** Dark brown. Mesothorax large. Wing membranous. Halter clavate shaped. Fore leg short, very weak, fore tarsus five segmented with well-developed fleshy pulvilli. Middle and hind legs resemble to the fore legs but slightly shorter. **Abdomen:** Elongated oval shaped, consists of 10 visible. **Male (Fig.4b):** Like female except, the antennae are plumose and mouthparts sucking type.



Fig. 4 *Culex pipiens* a. Female (7x) b. Male

**b. Family Sarcophagidae – Fleshly**

***Wohlfahrtia magnifica* (Schiner, 1862) - Screw worm fly**

**Third larval instar**

**Body (Figs. 5a&b):** Vermiform in shape, smooth, with a flattened ventral surface and pale-yellow coloration. Length 7.1 to 14.6 mm.

**Head:** The cephalopharyngeal skeleton is well developed. The hook part of the mouth is strongly curved. Dental sclerite is visible and subtriangular in shape. Hypostomal sclerite is large and nearly H-shaped. Dorsal cornua distinctly divided, upper parts slightly longer than the lower ones. The ventral cornua V-shaped, undivided, and shorter than the dorsal cornua. **Thorax:** Composed of three segments and legless. The anterior spiracles are fan-shaped, each bearing nine papillae in a single row without indentation. **Abdomen:** Gray color. Dorsal surface with black patches. The ventral surfaces of segments 4–11, between the spine bands, are completely covered with spines. Posterior spiracles nearly oval shaped, each containing three slits hidden within a cavity.



Fig.5 *Wohlfahrtia magnifica* (Schiner); Third larval instar (10 X) a. Dorsal surface  
b. Ventral surface

**c. Family Caliphoridae - Blow fly**

***Chrysomya bezziana* (Villeneuve, 1914)- Old World screw-worm fly (Adult)**

**Body (Fig.6a):** Oval metallic blue, bluish-purple or blue-green. Length 7.3-9.8 mm.

**Head:** Orange, with burgundy-colored. Frons brown, bearing 13–14 frontal bristles. Eyes oval, red color, and holoptic. Mouthparts sponging type. Antennae aristate type, brown, consist of three segments. Arista dark brown and plumose. **Thorax:** Metallic green to blue green or dark blue. Anterior thoracic spiracle black. Legs dark brown to black; anterodorsal surface of foretibia with row of bristles. Wings Hyaline. Halter yellow and clavate shape. **Abdomen:** Metallic green to blue green.

***Chrysomya bezziana* (Third instar larvae)**

**Body (Figs.7b):** Muscoid shaped, whitish to cream colored in young while the mature larvae is a pinkish coloration. Length 7.2-15.0 mm and width 1.2-3.1 mm.

**Head:** Small, consist a complete ring of 5-6 rows of minute spines backward directed. Cephalopharyngeal skeleton black height sclerotized (Fig.1). Mouth hook black, heavily sclerotized. Dorsal cornua and ventral cornua red-black color and height sclerotized. **Thorax:** Composed of three segments. Each one consists of complete row of spines back down directed. Anterior spiracles are palmate in shape. **Abdomen:** Composed of eight segments; the dorsal surface of 1<sup>st</sup>-4<sup>th</sup> segments bears 5-6 rows of fine spines directed for back. Anterior and posterior parts of ventral surface in the segment 1-4 bear 3-4 rows of spines, 5<sup>th</sup> -6<sup>th</sup> segments with 2-3 rows, 7<sup>th</sup> segment with two rows. Posterior spiracles bearing three separated straight slits.

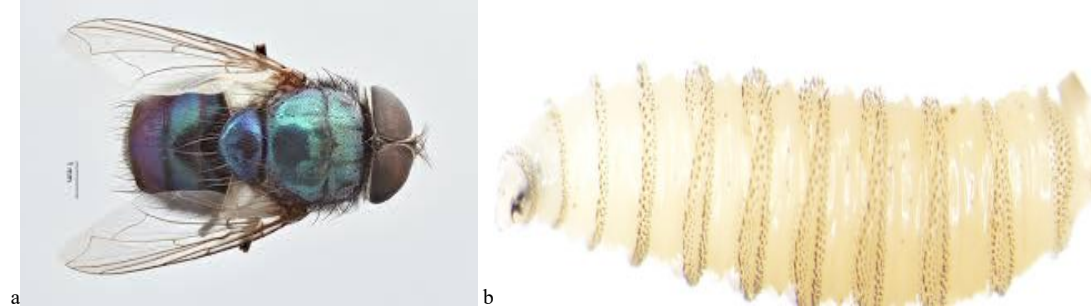


Fig.7 a. *Chrysomya bezziana* (Adult) (6X) b. Larvae (9X)

**B: Class: Archnida**

**1. Order: Ixodida; Family Ixodidae, Hard ticks**

***Rhipicephalus turanicus* Pomerantzev, 1936, Male (Fig.8a)**

**Body:** Oval shaped, reddish-brown to blackish-brown in color. Length 2.0–4.7 mm.

**Gnathosoma (Capitulum):** Mouthparts dark brown, piercing and cutting type. The basis capituli is hexagonal in shape with lateral protrusions. pedipalps short and segmented into four parts; the fourth segment. Chelicerae long, cylindrical, and sharply pointed distally, with teeth present at the tip. Eyes flat. Antenna absent. **Idiosoma** dorsally elongate and dorsoventrally rounded. The festoons with a series of small, rounded lobes. The body bears four pairs of brown legs, nearly similar in shape. The spiracular plates comma-shaped with tails that are as broad as the adjacent festoon.

**Female (Fig.8b):** Similar in general morphology to the male, except with the following distinguishing features: Size larger, measuring 2.4–6.4 mm in length. Basis capituli lateral angles are blunt.



Fig.8 *Rhipicephalus turanicus* a. Male (10X) b. Female

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