

# Cattle infestation by lice in Northern Tunisia

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## Keywords

Cattle, Phthiraptera, *Linognathus vituli*, *Bovicola bovis*, *Haematopinus eurysternus*, Tunisia

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## Summary

The reported study was carried out from October 2014 to January 2015 and involved 622 cattle belonging to a dairy farm in North Tunisia. Each animal was examined once for the presence of lice. The infestation prevalence was estimated at 14.3% (89/622). Three louse species were collected: *Linognathus vituli* (2.7%), *Haematopinus eurysternus* (11.4%) and *Bovicola bovis* (0.8%). The co-infestation prevalence was 0.6% and concerned only *B. bovis* and *L. vituli*, collected from four calves (three males and one female). Calves were infested by the three species, *L. vituli* (17.5%), *B. bovis* (5.2%) and *H. eurysternus* (1.0%), whereas adults were only infested by *H. eurysternus* (13.3%). All *H. eurysternus* parasites were found on the tail of the animals, whereas *L. vituli* was present on the whole body. *B. bovis* infested the anterior body parts, mainly the dorsal region (60%) ( $p < 0.05$ ). Clinical signs were observed only in calves under six months. The infested calves showed pruritus (63%) and depilation (37%).

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## ■ INTRODUCTION

Cattle production represents a very important economic activity in all African countries, allowing both daily (milk sale) and occasional (animal sale) cash income to rural populations. Animal breeding significantly decreases because of rural depopulation, an important problem in all African countries. Cattle breeding also has a social role. For example, in a village in Chad called Bagirmi (in Arabic cattle is *bagar* and one hundred is *mia*), the poverty threshold is considered to be the ownership of 100 head of cattle.

The cattle industry is still facing several health problems in Africa. Veterinary authorities, field veterinarians and farmers pay more attention to diseases with high morbidity and lethality such as foot and mouth disease, brucellosis or tuberculosis. On the other hand, endemic parasitic diseases (ectoparasites, gastrointestinal and hemoparasitic infections), which induce lower losses but may concern a high percentage of the population and may last for several years (sometimes the whole life of the animal) are often neglected. For instance, animals infested by ectoparasites are not considered sick and they do not therefore receive specific health care. Among the

ectoparasites, cattle can be infested by four louse species, one is a chewing louse (*Bovicola bovis*) and the others are sucking lice (*Linognathus vituli*, *Solenopotes capillatus*, *Haematopinus eurysternus*) (Dorchies et al., 2012). Louse infestation is an increasing problem as a deltamethrin-resistant *Bovicola bovis* population has been reported since 2014 in the United Kingdom (Sands et al., 2015).

Cattle population in North Africa has been relatively constant in recent years with 2.8, 1.6 and 0.6 million in Morocco, Algeria and Tunisia, respectively (Srairi et al., 2013). The only study regarding louse infestation in Tunisian cattle was published by Gharbi et al. (2013), who estimated the prevalence in Northeast Tunisia at 4.7%. This first study was performed in small extensive farms and involved cattle of different breeds. No survey was carried out in Tunisian intensive farms where animals belong to exotic breeds and are supposed to receive good health care. The aim of this study was thus to estimate the different parasitological indicators regarding louse infestation in an intensive farm of Northern Tunisia.

## ■ MATERIALS AND METHODS

### *Study region and animals*

The present study was carried out in Mateur (Bizerte District, North Tunisia) which is located in the subhumid area. The mean temperatures in winter and summer are 7°C and 32°C, respectively. The mean yearly rainfall varies between 600 and 800 mm.

The survey was carried out from October 2014 to January 2015 in a Holstein-Friesian intensive cattle farm. A total of 622 cattle (525 cows, 36 male calves and 61 female calves) were examined, each

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on one occasion. The animals were on average 4.5 years old (range: 1 day – 11 years).

All the animals were examined for the presence of lice according to the method of Colwell et al. (2001). Briefly, the whole body of each animal was inspected for the presence of lice. In addition, seven anatomical regions were minutely inspected: dewlap, cheeks, muffle, eyes, withers, back line and tail. During the inspection, the hairs were moved apart for careful examination of the skin and of the bottom part of the hairs; for each site, this operation was repeated 4–5 times on a 5-cm<sup>2</sup> area.

All the collected parasites were kept in identified vials containing 70% ethanol. For examination, they were washed with distilled water, incubated in a 10% potassium hydroxide (KOH) solution for two days, then washed in successive solutions of ethanol (30, 50, 70, 90 and 100% concentration) for 10–15 minutes, and finally washed with xylol (Kakar and Kakarsulemankhel, 2009). Species identification was done under microscope at 100 x magnification, according to the key of Price and Graham (1997).

