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Preliminary study of the epidemiology of ectoparasite infestation of goats and sheep in Makurdi, north central Nigeria

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Abstract
A total of 416 sheep and 624 goats under different management systems in Makurdi and its environs were examined for ectoparasite infestation for a period of 6 months, October, 2003 to March, 2004. Ninety one (21.9%) of the sheep and 149 (23.9%) of the goats were infested with various types of ectoparasites. The ectoparasites identified, and the number of sheep infested were ticks, 37 (8.9%), fleas, 20 (4.8%), lice, 18 (4.3%) and mites, 16 (3.8%). For goats, these were, ticks, 47 (7.5%), fleas, 34 (5.4%), lice, 39 (6.3%) and mites 29 (4.6%). The commonest species of ticks encountered were, Rhipicephalus evertis and Amblyoma variegatum while that of mites were Psoroptes communis and Sarcoptes species. The genera of lice recovered were Linognathus species and Bovicola species. Ctenocephalidis felis was the only species of fleas observed. Sex, age or breed of goat was not a significant factor ($P > 0.05$) in the ectoparasite infestation. However, a significant difference ($P < 0.05$) was recorded in breed distribution of ectoparasite infestation in sheep with Yankassa being the most affected followed by West African dwarf. The level of infestation was highest in extensive (24%) and lowest in intensive (7.2%) systems of management. Routine and strategic control measures should be employed to improve the health of these ruminants in order to minimize the expected profit of production and reduce cases of vector-borne diseases in the animals and handlers.

Key words: Epidemiology, Ectoparasite infestation, Ruminants, Makurdi, Nigeria.

Introduction

Sheep and goats are major sources of meat, skin and farm yard manure for more than 60% 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, 2000). The productivity of these small ruminants is, however, hampered by several factors amongst which is ectoparasitism.

Infestation by ectoparasites could lead to skin damage, irritation, cases of vector-borne diseases, weight loss, and in severe cases death with the consequent socio-economic implications (Dipeolu, 1975). The ticks, Rhipicephalus evertis, Amblyoma variegatum and Boophilus dacoloratus anr known to be capable of transmitting both protozoan and ricketsial diseases from animals to animals and from animals to man (Iwuala and Okpara, 1978a). The mite, Sarcoptes scabei is highly infectious to animals and humans (Soulsby, 1986), the lice, Linognathus caprae are nuisance irritants among goats and goat traders (Adediminiyi *et al.*, 1992). In rural areas where co-habitation between animals and humans are common, the potential of human infection by some of the ectoparasite borne pathogens are high (Soulsby, 1986). Despite these grave consequences to animals and man, the magnitude and epidemiology of ectoparasite infestation in sheep and goats has not been assessed in Benue State. The objective of the current study was to determine the presence, and magnitude of ectoparasite infestation of sheep and goats in Makurdi area of Benue State with a view to suggesting control measures for increased productivity and human health.

Materials and Methods

Study area

The study area is Makurdi, capital city of Benue State in north central Nigeria. It is located in the southern guinea savannah on latitude 7o41′ north and longitude 8o37′ east at altitude of 97 meters above sea level. It has an annual rainfall of 1300 millimetres. It has a population of about 0.5 million people, half of which live in the five peri-urban council wards as farmers and petty traders.

Field Survey

A field survey and interview of randomly selected sheep and goat owners and traders in the city and seven peri-urban council wards were carried out to identify the level of ectoparrasite infestation in sheep and goat. The multi-stage cluster sampling technique was used in the selection of the wards, the villages or quarters, and the sheep and goat farmers (Calvin *et al.*, 1977).

Twenty six villages or quarters and 67 farmers with at least either 8 sheep or 8 goats were selected. Each visit to a village or quarter was once a week and for each visit at least 16 sheep and 24 goats were examined for presence of ticks, lice, fleas and mites from October, 2003 to March, 2004. Parasite's larvae, eggs and 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). A total of 416 sheep and 624 goats were examined for the 6 months.

