Aspects of epidemiology of ectoparasite infestation of sheep and goats in Makurdi, North Central, Nigeria

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SUMMARY

A total of 416 sheep and 624 goats under different management systems in peri-urban areas of Makurdi were examined for ectoparasite infestations for a period of 6 months, October to March 2004. Ninety one (21.9%) sheep and 149 (23.9%) goats were infested with various types of ectoparasites. Ectoparasites identified, and the number of sheep infested were ticks 37 (40.7%), fleas 20 (22.0%), lice 18 (19.8%) and mites 16 (17.6%). For goats, they were ticks 47 (31.5%), fleas 34 (22.8%), lice 39 (26.2%) and mites 29 (19.5%). The commonest species of ticks observed were, *Rhipicephalus evertsi* and *Amblyomma variegatum* while the commonest of mites was *Psoroptes communis*. *Lignognathus* species and *Bovicola* species were the lice observed, and the fleas was *Ctenocephalidis felis*. The level of infestation was highest in extensive (27.0%) and lowest in intensive (7.2%) systems of management. The possibility of transmission of arthropod borne pathogens to humans is high considering the common co-habitation of the animals and man. Routine and strategic control measures should be factored into production to increase profit and health.

Keywords: Management systems, ticks, lice, mites, fleas, ectoparasite, infestation.

INTRODUCTION

Sheep and goats are major sources of meat, wool, skin and farm yard manure for more than 70% of indigenous population of Benue State. Added to these is the high social economic value, as insurance against crop failure, usage for cultural festivities and religious sacrifices (Ayoade, 1999). The productivity of these small ruminants is, however, hampered by several factors amongst, which is ectoparasitism (Adedimiyi *et al*., 1992; James-Rugu and Iwuala, 2000).

Infestation of these animals by ectoparasites could lead to blood loss (due to sucking) and transmission of arthropod borne viral, bacterial, protozoan and ricketsial diseases (Dipeolu, 1975; Opasina, 1985). It could also lead to skin damage, irritation, weight loss and in severe cases death with the consequent socio-economic implications (Dipeolu, 1975).

In rural areas where co-habitation between animals and humans is common, the potential of human infection by some of the ectoparasite borne pathogens are high (Adu, 1980; Soulsby, 1986). Despite these grave consequences, the magnitude and epidemiology of ectoparasite infestation in sheep and goats has not been assessed in Benue State. The objective of this study was, therefore, to determine the presence of ectoparasite infestation of sheep and goats in Makurdi area with a view to suggesting control measures.

MATERIALS AND METHODS

The study area was Makurdi, capital city of Benue State in north central Nigeria. It is located in southern guinea savannah on latitude 7°41' N and longitude 8°37' E and at altitude of 97 meters above sea level. It has an annual rainfall of 130 mm. It has a population of about 0.5 million people, half of which live in the 5 peri-urban council wards as farmers and petty traders.

The list of livestock farmers and the estimated population of sheep and goats in Makurdi Local Government for 2003 was obtained from Benue State Agricultural and Rural development Authority (BNARDA).

A field survey and interview of randomly selected sheep and goats owners and traders in 8 peri-urban council wards were carried out to identify cases of ectoparasite infestation. This was done for 6 months, October 2003 to March 2004.

Sixty-seven livestock farmers (those with at least 6 sheep and 6 goats) were selected from 26 villages in 8 peri-urban wards of Makurdi Local Government Area using multistage cluster sampling techniques. At least 16 sheep and 24 goats were examined at each village per visit of once a week. They were examined for presence of ticks, lice, fleas and mites on the body paying, particular attention to the predilection sites. Parasites, larvae, eggs, skin scrapings as the case may be, were collected into sterile screw-capped test tubes containing 70% alcohol. These were taken to the laboratory and the ectoparasites identified using the methods described by Soulsby (1986). Before each examination, the animal was identified by species, breed, sex, and age (Ayoade, 1999)

Also, the management systems used in rearing of the animals were noted using the method of Dipeolu (1975). The collected data were analysed using percentage, student 't' test and one-way analysis of variance as described by Calvin *et al*. (1997).

RESULTS

Ninety-one (21.9%) of the 416 sheep and 149 (23.9%) of the 624 goats examined were infested with various types of ectoparasite, mostly as mixed infestation (Table 1). Ectoparasites identified and the number of sheep infested with them were, ticks 37 (40.7%), fleas 20 (22.0%), lice 18 (19.8%) and mites 16 (17.6%). For the goats, these were ticks 47 (31.5%), fleas 34 (22.8%), lice 39 (26.2%) and mites 29 (19.5%). For both livestock, ticks were the most common ectoparasite (35.0%), while the least common were mites (18.8%) (Figure 1).

