



## Prevalence of Ectoparasites of Goats in Yola North and Yola South Local Government Areas of Adamawa State, Nigeria

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### ABSTRACT

Goats and sheep farming is one of the main animal husbandry activities in Northern and Eastern Nigeria. These animals are reared for meat, milk and ritual sacrifices. A total of one hundred and fifty (150) goats were examined to determine the prevalence of ectoparasite infestation in the study area. The sampled animals were prenumbered for clarity and examination for ectoparasites was done one after the other with plastic brush, forceps and hand lens. The predilection sites were mostly; ears, neck, back, limb and dorsal floor. Sixty-nine (69) goats were infested by one or more ectoparasites with overall prevalence of 46% and the different ectoparasites identified were Ticks, 142 (58.20%), Lice, 49 (20.08%), Fleas, 33 (13.52%), and Mites, 20 (8.20%) respectively which were found to be common among the studied animals. The analysis showed as if there was statistically significant difference ( $P < 0.05$ ) in the prevalence of tick with age of small ruminants while it was relatively higher in adults (58.20%) than younger animals (37.5%). In the sex related ectoparasite infestation, the females' goats had the highest infestation of 72.58% as against 27.27% in males. The highest prevalence of ectoparasites were recorded in July which has the prevalence rates of 77.27% while the least infestations were recorded in March with the prevalence rates of 17.14% respectively. In conclusion, Results revealed that goats in the study area were found to be infested with several species of ectoparasites which demands immediate control program and more intensive epidemiological study at the studied area

**Keywords:** Ectoparasite, Goat, Sheep, Ticks

### INTRODUCTION

Ectoparasites are organisms which spend all or part of their life cycles on the external of another organism, the host, and in the process extract nutriment from it for survival (Cable, 1988). They could live on, puncture, burrow or attach onto the surface of their host causing discomfort, annoyance, weight loss, loss of condition, reduction in milk production and irritation of the skin, which subsequently leads to ulceration and secondary infections. These result on negative effect on animal welfare, animal husbandry, and general quality of goat production (Colebrook and Wall, 2004). Goats rearing are among the most important aspects of agriculture, which has contributed immensely towards the growth and development of the national economy of Nigeria. Ectoparasites also impede the health of sheep and goats by causing them to lose weight, retard growth and reduce productivity. As a result of their activities, arthropod ectoparasites may have a variety of direct and indirect effects on their hosts (Wall and Shear, 2001; Cornall and Wall, 2015). Goats can suffer from a range of ectoparasites and the major ones include ticks, mites, lice, fleas and flies (Zewdu 2010). The ectoparasites feed on body tissue such as blood, skin, and hair. Heavy infestations are associated with anemia as adult female ticks can, for example, suck up to 10 ml of blood. Diseases associated with ectoparasitism include severe lameness, skin damage, hair loss, scale formation, thickening and wrinkling (Uilenberg, 1999; Chhabra *et al.*, 1998), tick paralysis, retchiry, drooling saliva, choraptic mange disease, scabies, and skin lesions (Soulsby, 1978; Handerson, 1986). The saliva and feces of some ectoparasites such as lice contain substances capable of causing allergies giving rise to severe irritations to the



skin (Clark and Milne, 2003). Ectoparasites particularly ticks are important parasites because of their voracious blood-sucking activity and as vectors of various agents of diseases in both humans and livestock (Hashemi-Fesharki *et al.*, 1994; Cumming, 1998). The growing threat of ectoparasites to sheep and goat production and the tanning industry, needs well-coordinated and urgent control intervention (Cornall and Wall, 2015). This study is aimed to determine the prevalence of ectoparasites of goats in Yola North and South L.G.A. of Adamawa state.

## MATERIALS AND METHODS

### Animals and Study Area

The study was carried out in goats at the local cattle market Adamawa state. The animals were originated and purchased from local cattle market which comprises By-pass, Chigari, Ngore, Geire and Song cattle markets within and around the study areas. (By-pass and Chigari markets respectively). The city is situated on altitude 186m. The geographical coordinates are  $09^{\circ}14'N$  and  $12^{\circ}28'E$ . Yola is located on the Benue River. The city is made up of two parts the old (Yola south) and new Yola (Yola north). Jimeta (new Yola) is about 5km North West of the old Yola with latitudes  $7^{\circ}$  and  $11'N$  of the Equator and between longitudes  $11^{\circ}$  and  $14'E$  of the Greenwich Meridian. Yola northern boundary is Mandaras' mountain and in the south by Sh'bshis' mountain with Dimlang (Vogel) peak, the second highest point (2042m) in Nigeria after ChappalWaddi (Mountain of death).

