The Prevalence of Ectoparasites on Sheep and Goats at EL Khoms Region – Libya

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Abstract: A study on ectoparasites of small ruminants was carried out in four districts of EL-Khoms Region (Jahawat, Gogas, Keaam and Celline), Libya, from November 2007 to September 2008, with the objectives of determining the prevalence and identification of ectoparasites. The results showed that the sheep were infested by only two parasites (ticks and mites) while goats infested by four different parasites (ticks, mites, fleas and lice). Out of 1600 sheep and 520 goats examined, 322 (20.1%) of sheep and 182 (35%) of goats were infested by one or more ectoparasites. The high prevalence of sheep infested by ticks was (40.9%) during the summer season in Celline area, while in mites was (10.9%) during the summer season in Gahawat. While in goats was (9.3%) in Celline during the winter and spring season. Ticks were the most frequent ectoparasites on sheep (18.7%), while fleas were the highest prevalence ectoparasetes on goats (17.9%). The identification showed two different species of tick (*Hyalomma anatolicum anatolicum and Rhipicephalus turanicus),* one species of mites (*Sarcoptes scabiei*), one species of lice (*Linognathus africanus*) and two species of fleas (*Pulex irritans andCctenocephalides canis*). The relationships among these ectoparasites are discussed in terms of flock size, seasonality and the ectoparasitic combinations on the host.

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1. Introduction

The arthropods contain over 80% of all known animal species and occupy almost every known habitat, as well as a plethora of small and little-known groups. As a result of their activity, arthropod ectoparasites may have a variety of direct and indirect effects on their hosts (Wall and Shearer, 2001). Ectoparasites, particularly ticks, are important parasites because of their voracious blood-feeding activity and as vectors for various agents of diseases in both man and livestock (Cumming, 1998; Hendrix, 1998).

The occurrence of ectoparasites in sheep and goats flocks are not reported in Libya but are seldom quantified. Information about ectoparasites existing in sheep and goats flocks has become necessary. Because of certain geographical specifications and the probable presence of different types of ectoparasites, El-Khoms Region (Jahawat, Gogas, Keaam and Celline) was selected for this study. In addition, sheep and goat farming is one of the main animal husbandry activities in El-Khoms Region. Furthermore, the effective long-term control of vector borne disease, and in particular the prediction of changes in patterns of infestation, relies on our understanding the factors that could determine where vector species occur. The key element in planning integrated approaches to pest control is a good knowledge of the epidemiology of the target organism.

The main objectives of this study were to contribute to knowledge of the distribution of the most common sheep and goat ectoparasites fauna by performing epidemiological investigation in this area. We also determined the frequency of ectoparasites and correlating levels of infestations with seasons.

2. Materials and methods

Field study area: El-Khoms City lies in a region between 14º 26´ N and 14º 05´ E. The climate is characterized by a mean annual rainfall of 27.8 mm, mean monthly relative humidity of 72%, and mean temperature ranging from 12 ºC to +28.6 ºC, according to the Libyan Metrological Organization (2005-2006).

Sample size: The 70 farms were selected over the area, the samples were collected from 400 sheep and 130 goats in the four region of El-khoms, which had been previously divided into four sub-areas (Jahawat, Gogas, Keaam and Celline). In each sub-area, sheep and goats to be tested were randomly selected and examined.

The flocks examined followed traditional husbandry practices, with animals grazing during the daytime in all seasons of the year. Animals were mainly crossbreed and indigenous.

Parasitological procedures*:* Tick collection was usually done in the early mornings and in the evenings

from the body of the animal and never from the ground, in order to minimize accidental occurrences from other livestock. Hard ticks were collected individually (goats and sheep) using alcohol by dabbing the tick and the surrounding skin to remove embedded living ticks. Care was taken to ensure that the mouthparts were not left behind during the traction with thumb forceps (Bowman, 1999). Ixodid tick numbers were recorded and ticks were placed into 70% ethanol in glass vials. The vials were individually labeled with the date and place of collection. Data recorded included the predilection site of the ticks (head, ear, neck, axilla, shoulder, back, belly, udder, anogenital area, flanks, front and rear legs, fat tail, and tail). Management practices followed (extensive or intensive); stage of tick collected (larva, nymph, adult); age and sex of the animals, and recent use of acaricide (s). Samples sent from the field to the Parasitology laboratory for identification were also used for mapping the tick.