For both sheep and goats, the common species of ticks identified were *Rhipicephalus evertsi*, *Amblyomma variegatum, Boophilus decoloratus*; while *Psoroptes communis* and *Linognathus* species were the common mites and lice respectively. Only one species of flea, *Ctenocephalid felis* was observed.

Of the 91 sheep infested, 48 (52.7%) and 43 (47.3%) were males and females respectively (Table 2). For the 149 goats, 83 (55.7%) and 66 (44.3%) were respectively males and females (Table 3). There was no significant difference ($P>0.05$) in the occurrence of ectoparasites between the sexes.

Table 1. Incidence of ectoparasite infestation in sheep and goats in Makurdi, North Central, Nigeria

	No. animal infested		*% infested*		*Incidence rate (%)*	
Ectoparasites observed	**Sheep**	**Goats**	**Sheep**	**Goats**	**Sheep**	**Goats**
Ticks						
Rhipicephalus evertsi	15	19	16.5	12.8	3.6	3.0
Amblyomma variegatum	9	8	9.9	5.4	2.2	1.3
Boophilus decoloratus	6	8	6.6	5.4	1.4	1.3
Rhipicephalus appendiculatus	5	9	5.5	6.0	1.2	1.4
Haemophysalis leachi leachi	2	1	2.2	0.7	0.5	0.2
Rhipicephalus sanguineus	0	2	0.0	1.3	0.0	0.3
Subtotal	**37**	**47**	**40.7**	**31.5**	**8.9**	**7.5**
Fleas						
Ctenocephalus felis	20	34	22.0	22.5	4.8	5.4
Subtotal	**20**	**34**	**22.0**	**22.5**	**4.8**	**5.4**
Lice						
Linognathus spp	11	25	12.1	16.8	2.6	4.0
Bovicola spp	7	14	7.7	9.4	1.7	2.2
Subtotal	**18**	**39**	**26.8**	**24.2**	**4.3**	**5.8**
Mites						
Psoroptes comunis	13	18	14.3	12.1	3.1	2.9
Sarcoptes scabiei	3	11	3.3	7.4	0.7	1.8
Subtotal	**16**	**29**	**17.5**	**19.5**	**3.8**	**4.6**
Grand total	**91**	**149**	**100.0**	**100.0**	**21.9**	**23.9**

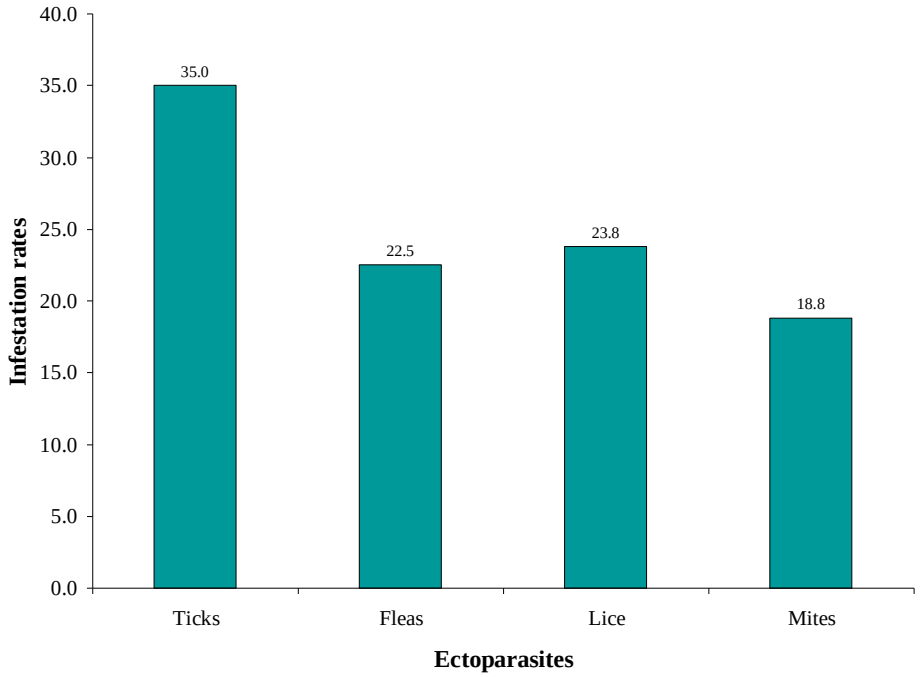

Figure 1. Percentage occurrence of ectoparasite infestation in small ruminants (sheep and goats) in Makurdi, North Central Nigeria