During the visits the sex and breeds of the infested animals and the type of management system used were also noted using the method of Dipeolu (1975). The ages of the animals were also determined using the methods described by Opasina (1985). The data obtained were analyzed using percentages, student t-test and one-way analysis of variance (ANOVA) as described by Calvin *et al.* (1997).

Results

The ectoparasites identified comprising of ticks, fleas, lice and mites and the number of animals infested are shown in Table I and Figure I. Ninety one (21.9%) of the 416 sheep and 149 (23.9%) of the 624 goats examined were infested with various types of these ectoparasites.

Table I and Figure I reveal that tick infestation rate was higher in sheep (8.9%) than in goats (7.5%), while infestation rates of fleas, lice and mites were higher in goats (5.4%, 6.5% and 4.6% respectively) than in sheep (4.8%, 4.5% and 3.8% respectively). However, the difference in the infestation rates of sheep and goats with these ectoparasites was statistically insignificant ($P > 0.05$).

For both sheep and goats six species of ticks were identified with Rhipicephalus evertsi being the commonest (3.6%) in sheep; 3.0% in goats. The only flea

identified was Ctenocephalid felis. Two genera of lice (Bovicola species and Linognathus species) and two genera of mites (Psoroptes communis and Sarcoptes species) were also recovered.

The sex, age and breed distribution of infestation are shown in Tables II, III and IV respectively. Of the 91 sheep infested, 48 (52.7%) and 43 (47.3%) were males and females respectively; while for the 149 goats, 83 (55.7%) and 66 (44.3% were respectively males and females. The breeds of sheep examined were mainly Yankassa (52.4%), West African Dwarf (20.7%) and Balami (11.5%); while the breeds of goats were Sokoto red (47.4%), West African Dwarf (15.4%) Kano brown (18.1%) and other crosses (19.1%).

Though the females of these small ruminants (sheep and goats) recorded higher infestation rates (Tables II and III) than the males, there were no significant differences ($P > 0.05$) in the infestation rates between the males and females.

Table IV and Figure II show breed distribution of ectoparasite infestation in sheep. The differences in infestation rates between Yankassa, West African Dwarf and Balami breeds were not significant ($P > 0.05$). Also there were no significant differences ($P > 0.05$) between West African Dwarf, Balami and "Others". However, a significant difference ($P < 0.05$) existed between Yankassa and "Others".

The breed distribution of ectoparasite infestation in goats is shown in Table V and Figure III. No significant differences ($P > 0.05$) were recorded between the different breeds of goats examined in this study. However, Sokoto Red recorded the least infestation rate (20.6%) as against 27.1% recorded by West African Dwarf.

Ectoparasite infestation rates in different husbandry systems of management are shown in Table 4 and Figure 4. Infestation rates were significantly higher ($P < 0.05$) in semi-intensive (25%) and extensive (27%) than in the intensive (7.2%). No acaricide has ever been used in the semi-intensive and extensive systems but was occasionally used in the intensive system. All the farmers were, however, small holders of these ruminants.

Table 1: Incidence of ectoparasite infestations in sheep and goats in Makurdi, North Central Nigeria

Ectoparasites observed	No. sheep infested (%)*	No. goats infested (%)	Total (%)
Ticks			
Rhipicephalus evertsi	15 (3.6)	19 (3.0)	34 (3.3)
Amblyomma varigatum	9 (2.2)	8 (1.3)	17 (1.6)
Boophilus decoloratus	6 (1.4)	8 (1.3)	14 (1.3)
Rhipicephalus appendiculatus	5 (1.2)	9 (1.4)	14 (1.3)
Haemophysalis leachi	2 (0.5)	1 (0.2)	3 (0.3)
Rhipicephalus sanguineus	0	2 (0.3	2 (0.2)
Sub-total	37 (8.9)	47 (7.5)	84 (8.1)
Fleas			
Ctenocephalis felis	20 (4.8)	34 (5.4)	54 (5.2)
Sub-total	20 (4.8)	34 (5.4)	54 (5.2)
Lice			
Linognathus spp	11 (2.6)	25 (4.0)	36 (3.5)
Bovicola spp	7 (1.7)	14 (2.2)	21 (2.0)
Sub-total	18 (4.3)	39 (6.3)	57 (5.5)
Mites			
Psoroptes communis	13 (3.1)	18 (2.9)	31 (3.0)
Sarcoptes scabei	3 (0.7)	11 (1.8)	14 (1.3)
Sub-total	16 (3.8)	29 (4.6	45 (4.3)
Grand total	91 (21.9)	149 (23.9)	240 (23.1)

