

Presence of Two Lice Species (Insecta: Phthiraptera) in a Goat (*Capra hircus*) from La Comarca Lagunera, Mexico: A Case Report

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ABSTRACT

Phthirapteriasis or pediculosis is the name given to the lice infestation, that causes skin allergy, anemia, and transmission of pathogens. This case report describes the presence of two lice species in a goat from la Comarca Lagunera in Coahuila. The collected specimens were identified as *Bovicola caprae* and *Linognathus africanus*. This document represents the first report of these lice species parasiting goats in the southeastern part of Coahuila, Mexico. Further research are required including a greater number of animals and farms in order to stablish the prevalence of these ectoparasites, establish control measures, as well as to determine its role in the posible transmission of diseases of public and veterinary health concern.

Keywords- *Bovicola caprae*, Goats, Lice, *Linognathus africanus*, Mexico.

I. INTRODUCTION

Lice are obligate permanent ectoparasites of mammals classified in the order Phthiraptera, and depending on the presence or the absence of mandibles they can be divided into Mallophaga (biting lice) and Anoplura (sucking lice) (Sánchez-Montes et al., 2018). Globally, about 540 species are known, but only 20 are parasites of domestic animals (Hopla et al. 1994), with a high specificity as regards its host, and it is known that *Bovicola caprae*, *B. limbata*, *Linognathus africanus* y *L. stenopsis* are the species of lice that parasitize goats (Ballweber 2001). The lice spend their whole lives on their host, where the adult female, after mating, oviposits small, whitish and oval eggs, which are known as nits, and can be found firmly attached to the hair. From the eggs the nymphs emerge, which complete three stages before becoming adults. The entire life cycle can last between 3-4 weeks, beginning with oviposition (Price and Graham 1997).

Phthirapteriasis or pediculosis is the name given to the lice infestation, condition that occurs more frequently during winter and the beginning of spring, and affects more severely animals with low body condition (Uslu et al. 2017). In goats, manifestations in the skin due to lice infestation are attributed to the hypersensitivity caused by the antigenic reaction of the proteins present in the saliva of the lice, that leads to irritation and alopecia

as the main clinical signs, as well as secondary skin infections due to excessive scratching (Iqbal et al. 2018). Furthermore, depending on the ectoparasitic charge, alterations in the blood parameters has been proven, these include lower red blood cell count, packed cell volume, hemoglobin concentration and platelets counts that carries to the presentation of an anemic state (Iqbal et al. 2018). Finally, it is important to mention that lice are capable to transmit some pathogens of public and veterinary health importance, that in goats can be traduced in production losses due to poor weigh gain and reproductive disorders of considerable economic importance (Kumsa et al. 2012, Ajith et al. 2017).

Some publications mention that husbandry methods (Ofukwu et al. 2008), agroclimatic conditions, season (Amare et al. 2013, Adang et al. 2015), as well as ectoparasite control practices (Zeryehun and Atomsa 2012), are determinant factors associated with lice infestations. Around the world, there are reports over the presence of lice in goats, these include Brasil (dos Santos et al. 2006; Santana et al. 2009), Philippines (Portugaliza and Bagot 2015), Great Britain (Bates et al. 2001), India (Kumar et al. 1994), Libya (Gabaj et al. 1993) and South Africa (Sebei et al. 2004). According to Lozoya-Saldaña et al. (1986), in Mexico, it has been reported the presence of *B. caprae*, *L. africanus* and *L. stenopsis* in Saltillo, Coahuila. However, in La Comarca Lagunera, one of the most important areas in terms of goat heads and milk production in the country (Salinas-González et al. 2015), there are no reports in the literature over the presence of these ectoparasites on goats. Thus, this case report describes the presence of two lice species in a goat from La Comarca Lagunera de Coahuila, México.

II. METHODOLOGY

During the month of February 2018, the presence of lice was observed in a goat, on a farm located in the Ejido Vicente Guerrero, Matamoros, Coahuila. México (25°36'37"N-103°12'51"O). After written consent from the animal owner, the goat was held under veterinary supervision for the purpose of performing the visual inspection for the collection of lice. The proper goat handling was done in accordance with animal welfare criteria with the approval of the Institutional Ethics Committee, as well as recommended in LFSA

(2012) and HFAC (2013), with not chemical contention used for animal restriction. Although at the time of the collection of lice it was not known if other goats were infested, treatment based on baths with coumaphos was recommended (Foreyt 2001). The animal used for the sampling was the only one in the farm, while the others were far of the area grazing in the rangeland.