### Parasitological indicators

The infestation prevalence was estimated as follows (Bush et al., 1997) :

Infestation prevalence = 100 x number of infested animals / Number of examined animals.

The infestation intensity was calculated as:

Total number of lice / Total number of infested animals.

### Statistical analysis

Comparisons of percentages were carried out with EPI INFO 2000 using the chi-square test at 5% threshold.

## RESULTS

### Infestation prevalence

A total of 89 animals were infested by lice, corresponding to a prevalence of 14.3%. Three louse species were collected: *Linognathus vituli* (2.7%), *Haematopinus eurysternus* (11.4%) and *Bovicola bovis* (0.8%). The co-infestation prevalence was 0.6% and concerned *B. bovis* and *L. vituli* collected in four calves (three males and one female) (Table I).

Calves were infested by the three species (*L. vituli*: 17.5%; *B. bovis*: 5.2%; *H. eurysternus*: 1.0%), whereas adults were only infested by *H. eurysternus* (13.3%). There was no difference in infestation prevalence between male (19.4%; 7/36) and female (19.7%; 12/61) calves ( $p > 0.05$ ).

### Infestation intensity

The mean infestation intensity was four lice per infested cattle. *H. eurysternus* was the most frequent species but its infestation intensity was low (1.3). On the other hand, the infestation intensity by *B. bovis* and *L. vituli* was relatively high (7.4 and 16.3, respectively). Less than one-year-old calves showed the highest infestation intensity (13.8) (Figure 1).

### Anatomical infested regions

All *H. eurysternus* were found on the tail of animals, whereas *L. vituli* was present on the whole body. *B. bovis* infested the anterior body parts and the dorsal region (60%) (Table II).

### Clinical signs

Clinical signs caused by pediculosis were observed only in calves under six months, which expressed pruritus (63% of the infested calves) and depilation (37%) (Figure 2). The depilation was irregular with discrete erythema of 5–12 centimeter diameters.

Table I

Cattle infestation prevalence and intensity of different louse species in Northern Tunisia

| Animal species                  | Num. of infested calves | Num. of infested cows | Overall prevalence (%) | Overall intensity (range) |
|---------------------------------|-------------------------|-----------------------|------------------------|---------------------------|
| <i>Bovicola bovis</i>           | 5*                      | 0                     | 0.8                    | 7.4 (1-11)                |
| <i>Haematopinus eurysternus</i> | 1                       | 70                    | 11.4                   | 1.3 (1-14)                |
| <i>Linognathus vituli</i>       | 17*                     | 0                     | 2.7                    | 16.3 (1-39)               |
| Total                           | 19/97<br>(19.6%)        | 70/525<br>(13.3%)     | 14.3                   |                           |

\* Four calves were co-infested by *B. bovis* and *L. vituli*

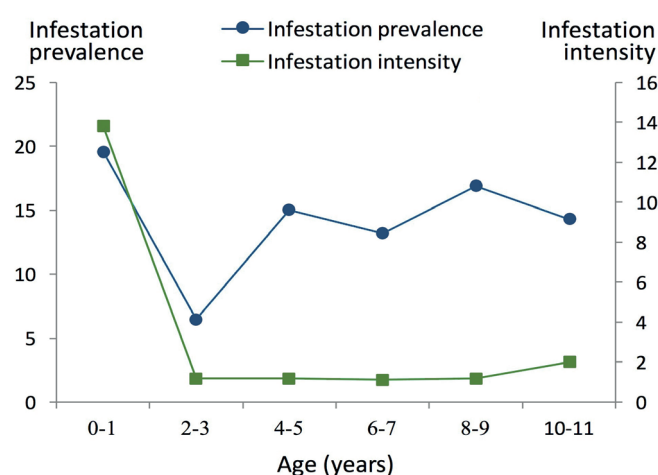


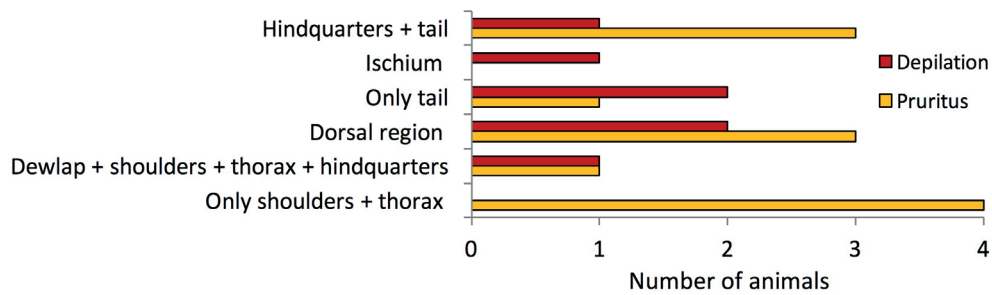
Figure 1: Louse infestation prevalence of examined cattle and intensity according to age in Northern Tunisia.