()* percentage of total number of animals examined (sheep = 416; goats = 624)

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

Age group	Male sheep		Female sheep		Total	
(years)	Examined	Infested	Examined	Infested	Examined	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 of goats in Makurdi, North Central Nigeria

Age group	Male goats		Female goats		Total	
(years)	Examined	Infested	Examined	Infested	Examined	Infested
0 – 2	97	21 (21.6)	78	19 (24.4)	175	40 (22.9)

3 – 5	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

Table 4: Breed distribution of ectoparasite infestation of sheep in Makurdi, North Central Nigeria

Age group (years)	Yankassa		West African Dwarf		Balami		Others	
	Examined	Infested	Examined	Infested	Examined	Infested	Examined	Infested
0 – 2	50	9 (18.0)	26	5 (19.2)	9	2 (22.2)	13	2 (15.4)
3 – 5	57	16 (28.1)	28	5 (17.9)	10	1 (10.0)	23	2 (8.7)
6 – 8	64	17 (26.6)	18	4 (22.2)	21	4 (19.0)	19	3 (15.8)
> 8	47	13 (27.7)	14	4 (28.6)	8	2 (25.0)	9	2 (22.2)
Total	218	55 (25.2)^{a}	86	18 (20.9)^{ac}	48	9 (18.8)^{ac}	64	9 (14.1)^{bc}

( ), Percentage of the number examined that were infested.
Figures in the parentheses with different superscript are significantly different (P < 0.05)

Table 5: Breed distribution of ectoparasite infestation of goats in Makurdi, North Central Nigeria

Age group (years)	Sokoto Red		West African Dwarf		Kano Brown		Others	
	Examined	Infested	Examined	Infested	Examined	Infested	Examined	Infested
0 – 2	59	13 (22.0)	17	6 (35.3)	23	11 (47.8)	26	10 (38.5)
3 – 5	99	20 (20.2)	29	9 (31.0)	28	7 (25.0)	43	12 (27.9)
6 – 8	85	15 (17.6)	31	57 (23.8)	41	7 (17.1)	31	4 (12.9)
> 8	53	13 (24.5)	19	6 (31.6)	21	5 (23.8)	19	6 (31.6)
Total	296	61 (20.6)	96	26 (27.1)	113	30 (26.5)	119	32 (26.9)

( ), Percentage of the number examined that were infested

Table 6: Incidence of ectoparasite infestation of sheep and goats under different husbandry methods in Makurdi, North Central Nigeria

Husbandry methods	Number of sheep		Number of goats		Total number of animal	
	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)	1040	240 (23.1)

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

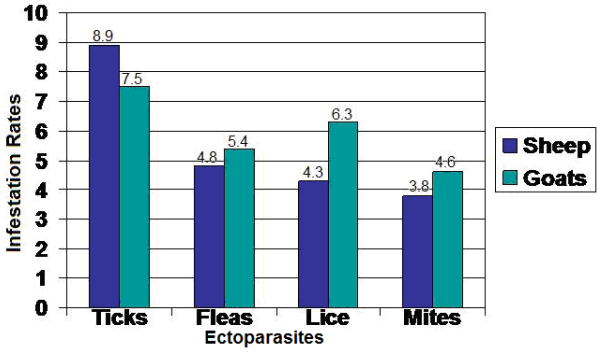

Figure 1: Incidence rates of ectoparasite infestations in sheep and goats in Makurdi, North Central Nigeria

