

Original Research Article

Epidemiology of Ectoparasites Infestation in Jos North, Plateau State, NigeriaKaze Paul Davou¹, Dogo Goni Abraham¹, Tanko James, Bialla Markus¹, Kogi Cecilia Asabe¹¹Department of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, University of Jos, Nigeria***Corresponding Author:**

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Abstract: A total of 54(47.4%) sheep and 60(52.6%) were observed infested with ectoparasites. The overall prevalence rate was 114 (100%). The major identified ectoparasites in sheep and goats were, ticks (47.3%, 52.7%), lice(27.1%, 72.9%), mite(42.0%, 58.0%), and fleas(28.6%, 71.4%) respectively. Six species of hard ticks (ixodidae) were found the animals examined consisting of *Rhipicephalus evertsi* (44.3%,55.7%), *Amblyomma variegatum* (52.0%, 48.0%), *Boophilus decloratus* (45.5%, 55.5%), *R. appendiculatus* (39.1%, 60.9%), *Heamaphysalis leachi leachi* (66.7%, 33.3%), *R. sanguineus* (56.3% 43.8%), one species of fleas (*Ctenocephalis felis* 28.65, 71.4%), two species of lices, *Linognathus* species (30.6%, 46.4%), and *Bovicola* species (20.0%, 80.0%) respectively. *Psoroptes comunis* (41.9%, 58.1%) and *Sarcoptes scabiei* (42.1%, 58.1%) were the identified mites in the study. The possible transmission of arthropod borne diseases to human may attributed by the co-habitation of the infested animals and Man. Routine and strategic control measures should be factored into production to increase profit and good health.

Keywords: Epidemiology of Ectoparasites Infestation In Jos North, Plateau State, Nigeria

INTRODUCTION

Parasitism is a type of symbiotic relationship between organisms of different species where one organism, the parasite benefit at the expense of the other host. The infestation of animal caused by the ectoparasites lice, ticks, mites, fleas is called ectoparasites. Sheep and goats are the major source of meat, wool, skin and farm yard manure, added to these is the high social economic value, as insurance against crop failure, usage for cultural festivities and religious sacrifice [1]. The productivity of these small ruminants is how ever hampered by several factors amongst which are ectoparasitism [2].

In rural areas where co-habitation between animals and human is common, the potential of human infection by some of the ectoparasite borne pathogens are high [3]. Despite these grave consequences, the magnitude and epidemiology of ectoparasite infestation in sheep and goats has not been accessed in Plateau State. Ectoparasite of sheep and goats do not generally cause heavy mortalities unless the infestation are extreme, but they will cause unthriftiness and loss of production if not controlled. Animals in poor health or low level of nutrition are more likely to be affected and young animals are more susceptible.

Ectoparasite has major effects on the husbandry, productivity and welfare of livestock. These obligate parasites live on puncture or burrow into the

surface of their host's epidermis to feed or shelter. Ectoparasites are responsible for economic losses to livestock producer. Direct losses are results of discomfort and damage caused by the parasites. Discomfort results in drop in milk production and retarded growth rate. Ticks, mites, lice and fleas cause direct damage to the skin and other subcutaneous tissues. The presence of salivary and faecal antigens from burrowing ectoparasite may result in significant hypersensitivity in some animals. Feeding activity of the ectoparasite may result in significant blood loss, secondary infestations, purities, escoriation and in some cases premature death [4]. Indirect losses are due to diseases transmitted by ectoparasite. This study therefore is aimed at determining the epidemiology of ectoparasite infestation in sheep and goats and relate it to their sex and age.

MATERIALS AND METHODS**Study Area**

The study area was Jos, Capital city of Plateau State in north central Nigeria. It covers 8600km² and is bounded by 300-600 metre escarpments around much of its circumference with an average altitude of 1280meter above sea level. It has a population of 900, 000 resident based on the 2006 census.

Jos enjoys a more temperate climate than much of the rest of Nigeria. Average monthly temperature range from 18^oc (16.4 of) – 25^oc (77.0 ^of)

and from mid November to late January, night time temperatures drops as low as 11°C (52°F) resulting in chilly nights. Hail sometime fall during the rainy season, owing to cool high altitude weather. These cooler temperatures have meant that from colonial times until the present day, Jos is a favourite holiday location for both tourist and expatriates based in Nigeria.

Jos receives about 1400 millimetres (55 inches) of rainfall annually, the precipitation arising from high convection and orographic sources, owing to the location of the city on the Jos plateau.

The study was carried out in district selected from Jos northern Central in plateau state namely Kabong, Nassarawa Gwom and Angwansoya respectively. At least 50 sheep and 50 goats were examined at each village within the mentioned districts per visit of once a week.

ECTOPARASITES COLLECTION AND IDENTIFICATION

Ticks, lice, mites and fleas were collected manually from their sites of attachment. The ticks were removed from the host skins while retaining their mouth parts for identification using forceps. Coat brushing techniques were used for collection of lice. They were placed in labelled universal bottles containing 70% ethanol and identified according to the descriptions of Walker *et al.* [5] (ticks, lice, mite and fleas).

MATERIALS

- Lab Coat
- Hand gloves
- Forceps
- Coat brush
- Universal bottles
- 70% ethanol

RESULT AND DISCUSSION

Results

The result obtained from the study is presented in the tables below:

Table-1: Prevalence of Ectoparasites In Relation To Study Area

Study areas	No. of sample examined	No. of Sample infected	Percentage infected	χ^2	P value
Kabong	50	37	74.0	19.956	0.001
Nassarawa Gwom	50	29	58.0		
Angwan Soya	50	48	96.0		
Total	150	114	76.0		

Table 1 above shows the prevalence of ectoparasites in the study area. The result indicated that the overall prevalence is 76.0%. Distribution of the prevalence according to the study sites shows a

statistically significance difference ($P < 0.05$) with the highest rate in Angwan Soya (96.0%), Kabong (74.0%) while Nassarawa Gwom (58.0%) having the least.