Table II

Infestation prevalence by lice according to cattle body regions in Northern Tunisia

| Body region              | Num. of positive animals (prevalence in %) |                                 |                             |
|--------------------------|--|---------------------------------|-----------------------------|
|                          | <i>Bovicola bovis</i>                      | <i>Haematopinus eurysternus</i> | <i>Linognathus vituli</i> * |
| Head                     | 1 (20)                                     | 0                               | 3 (21.4)                    |
| Neck                     | 0  | 0                               | 1 (7.1)                     |
| Shoulders + thorax       | 1 (20)                                     | 0                               | 2 (14.3)                    |
| Dewlap                   | 0  | 0                               | 1 (7.1)                     |
| Dorsal line              | 3 (60)                                     | 0                               | 4 (28.6)                    |
| Base of the tail + thigh | 0  | 0                               | 2 (14.3)                    |
| Tail                     | 0  | 71 (100)                        | 1 (7.1)                     |

\* Data are missing on three animals



**Figure 2:** Localisation of clinical signs caused by louse infestation of infested calves in Northern Tunisia.

## DISCUSSION

The present study was carried out in 622 cattle reared in different units of the same intensive cattle farm in Northern Tunisia. It showed that 14.3% of the animals were infested by lice. A lower infestation prevalence (4.6%) was reported in small cattle farms in Northeast Tunisia (Gharbi et al., 2013). The difference in infestation prevalence between the two studies may be caused by several factors: low hygiene practices due to the high number of animals, abiotic factors (temperature and hygrometry) and high animal density in the intensive farm of the present study. However, the prevalence was much lower than that observed in cattle bred in other countries and under different management practices: England and Wales (75%: Milnes and Green, 1999), Iceland (50%: Eydal and Richter, 2010), India (33.2%: Sanjay and Prasad, 2004), Ethiopia (31.4%: Khumsa and Bekele, 2008), and Turkey (27.6%: Colebrook and Wall, 2004).

Three louse species were collected: *Bovicola bovis* (a chewing louse), *Haematopinus eurysternus* and *Linognathus vituli* (two sucking lice or Anoplura). They were also reported by Levot (2000) in Australia. In the present study, all *H. eurysternus* lice were collected from cows except for one from a three-month-old calf, a trend also reported by Geden et al. (1990). On the other hand, *L. vituli* and *B. bovis* were found only in calves, as also found by other authors (Hornok et al., 2010). Few calves were co-infested by *L. vituli* and *B. bovis*, which was also reported by Colwell et al. (2001). Scharff (1962) studied louse infestation in Montana (USA) during three successive winters and showed that *L. vituli* was the predominant species in cattle under 18 months, and that animals older than two years were more infested by *H. eurysternus*. This is consistent with the findings of the present study. However, Kakar and Kakarsulemankhel (2009) found *B. bovis* in animals of all ages, whereas in the present study only calves were infested by this species.

Generally, infested animals do not express symptoms, mainly when the infestation intensity is low. Only calves showed local symptoms during this study, more precisely pruritus in 63% of the infested ones, which sometimes induced a depilation observed in 37% of these calves.

In the present study, infestation prevalence by chewing lice was low since all infested cattle but five calves were infested by sucking lice. Species of this group are more pathogenic since they cause anemia, whereas chewing lice only cause pruritus. Gharbi et al. (2013) mentioned a different trend in small farms as they found a higher prevalence of *B. bovis* (4%) than of Anoplura (0.6%). This could be explained by a potential use of ivermectin by smallholders eliminating sucking lice. Ivermectin is forbidden in lactating cows and was never used in the studied farm. Other authors reported a higher infestation by chewing lice from 26.7% (Colwell et al., 2001) to 97% (Milnes et al., 2003).

The highest infestation prevalence was observed during this study for *H. eurysternus* (11.4%). Infestation prevalence by this species can be very variable. Hussain et al. (2006) thus reported a prevalence varying between 1.9 and 94% in Pakistan.