Table 2. Age and sex distribution of ectoparasite infestation in sheep in Makurdi, North Central Nigeria

Age group (years)	*Male*		*Female*		**Total**	
	No. examined	**No. infested**	**No. examined**	**No. infested**	**No. examined**	**No. infested**
0 – 2	78	15 (19.2)*	20	3 (15.0)	98	18 (18.4)
3 – 5	91	18 (19.8)	27	6 (22.2)	118	24 (20.3)
6 – 8	43	10 (23.3)	79	18 (22.8)	122	28 (23.0)
> 8	25	5 (20.0)	53	16 (30.2)	78	21 (26.9)
Total	**237**	**48 (20.3)**	**179**	**43 (24.0)**	**416**	**91 (21.9)**

()* Percentage of the number examined that were infested

Table 3. Age and sex distribution of ectoparasite infestation in goats in Makurdi, North Central Nigeria

Age group (years)	*Male*		*Female*		**Total**	
	No. examined	**No. infested**	**No. examined**	**No. infested**	**No. examined**	**No. infested**
0 – 2	97	21 (21.6)*	78	19 (24.4)	175	40 (22.9)
3 – 4	120	28 (23.3)	88	20 (22.7)	208	48 (23.1)
6 – 8	67	17 (25.4)	46	14 (30.4)	113	31 (27.4)
> 8	71	17 (23.9)	57	13 (22.8)	128	30 (23.4)
Total	**355**	**83 (23.4)**	**269**	**66 (24.5)**	**624**	**149 (23.9)**

()* Percentage of the number examined that were infested

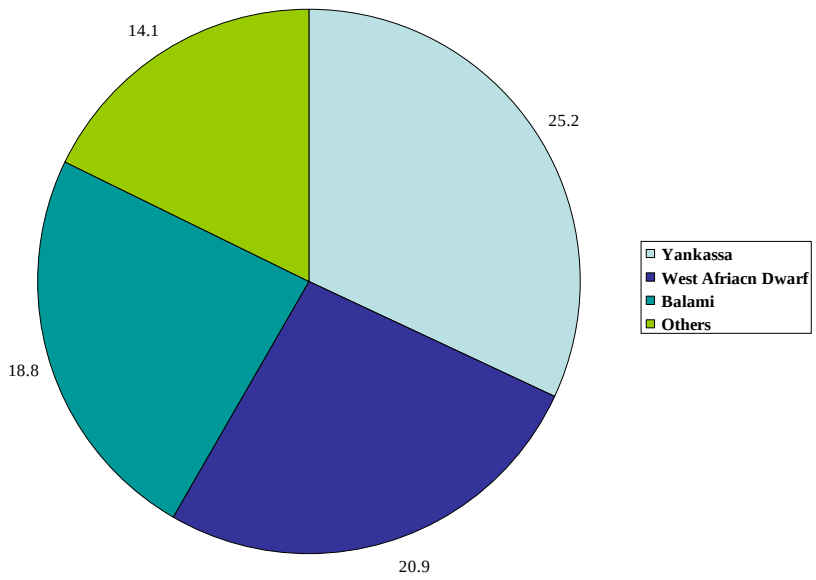

Figure 2. Breed distribution of ectoparasite infestation rates of sheep in Makurdi, north central Nigeria

Occurrence of ectoparasite infestation in sheep was highest in Yankassa breed (25.2%), followed by West African Dwarf (20.9%) (Figure 2). Other breeds, other than Balami (18.8), recorded the least infestation (14.1). For different breeds of goats, Sokoto Red recorded the least percentage occurrence (20.6%). West African Dwarf goat, Kano Brown and others recorded 27.1%, 26.5% and 26.5% respectively (Figure 3). However, there were no significant differences (P>0.05) in the occurrence of ectoparasites between species of the small animal ruminants.

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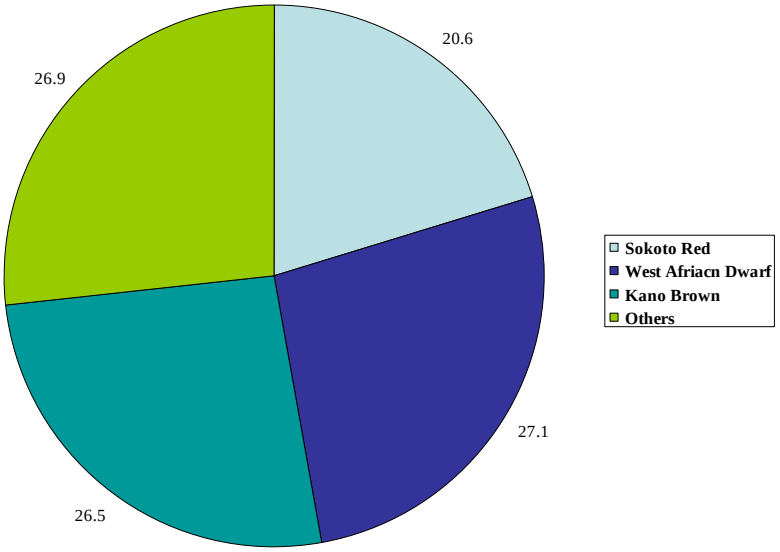