### Sample Collections and Preservations

One hundred and fifty (150) goats were examined for ectoparasites on a monthly basis from Yola north and south L.G.A local cattle markets. Each week during the three (3) months study period, information on age and types of the animals were determined from the physical examination of each sampled animal. Age was estimated by dentition and was based on the number of primary and or permanent incisors pairs in their mouths (Owen, 1981; Gatenby, 1991). For more convenience, the ectoparasites collected were transferred in the specimen containers and preserved using 10% formalin and labeled according to the animals' age and ectoparasites' species. However the specimen container that contains the ectoparasites was however transferred to the Zoological Laboratory, Modibbo Adama University of Technology for further microscopically analysis.

### Examination of Animals for Ectoparasites

The examination of animals was done in the early mornings and evenings on the agreed hours with the farmers. The sampled animals were pre-numbered for clarity and examined one after the other at various body parts with plastic brush, scalpal and forceps. The visible ectoparasites; ticks were picked with forceps into vials with detailed information about the animal examined. The skin and hairs were brushed out onto white background made with white cloth. The emerging ectoparasites were isolated into their respective vials. The morphological features of each ectoparasite were used in their identifications. The results obtained were analyzed using Chi-square.



## Statistical Analysis

Data collected from each studied animals were recorded properly and then analyzed using Chi-square ( $\chi^2$ ) test to determine any significant difference amongst the variables at  $p < 0.05$ .

## RESULTS

A total of 150 goats were examined to determine the prevalence of ectoparasite infestation in yola north and south LGA, Adamawa state. Of these, 69 (46%) goats were infested by one or more ectoparasites and the different ectoparasites identified were Ticks, 142 (58.20%), Lice, 49 (20.08%), Fleas, 33 (13.52%), and Mites, 20 (8.20%) respectively. Ticks were significantly the commonest ectoparasite infesting goats in the area (Table 1). The overall prevalence of ectoparasites for a total of 69 (46%) goats infected; males, 24 (27.27%) and 45 (72.58%) in females respectively, When these values were subjected to statistical test, it showed that there is no significant difference amongst the sex ( $p < 0.05$ ), (Table 2). With regard to age wise comparison, among the 150 examined goats which had 69 (46%) infected ones, and also age related prevalence of ectoparasites on goats were highlighted as follows: 0-6months had 12 (37.5%) infected goats and 31 (12.70%) different no. of parasites species 7-11months had 17 (58.62%) infected goats and 52 (21.31%) venipuncture different no. of parasites species 1-5years had 32 (44.44%) infected goats and 142 (58.20%) venipuncture different no. of parasites species >5years had 8 (47.06%) infected goats and 19 (7.79%) venipuncture different no. of parasites species. When the values were subjected to statistical test, showed no significant difference amongst the age categories ( $p < 0.05$ ), (Table 3).

An overall prevalence of ectoparasites recovered in goats at genera level of ectoparasites species. For ticks species, *Amblyomma spp.* 40(16.40%), *Rhipicephalus spp.* 28 (11.48%), *Boophilus spp.* 74 (30.33%), for Lice species, *Damalinea spp.* 49 (20.08%), for Fleas species, *Ctenocephalids felis* 33 (13.52%), and for Mites species, *Sarcoptes scabiei* 14 (5.74%), *Psoroptes spp.* 6 (2.46%) respectively. Total number of animals affected is less than the summation of individual infestation because same animal was infested by more than one type of ectoparasites, (Table 5). Monthly prevalence of goats ectoparasites infestation shown in (Table 4), indicates that goats examined at the month of July had the highest infestation (77.27%) followed by June with (71.43%), May with (56%) and April with (30%). Lowest infestations were recorded in March with (17.14%) respectively. (Table 4) also showed that goats examined in the month of July indicates the highest mean of (4.6) ectoparasites goats examined followed by March with (4.2), May with (3.4), June with (3.2) and had least mean of (2.5) ectoparasites per goats in the month of April. And the overall mean of (3.5) ectoparasites were emerged.