The dorsal line was the anatomical region that was the most infested by *B. bovis*. Similar findings were reported in the southwest of England where the parasites were present on the dorsal line of 86.4% of the infested animals (Milnes et al., 2003). *H. eurysternus* was only found on the tail as also reported by Matthyse (1946). On the other hand, *L. vituli* infested the whole body without any preference, as also reported by Scharff et al. (1962). It is important to know the exact anatomical localization of lice since it allows the farmer to use insecticides only on infested body parts, allowing then an increase of the treatment effectiveness and a drastic reduction in the quantity of insecticides used.

The present study showed the low infestation prevalence and intensity in cattle in the studied farm, pointing out that the eradication of these parasites from such farms could be obtained at low cost. The results also showed that louse infestation is not a major health problem in the studied cattle farm. Animal health decision makers and field veterinarians should be informed about the clinical (anatomical localization, louse species) and epidemiological features (e.g. regional distribution, infection distribution according to age) of cattle infestation by lice. A standard program should be developed and implemented in louse-infested cattle farms with the aim to decrease the impact of these parasites that mainly affect calves, causing often symptoms of pruritus and depilation.

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## Author contributions statement

MG designed the study, participated in its planning and manuscript drafting; WL collected the data and drafted the first version of the manuscript; MZ participated in the study planning; MJ carried out parasite identification.

## Conflicts of interest

The study was carried without any conflict of interest.

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## Résumé

**Gharbi M., Labibi W., Jedidi M., Zouari M.** Infestation des bovins par les poux au nord de la Tunisie

La présente étude a été réalisée entre octobre 2014 et janvier 2015 sur 622 bovins appartenant à un élevage bovin laitier au nord de la Tunisie. Chaque animal a été examiné une fois afin de détecter la présence de poux. La prévalence de l'infestation a été estimée à 14,3 % (89/622). Trois espèces de poux ont été collectées : *Linognathus vituli* (2,7 %), *Haematopinus eurysternus* (11,4 %) et *Bovicola bovis* (0,8 %). La prévalence de co-infestation était de 0,6 % et concernait *B. bovis* et *L. vituli*, récoltés chez quatre veaux (trois mâles et une femelle). Les veaux étaient infestés par les trois espèces de poux, *L. vituli* (17,5 %), *B. bovis* (5,2 %) et *H. eurysternus* (1,0 %), alors que les adultes étaient infestés uniquement par *H. eurysternus* (13,3 %). Tous les spécimens de *H. eurysternus* ont été retrouvés au niveau de la queue des animaux, tandis que *L. vituli* était présent sur tout le corps. *B. bovis* était observé sur la partie antérieure du corps, principalement la région dorsale (60 %) ( $p < 0,05$ ). Des signes cliniques n'ont été observés que chez les veaux âgés de moins de six mois, les animaux infestés présentant du prurit (63 %) et des dépilations (37 %).

**Mots-clés :** bovin, Phthiraptera, *Linognathus vituli*, *Bovicola bovis*, *Haematopinus eurysternus*, Tunisie

## Resumen

**Gharbi M., Labibi W., Jedidi M., Zouari M.** Infestación del ganado por piojos en el norte de Túnez

El estudio que se reporta se llevó a cabo entre octubre 2014 y enero 2015 e incluyó 622 bovinos pertenecientes a una finca lechera en el norte de Túnez. Cada animal fue examinado una vez para la presencia de piojos. La prevalencia de infestación se estimó en 14.3% (89/622). Se recolectaron tres especies de piojos: *Linognathus vituli* (2,7%), *Haematopinus eurysternus* (11,4%) y *Bovicola bovis* (0,8%). La prevalencia de coinfección fue de 0,6 % y concernió sólo *B. bovis* y *L. vituli*, recolectados en cuatro terneros (tres machos y una hembra). Los terneros estaban infestados con tres especies *L. vituli* (17,5%), *B. bovis* (5,2%) y *H. eurysternus* (1,0%), mientras que los adultos estaban infestados únicamente por *H. eurysternus* (13,3%). Todos los parásitos *H. eurysternus* fueron encontrados en la cola de los animales, mientras que *L. vituli* estaba presente en todo el cuerpo. *B. Bovis* infestó las partes anteriores del cuerpo, principalmente la región dorsal (60%) ( $p < 0,05$ ). Los signos clínicos fueron observados únicamente en terneros de menos de seis meses. Los terneros infestados presentaron prurito (63%) y depilación (37%).

**Palabras clave :** ganado bovino, Phthiraptera, *Linognathus vituli*, *Bovicola bovis*, *Haematopinus eurysternus*, Túnez