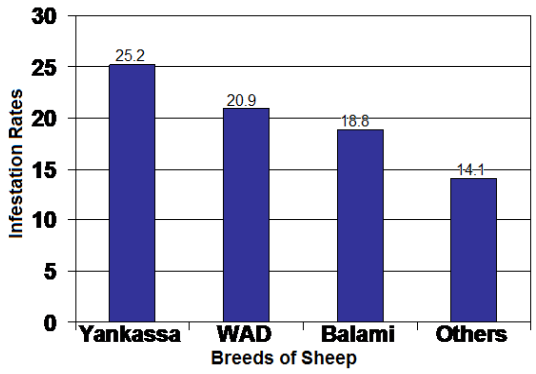

Figure 2: Percentage breed distribution of ectoparasite infestation of sheep in Makurdi, North Central Nigeria

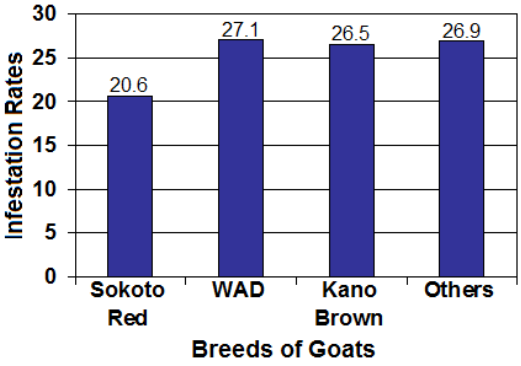

Figure 3: Percentage breed distribution of ectoparasite infestation of goats in Makurdi, North Central Nigeria

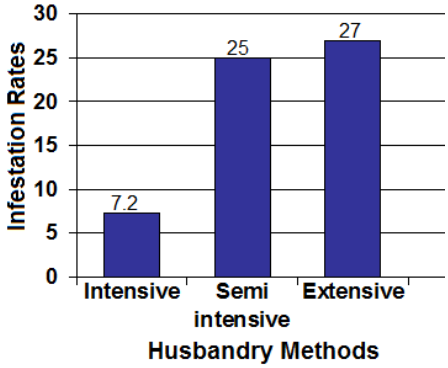

Figure 4: Percentage occurrence of ectoparasites in different husbandry methods in Makurdi, North Central Nigeria

Discussion

The study revealed overall incidence rates of 21.9% and 23.9% in sheep and goats respectively with no significant difference ($P > 0.05$) between the two. This finding suggested that sheep and goats are equally susceptible to the identified ectoparasites in this study. This contradicts the earlier findings of Fagbemi (1982) and Edoga (2005) who reported that sheep were more susceptible to ectoparasite infestation than goats. The present study also revealed that ticks, lice, fleas and mites were common ectoparasites with tick topping the table in both sheep and goats. These findings were close to those of Dipeolu (1975) and Abdullahi *et al.* (2000) in northern Nigeria.

In this study, sex, age or breed of goats was not a significant factor ($P>0.05$) in eectoparasite infestation; and thus suggesting that ectoparasite infestation rate in goats is not dependent on any of these factors. These observations corroborated those of Ogebe (1998) and Abdullahi *et al.* (2000). This was not the case in sheep where a significant breed difference ($P < 0.05$) was recorded between Yankassa and "Others". The possible reasons for the difference were outside the scope of this present study. However, this observation suggested that other breeds other than West African Dwarf and Balami were significantly ($P < 0.05$) less susceptible to ectoparasite infestation than Yankassa breed. There is a need, therefore, to undertake more study into the influence of breeds in the predilection of ectoparasites in this area.

No association was recorded between sex or age of these ruminants in ectoparasitism. The infestation rates observed in the three main management systems corroborated those obtained by Dipeolu (1975) and Abdullahi *et al.* (2000) for Bauchi area. The study revealed that ectoparasite infestation rates were significantly ($P < 0.05$) reduced in intensive system of management.

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 as well as the inclusion of market or trade sheep and goats which were normally more infested.

Some of the ticks identified, Rhipicephalus evertsi, Amblyomma variegatum and Boophilus decoloratus are known to be capable of transmitting protozoan and ricketsial diseases from animals to man. The mite Sarcoptes scabei is highly infectious to man (Soulsby, 1986) and the lice Linognathus caprae has become nuisance irritants among goat traders.