**Table 1. Prevalence of Ectoparasites amongst the Sampled Goats**

Parasites Identified	No. of Goats Infested	No. of Parasites Recovered (%)
Ticks	28	142 (58.20)
Lice	18	49 (20.08)
Fleas	13	33 (13.52)
Mites	10	20 (8.20)
<b>Total</b>	<b>69</b>	<b>244 (100)</b>

$\chi^2 = \text{Calculated} = 12.000^a$

$\chi^2 = \text{Tabulated} = 16.92$

DF = 9

**Table 2. Sex-related Prevalence of Ectoparasites on Goats**

Sex	No. of goats examined	No. of goats infested	Prevalence (%)
Males	88	24	27.27
Females	62	45	72.58
<b>Total</b>	<b>150</b>	<b>69</b>	<b>46</b>

$\chi^2 = \text{Calculated} = 2.000^a$

$\chi^2 = \text{Tabulated} = 3.84$

DF = 1

**Table 3. Age – related Prevalence of Ectoparasites Amongst Goats**

Age	No. of Goats Examined	No. of Goats Infested (%)	No. of Parasites Recovered (%)
0- 6 months	32	12 (37.5)	31 (12.70)
7-11 months	29	17 (58.62)	52 (21.31)
1-5 yrs	72	32 (44.44)	142 (58.20)
5yrs above	17	8 (47.06)	19 (7.79)
<b>Total</b>	<b>150</b>	<b>69 (46)</b>	<b>244 (100)</b>

$\chi^2 = \text{Calculated} = 12.000^a$

$\chi^2 = \text{Tabulated} = 16.92$

DF = 9

**Table 4. Monthly Prevalence of Ectoparasites Amongst Sampled Goats**

Months	No. of Examined Goats	No. of Infested (%)	No. of Parasites Recovered	Mean
March	35	6 (17.14)	25	4.2
April	40	12 (30)	30	2.5
May	25	14 (56)	48	3.4
June	28	20 (71.43)	63	3.2
July	22	17 (77.27)	78	4.6
<b>Total</b>	<b>150</b>	<b>69 (46)</b>	<b>244</b>	<b>3.5</b>

$\chi^2 = \text{Calculated} = 20.000^a$

$\chi^2 = \text{Tabulated} = 26.3$

DF = 16



**Table 5. Prevalence of Ectoparasites at Genera Level on Goats**

Ectoparasites	Parasite Species	No. of Infested Goats	No. of Parasites Recovered (%)
Ticks	<i>Amblyomma spp.</i>	10	40 (16.40)
	<i>Rhipicephalus spp.</i>	6	28 (11.48)
	<i>Boophilus spp.</i>	12	74 (30.33)
Lice	<i>Damalinia spp.</i>	18	49 (20.08)
Fleas	<i>Ctenocephalides felis</i>	13	33 (13.52)
Mites	<i>Scarcoptes scabiei</i>	7	14 (5.74)
	<i>Psoroptes spp.</i>	3	6 (2.45)
<b>Total</b>		<b>69</b>	<b>244 (100)</b>

$$X^2 = \text{Calculated} = 42.000^a$$

$$X^2 = \text{Tabulated} = 51$$

$$DF = 36$$

## DISCUSSION

The obtained results on ectoparasites affecting goats showed that these animals were highly infested with an overall prevalence of 46%. The common ectoparasites were; lice, ticks, fleas and mites. This supports the findings of (Urquhart *et al.*, 2001; Williamson and Payne, 2001; Kusilaka and Kambarage, 2006) in different parts of Nigeria on small ruminants. This finding suggests the great importance of ectoparasites in goats of the study areas. The absence of improved husbandry practices and inadequate veterinary services, favorable climatic conditions, low input of feeds, and poor awareness of goat owners on the effects of ectoparasites might have strongly contributed for wide occurrence of infestation by ectoparasites. The findings of the current study are in agreement with the previous reports from Ethiopia (Haffize, 2001; Kassa, 2006; Chanie *et al.*, 2010; Mulugeta *et al.*, 2010) and other countries of the world (Madeira *et al.*, 2000, in Brazil; Mohammed, 2006 in Iran) who reported high prevalence and great importance of ectoparasites in small ruminants. Among the relationships between sex of the infested goats and ectoparasite, the females had the highest infestation of 72.58% as against 27.27% in males. The high infestation of females of goats can be attributed to their confinement either during lactation or gestation, which make them less active, low immunity and because of these are subjected to heavy loads of ectoparasite infestation (Veen and Mohammed, 2005). The activities of the males could help in shading off some of these ectoparasites passively, and could also be source of transmission to healthy females during mating.