Deep skin scraping is one of the most common diagnostic tools used in evaluating animals with dermatological problems. Before the skin was scraped the blade was dipped in a drop of mineral oil on the slide. During the scraping process, 6-8 cm2 was scraped.

Upon clinical findings, the skin was scraped for mites that lived in tunnels (e. g. Sarcoptes species) until capillary ooze occurred from the area (Hendrix, 1998). Brushing over moistened, white blotting paper helped to identify fl ea Infestation (Wall and Shearer, 2001). The most practical means of detecting lice was generally inspection of sheep with primary sample units of animals and secondary units of fleece pertaining to multiple body sites and collecting the lice from the body regions (head, neck, flanks, front and rear legs, and belly), (Kettle and Lukies, 1984; James and Moon, 1999; Wall and Shearer, 2001; Ward and Armstrong, 2000).

Examination of ectoparasites*:* Unfed adult hard ticks used in the morphological study were examined by light microscope and each morphological character was measured and recorded.

Hairs collected by coat brushing and plucking were mounted in liquid paraffin, and examined microscopically for evidence of ectoparasites (Wall and Shearer, 2001). For lesions caused by lice, the detritus was scraped into an ointment tin using the cover as carper and then the scrapings were examined under a stereoscope. The scrapings which contained much debris with no lice and mites were digested by potassium hydroxide (10% KOH) for 20 min and centrifuged (Bowman, 1999).

The observed ectoparasites (ticks, mites, lice, and fleas) were identify ed according to the keys of Clifford et al. (1964), Wall and Shearer (2001), and Walker et al. (2003).

3. Results

Laboratory investigation indicated that several kinds of arthropods (tick, mite, lice, and flea), Out of 1600 sheep and 520 goats examined for ectoparasites, 322 (20.1%) sheep and 182 (35%) goats were found to be infested with one or more ectoparasites

The results of this study over four seasons in El-Khoms Region are presented in Tables 1 and table 2 The highest prevalence were noted in summer and spring season (30.7% and 33.5%) while the lowest prevalence in winter and autumn seasons (14.3% and 21.9%) in sheep and goats respectively.

The ticks were the most frequent ectoparasites in sheep. In contrast in goats the fleas were the most common followed with lice. In this study two species of ticks were found (*Hyalomma anatolicum anatolicum* and *Rhipicephalus turanicus*), also were found another two species of fleas (*Ctenocephalides canis* and *Pluex irritans*).

Table 1: Show the prevalence of ectoparasites of sheep and goats during the four seasons in El-Koms.

season	infested Animal		Non infested animals		Total	
	Sheep	Goats	Sheep	Goats	Sheep	Goats
Winter	46(14.3%)	29(15.9%)	427(33.4%)	78(23.1%)	473	107
Spring	103(32.0%)	48(26.4%)	255(20.0%)	83(24.6%)	358	131
Summer	99(30.7%)	61(33.5%)	339(26.5%)	103(30.4%)	438	164
Autumn	74(23.0%)	44(24.2%)	257(20.1%)	74 (21.9%)	331	118
Total	322	182	1278	338	1600	520

Table 2: Show the prevalence of ectoparasites of sheep and goats in the four studies areas in El-Koms.

Regions	infested Animals		Non infested animals	
	Sheep	Goats	Sheep	Goats
Gogas	78(19.5%)	44 (33.8%)	322(80.5%)	86(66.2%)
Keaam	78 (19.5%)	50 (38.5%)	322(80.5%)	80(61.5%)
Celline	93 (23.3%)	43 (31.1%)	307(76.8%)	87(66.9%)
Jahawat	73 (18.3%)	45 (34.6%)	327(81.8%)	85(65.4%)
Total	322 (20.1%)	182 (35.0%)	1278(79.9)	338(65.0%)

On the other hand, were found only one species of lice (*Linognathus africanus*) and mites (*Sarcoptes scabiei*) (Table 3).