The flock is managed in extensive grazing with poor husbandry conditions, and is composed by mixed breed goats. The farmer informs does not to administer an adequate management for endo and ectoparasites control, and it is unknown if endoparasite infestation coexists. None of the goats have had skin problems, so no studies have been conducted to detect the presence of ectoparasites, including mites, fleas or ticks. Poor bodily condition is observed in several animals of the herd; however, it is not known if it is due to the poor conditions of the grazing area, deficiency of vitamins or some other factor that could be reducing the weight gain. No other studies has been done in order to establish the severity of lice infestation, of which needs more research.

III. RESULTS

In brief, all the observed specimens were collected manually, deposited in properly labeled vials containing 70% alcohol, and translated to the Parasitology Laboratory at the Facultad de Medicina Veterinaria y Zootecnia No. 2. The specimens were rinsed in potassium hydroxide (KOH) at 10%, a rapid passage was made in the pure phenol and they were mounted using slide and cover slips adding Canada Balsam. Finally, they were identified using the appropriate keys (Price and Graham 1997), under stereoscopic microscopy (4X). The specimens were not used for molecular detection of pathogens, and they are kept in the collection of the Parasitology Laboratory of the University.

This study describes the presence of two lice species parasitizing a goat. In total, 13 lice were collected and identified as *B. caprae* (n = 2) and *L. africanus* (n = 11). The order Mallophaga includes all mandibulate or chewing lice, this species have a bluntly rounded head with prominent mandibles on the underside, its thorax is narrower than the head. *B. caprae*, the goat biting louse (figure 1), has a brownish-red head and thorax, with yellowish abdomen and brown crossbands, and a truncated anterior margin of the head. The sucking lice, belongs to the order Anoplura, it has piercing-sucking mouthparts, and the head is narrower than the prothorax. The African blue louse, *L. africanus* (figure 2), on its head five-segmented antennae can be observed, and a very slender thoracic sternal plate, the main characteristic are its greatly expanded postantennal lateral margins on the head (Price and Graham 1997).



Figure 1: *B. caprae*. Flat and round head, characteristic masticatory mouthpiece of chewing lice.



Figure 2: *L. africanus*. Characteristic sucking mouthparts and expanded posterolateral margins of the head.

IV. DISCUSSION

Our results are similar to those observed by dos Santos et al. (2006) and Santana et al. (2009) in Brazil, and Lozoya-Saldaña et al. (1986) in Mexico, who observed the presence of *B. caprae* and *L. africanus*, parasitizing goats. In fact, Rashmi and Saxena (2017) and Corke and Matthews (2018) stated that in goats, the presence of chewing and sucking lice as mixed infestations is very common. Furthermore, it is known that lice infestations cause a decrease in the productive and reproductive parameters of goats (Mellado 2008), this due to effects associated with the presence of lice, such as anemia and abortions (Tongjura et al. 2012); in addition, some species are the cause of irritating problems of the skin and are incriminated in the transmission of some diseases (Iqbal et al. 2014).

Worldwide, parasite infestation continues being a major challenge in the production of small ruminants, like goats (Obi et al. 2014). As mentioned by Uslu et al. (2017), lice infestation is more prone to occurs in the lapse of winter to spring, while, Obi et al. (2014) refers that activities like mating could increase the risk in the spread of these ectoparasites. On the other hand, to control lice infestations it is recommended the use of systemic macrocyclic lactones, like Ivermectin, with an effectivity ranging from 89.5%-100% (Puvajaran 2017). Brown et al. (2005), mentioned that synthetic pyrethroids could be used as treatment for infestations, and should be applied at the same time to whole herd. Delthametrin or

Flumethrin have shown to decrease significantly the adult lice infestations, with an effectiveness that ranges from 62%-100%. As well as possible, the rotation of products could be useful, formulations such as Doramectin, Moxidectin, have proven to be very efficient with just one application, protecting treated animals for more of 40 days (Benelli et al. 2018).

V. CONCLUSION

More research is needed on the diversity and prevalence of goat lice including more regional farms, it is necessary to characterize the managing type in regards to elucidate poor husbandry conditions and mismanagement of ectoparasiticides, and establish programmes on ectoparasite control, and finally to determine their possible capacity as vectors of diseases of interest in public and veterinary health.

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