Conclusion/Recommendation

Infestation of sheep and goats by ixotid ticks, mites, lice, and fleas were common in Makurdi. The incidence rates were higher in those raised by extensive and semi-intensive than those by intensive system. It is recommended that periodic and strategic ectoparasite control programme should be instituted by every livestock owner.

Sanitary conditions, adequate nutrition and proper housing should be provided for sheep and goats to reduce infestation to an economic level. Personal hygiene of animal handlers is also recommended to avoid zoonotic transmission of arthropod-borne diseases.

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References

Abdullahi, U.S.; Egbo, M.I.; Musau, B.S. (2000). A survey of ectoparasites and ectoparasitic condition of small ruminants in Bauchi metropolis and its environs. *Proceedings of the 25th Annual Conference of Nigeria Society for Animal Production, Michael Okpara University of Agriculture, Umudike, March 19 – 23, 2000*. pp. 280 – 281.

Adediminiyi, B.; Ogunleye, J.; October, J.; George, J.B.D. (1992). Louse and mites infestation in domestic animals in Northern Nigeria. *Trop. Ani. Hlth. Prod*. **24**(2): Pp. 213 – 219.

Adu, I.F. (1980). Sheep farming in Nigeria. *Nat. Ani. Prod. Res. Inst. Bull*. 3, 19 – 46.

Ayoade, J.A. (2000). Problems and prospect of small ruminant production in Benue State. *Proceedings of the Annual Conference of Nigeria Society for Animal Production. Michael Okpara University of Agriculture, Umudike, March 19 – 23, 2000*. pp. 150 – 151.

Calvin, W.S.; Hans, P.R.; Charles, E.T. (1977). *Epidemiology in Veterinary Practice (1st edition)*. Lea and Febiger, Philadelphia. pp. 38 – 42.

Dipeolu, O.O. (1975). Survey of blood parasite in domestic animals in Northern Nigeria. Historical

review (1923 – 1966). Trop. Ani. Hlth. and Prod. 2: 49 – 52.

Edoga, E.O. (2005). Breed susceptibility to ectoparasitic infestations in small ruminants managed under semi-intensive system. *J. Ani. Prod*. (in press).

Fagbemi, B.O. (1982). Effect of Ctenocephalides felis and strongylus infestation on the performance of West African Dwarf goats and sheep. *Veterinary Quarterly*, **4**(2): 92 – 95.

Iwuala, M.O.W.; Okpala, I. (1978a). Studies on the ectoparasitic fauna of Nigerian livestock. 1. Types and distribution pattern on host. *Bul. Ani. Hlth. and Prod. in Afr*, **26**: 339 – 349.

James-Rugu, N.N.; Iwuala, M.O.E. (2000). Ectoparasitic of some domestic animals on the Jos Plateau, Nigeria. *Sci. Forum*, **5**: 146 – 156.

Ogebe, P.O. (1998). Factors affecting the presence and spread of ectoparasitism in sheep and goats in Agbowo area of Ibadan. *J. Ani. Prod*. **5**: 146 – 156.

Opasina, B.A. (1985). Health problems of market-purchased sheep and goats in South West Area of Nigeria. *Nig. Vet. J*., **14**(1): 14 – 17.

Soulsby, E.J.L. (1986). *Helminths, Arthropods and Protozoa of Domesticated Animals (7th edition)*. Baillere' Tindall, London. Pp. 291 – 318.

Sunberg, J.E. and Mack, S.J. (1985). Village production West African Dwarf goats and sheep in South West Nigeria. *Trop. Ani. Hlth. Prod*. **17**:135 – 140.

Ugochukwu, E.I. and Ephraim, B.U. (1985). An analysis of prevalence of disease of domestic animals at Veterinary clinic Calabar. *Nig. Vet. J*. **14**(1): 10 – 12.

Un-Swoth, K. (1952). The ixodid parasites of cattle in Nigeria with particular reference to the Northern Territories. *Anl. Trop. Med. Parasitol.*, **46**:331 – 335.