The 322 infested sheep consisted in 50 males (infestation rate among males: 25.00%) and 272 females (infestation rate among females: 34.62%). Out of 192 infested goats consisted in 41 male (infestation rate among males: 38.32%) and 151 females (infestation rate among females: 36.56%) (Table 4).

Table 3. Frequency of ectoparasites in relation to flocks of sheep and goats.

8	infested Animals	
	Sheep	Goats
Ticks	300(18.7%)	24 (04.7%)
Mites	22 (01.4%)	03 (00.5%)
Lice	00 (00.0%)	62 (11.9%)
Fleas	00 (00.0%)	93 (17.9%)
Total	322 (20.1%)	182 (35.0%)

4. Discussion

This longitudinal study, extending over four seasons, considered the spectrum of ectoparasites species involved, the levels of infestations, and the seasonal epidemiology of these ectoparasites. With regard to the present study on the ticks, the ticks were present on the animals throughout the year, being most abundant in summer and the least in fall. These findings thus lend support for the peak activity of hard ticks, which is from June to July (Mazlum, 1971; Tavasoli and Rahbari, 1998).

Table 4. Prevalence of ectoparasites in correlation of sex in sheep and goats.

Results		Infested	Non infested	total
sheep	Male	50 (25.00%)	150 (75.00%)	200
	Female	272 (34.62%)	1128 (56.38%)	1400
goats	Male	41 (38.32%)	66 (61.68%)	107
	Female	151 (36.56%)	262 (63.44%)	413

According to Lemos et al. (1985) ticks attacked kinds of animal, those with their bodies fully protected by wool and those without wool. The numbers of ticks on the animals in these two categories did not differ significantly, suggesting that whether wool covered the body completely or left parts of the body uncovered, this did not affect infestation.

In the present study, infestation rate of *Sarcoptes scabiei* was very low in ewe and was observed only in the winter, when the lesions were on the head, neck, and face. With regard to this finding, this mite did not represent one of the most serious welfare concerns amongst sheep farmers, because it was compulsory to dip all sheep in the fall. In addition, organophosphate-based dips have been offered as a broad spectrum control against all the ectoparasites in this region, and dipping remains the most common method of the prevention and treatment of *S. scabiei*. These findings were in close agreement with Murray (1968), Nadalian et al. (1989) and Mazaya and Helmy (2001). Sheep biting lice are host specific ectoparasites that spread mainly by direct contact (Heath et al., 1995), if left uncontrolled, these lice could reduce wool quantity and quality, and cause defects in sheep leather (Wilkinson et al., 1982; Kettle and Lukies, 1982; Heath et al., 1995). *D. ovis* has been shown to be able to complete a life cycle on

goats (Hallam, 1985). In practical terms goats are unlikely to be important in causing infestations in sheep.

The absence of lice during the dry season as a result of environmental influences was observed on sheep and goats. This finding is in accordance with Murray (1968) who suggested that significant lice mortalities may also be caused by rapid reversal of temperature gradients in the fleece as sheep walk from shade into sunlight. Moreover, amount of fleece and shearing were powerful regulating influences, which removed most of the population. It also exposes the remaining lice to environmental influences (high temperature and high solar radiation during summer) and many more die subsequently. Neither of these two parasites, lice and ticks, was treated alone but was always treated in combination with other ectoparasites. This may be a result of conventional dipping practice, where most commercially available dips will treat more than one parasite. Furthermore, lice seem to require the presence of wool for development and survival and this would explain their presence on sheep in the winter, which are covered fully with wool.

5. Conclusion

This study, extending over four seasons, took into consideration the spectrum of ectoparasites species involved, levels of infestations and seasonal epidemiology. In general, the individual climatic conditions of this area and the importance of the animal wealth in the national economy are all factors that call for more efforts to study the ectoparasites problem.

The study of small ruminant ectoparasites is important, not only for livestock but also for humans, since fleas, mites and ticks also parasitize humans, especially those who work in close contact with the affected animals. Much is currently known about ectoparasites infestation of livestock in Libya. In contrast to the frequency of occurrence of these parasites, infestation is not taken into consideration very seriously by farmers, which calls for an extension work to be carried out in this area, a fact that represents an obstacle to the control measures. Therefore, further studies are needed to estimate what economic losses are caused by these parasites and to establish measures for their control.

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