Figure 3. Breed distribution of ectoparasite infestation rates of goats in Makurdi, North Central Nigeria

Table 4. Prevalence of ectoparasite infestation in sheep and goats under different husbandry methods in Makurdi, North Central Nigeria

Husbandry methods	***Number of sheep***		***Number of goats***		**Total number of animals**	
	examined	**Infested**	**Examined**	**infested**	**examined**	**infested**
Intensive	75	6 (8.0)[a]	63	4 (6.3)[a]	138	10 (7.2)[a]
Semi-intensive	246	60 (24.4)[b]	423	107 (25.3)[b]	669	167 (25.0)[b]
Extensive	95	25 (26.3)[b]	138	38 (27.5)[b]	233	63 (27.0)[b]
Total	**416**	**91 (21.9)**	**624**	**149 (23.9)**	**1, 040**	**240 (23.1)**

()* Percentage of the number examined that were infested
Figures in the same column with different superscripts are significantly different (P<0.05) from each other.

Table 2 showed that sheep of age-group above 8 years were more infested (26.9%) than others. For goats (Table 3), the age-group between 6 and 8 years had the

highest infestation rate (27.4%). However, these differences were not significant ($P<0.05$).

Infestation was highest (27.0%) for extensive system and lowest (7.2%) for intensive system of management (Table 4). No acaricide was used in the extensive systems, but was occasionally used in the semi-intensive and routinely used in the intensive system. All the livestock farmers were small holders of average of seven.

DISCUSSION

The present study revealed overall incidence rates of 21.9% and 23.9% in sheep and goats respectively. It also revealed that ticks, lice, fleas and mites are common ectoparasites in Makurdi. These results were close to those of Dipeolu (1975) and Abdullahi *et al*. (2000) obtained for far Northern Nigeria.

In this study, sex, age, species or breed of the animal were not significant factors ($P>0.05$) in ectoparasite infestation, similar to the reports of Ogbe (1998) and Abdullahi *et al*. (2000). It, however, contradicts the earlier findings of Fagbemi (1982) who reported that sheep were more susceptible to ectoparasite infestation than goats. There is a need, therefore, to undertake more study into the influence of species in the predilection of ectoparasite in this area.

We also found no association between sex or age and ectoparasitism. The infestation rate observed in the three main management systems were close to those obtained by Dipeolu (1975) and Abdullahi *et al*. (2000) for Bauchi area. It is, however, significantly less ($P>0.05$) than 41.0%, 35.0% and 23.0% for extensive, semi-intensive and intensive systems respectively obtained by Ogunsisi *et al*. (1998) for Ondo State of south western Nigeria.

The higher rates of infestation obtained in this study may be due to poor nutrition especially during the dry season when the study was done. The inclusion of market or trade sheep and goats, which are normally more infested (Sunderg and Mack, 1985), may have also contributed to the infestation.

Some of the ticks identified, *Rhipicephalus evertsi*, *Amblyomma variegatum* and *Boophilus decoloratus* are known to be capable of transmitting protozoan and ricketsial disease from animals to man (Un-Swoth, 1952; Dipeolu, 1975). The mite *Sarcoptes scabiei* is highly infectious to man (Soulsby, 1986) and the lice *Linognathus caprae* has become nuisance irritants among goat traders.

Infestation of the small ruminants, sheep and goats, by hard ticks, mites and fleas were high in Makurdi, Nigeria. The incidence rates were higher in those raised by extensive than those by semi-intensive and intensive systems. The chances of transmission of arthropod borne pathogens to farmers and animal handlers are high, raising high questions of zoonoses. It is recommended that periodic and strategic ectoparasite control programme should be instituted by every livestock owner.

Broad sanitary condition, adequate nutrition and proper housing should be provided to reduce infestation to an economic level. Personal hygiene of animal handlers is also recommended to avoid animal to man transmission of the arthropod-borne diseases.

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