In specific ectoparasite infestation, ticks were found to be higher in goats with 58.20%. In comparison, there was no significant difference between the both sexes in tick infestations. The age related prevalence of ectoparasites in goats examined was higher among 1 – 5 yrs aged goats with 58.20%. During this age, the animals are known to be very active, struggling to survive on their own and thus become exposed to more infestation. The reduced infestation among older goats (>5 yrs) can be as a result of their number, for the older ones are selectively killed for meat while the remaining few are kept as parent stock for further production. Furthermore, the high infestation of these goats examined can be favoured by overcrowding, warm and humid environment which aids the spread of ticks.



The results of the present study indicated that lice infestations were encountered as the second most prevalent ectoparasites on goats with overall prevalence of 20.08% (Table 1). The prevalence of lice recorded in the present study is higher than the findings of (Haffize, 2001) 1.5 % in goat in Central Ethiopia; (Numery, 2001) 14.5% in goats in Kombolcha, Northeastern Ethiopia, and (Molu, 2002) 1.5 % in goats in Southern rangelands of Oromia, Ethiopia. But this prevalence is lower than those recorded in the eastern part of Amhara region Northeastern Ethiopia of 29.2 % in goats. (Sertse and Wossene, 2007) and the southeastern parts of Tigray of 26.7 % in goats (Mulugeta *et al.*, 2010). Such differences in prevalence might arise from differences in agroecology, season during which the study was conducted, variations in management, breed and health care of goats in the study areas, and the sensitivity of the diagnostic method used. Lice infestation may reflect some other underlying problems such as malnutrition and chronic diseases (Wall and Shearer, 1997). The possible reasons for such high prevalence of lice in the study area include management problems, poor feeding, and inadequate veterinary services. The high infestation rate of the free ranging goats emphasizes the need for optimal management system in goat keeping. The most abundant ectoparasite species in this study was *Boophilus spp.* This species has been reported elsewhere (Kumar *et al.*, 1994, Mulugeta *et al.*, 2010) as one of the major louse of goats. The highest prevalence of ectoparasites were emerged at the months of July which has the prevalence rates of 77.27% while the least infestations were observed within the month of March with the prevalence rates of 17.14% respectively. This may be due to the high occurrence period of ectoparasites and also a more suitable and conducive periods for goats infestations. The predilection sites of infestation were mostly the ears, neck and dorsal floor, which according to (Chandler and Read, 2000) are areas where capillary blood can be reached easily.

## CONCLUSION

Results revealed that 46% of goats in the study area were found to be infested with several species of ticks, lice and flea. This study quantifies the level of ectoparasitic infestation in goats which demands immediate control program and more intensive epidemiological study for detail identification of the constraints of goat health and production and will seek for remedies. The chances of transmission of arthropod borne pathogens to farmers and animal handlers are high, raising high questions of the findings of (Haffize, 2001) 1.5 % in goat in Central Ethiopia; (Numery, 2001) 14.5% in goats in Kombolcha, Northeastern Ethiopia, and (Molu, 2002) 1.5 % in goats in Southern rangelands of Oromia, Ethiopia. But this prevalence is lower than those recorded in the eastern part of Amhara region Northeastern Ethiopia of 29.2 % in goat's zoonoses. The veterinary personnel at the district level and the veterinary technicians at the grassroots level need to be mobilized to implement mass treatment programs for urgent action which need to be repeated regularly with simultaneous awareness creation to the owners.

## RECOMMENDATIONS

Ectoparasitism is still regarded as a serious problem for stock raisings in Nigeria. Cost effective control measures such as clean and well-constructed pens are recommended if



increased productivity of goat meat is to be achieved. With all these in place, ectoparasites infestation can be reduced to a controllable level.

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