Table-2: Distribution of Ectoparasite According to Sampling Sites

Study areas	Ticks	Mites	Lice	Fleas	Total	χ^2	P value
Kabong	51(51.0)	14(14.0)	29(29.0)	6(6.0)	100(100.0)	4.616	0.594
Nassarawa Gwom	40(43.0)	14(15.1)	34(36.6)	5(5.4)	93(100.0)		
Angwan Soya	74(51.0)	22(15.4)	44(30.8)	3(2.1)	143(100.0)		
Total	165(49.1)	50(14.0)	107(31.8)	14(4.2)	336(100.0)		

Distribution of ectoparasite in relation to the study area is as presented in table 2 above. Kabong and Angwan Soya recorded the highest proportion of Ticks (51.0%) each. Mites recorded 15.4% infestation rate in

Angwan Soya while lice had 36.6% in Nassarawa gwom. However, fleas were observed as least in all the study areas. The distribution of these rates shows no significant difference ($P > 0.05$).

Table-3: Number of Animal Examined With Ectoparasites in The Study Area

Study areas	No. of sheep infected	No. goats infected	Total infected	χ^2	P value
Kabong	15(40.5)	22(59.5)	37(100.0)	2.210	0.331
Nassarawa Gwom	17(58.6)	12(41.4)	29(100.0)		
Angwan Soya	22(45.8)	26(54.2)	48(100.0)		
Total	54(47.4)	60(52.6)	114(100.0)		

Result of number of animals examined with ectoparasites in the study areas is presented in table 3. In Kabong, the infection rate is higher in goats (59.5%)

than in sheep (40.5%). In Angwan Soya, goat and sheep infested are 54.2% and 45.8% respectively. Also in Nassarawa gwom, the infestation with sheep (58.6%)

while goats had 41.4% respectively. However, no significant difference was observed in these study sites ($P > 0.05$).

Table-4: Number of Animals Examined With Ectoparasites According To Sexes in the Study Area

Study areas	Sheep					Goats				
	M	F	Total	χ^2	P	M	F	Total	χ^2	P
Kabong	9(60.0)	6(40.0)	15(100.0)	1.049	0.592	12(54.5)	10(45.5)	22(100.0)	0.069	0.966
Nassarawa Gwom	12(70.6)	5(29.4)	17(100.0)			6(50.0)	6(50.0)	12(100.0)		
Angwan Soya	12(54.5)	10(45.5)	22(100.0)			14(53.3)	12(46.2)	26(100.0)		
Total	33(61.1)	21(38.9)	54(100.0)			32(53.3)	28(46.7)	60(100.0)		

Table 4 above shows the result animals examined with ectoparasites in relation to sexes of the animals. The study in sheep shows that the male had the highest rate in all the study area when compared with the female. However, no significant difference was

found across the study sites ($P > 0.05$). A similar result was observed in goats except in Nassarawa Gwom which has same infestation (50.0%). There was no significant difference of ectoparasites among the sexes ($P > 0.05$).

Table 5: Age Distribution of Ectoparasites Infestation in Sheep and Goats in JOS, North Central

Age in months	Ticks	Mites	Lice	Fleas	χ^2	P value
0-6	58(53.7)	18(16.7)	28(25.9)	4(3.7)	41.995	0.001
7-12	62(44.3)	20(14.3)	55(39.3)	3(2.1)		
13-20	40(58.0)	2(2.9)	20(29.0)	7(10.1)		
21-28	5(26.3)	10(52.6)	4(21.1)	0(0.0)		
Total	165(49.1)	50(14.9)	107(31.8)	14(4.2)		

Result of age distribution of ectoparasites infestation in sheep and goats is shown in table 5. Ticks recorded the highest infestation rate in 13-30 months old animals. In mites the highest rate was in the age of 21-28 months. Lice recorded the highest rate in age 7-

12 months, while that of fleas was between the ages of 13-20 months. There was a significant difference in the ectoparasites infestation among the different age groups ($P < 0.05$).

Table-6: Distribution of Ectoparasites Species According To Animals Infected

Ectoparasites observed	No of animal infected		Percentage (%) infected		Total
	Sheep	Goats	Sheep	Goats	
Ticks					
<i>Rhipicephalus evertsi</i>	31	39	44.3	55.7	70(42.4)
<i>Amblyomma variegatum</i>	13	12	52.0	48.0	25(15.2)
<i>Boophilus decoloratus</i>	10	12	45.5	54.5	22(13.3)
<i>Rhipicephalus appendiculatus</i>	9	14	39.1	60.9	23(13.9)
<i>Haemophysalis leachi leachi</i>	6	3	66.7	33.3	9(5.5)
<i>Rhipicephalus Sarguineus</i>	9	7	56.3	43.8	16(9.7)
Subtotal	78	87	47.3	52.7	165(100.0)
Fleas					
<i>Ctenocephalus felis</i>	4	10	28.6	71.4	14(100.0)
Lice					
<i>Linognathus spp</i>	22	50	30.6	69.4	72(68.6)
<i>Bovicola spp</i>	7	28	20.0	80.0	35(31.4)
Subtotal	29	78	27.1	72.9	105(100.0)
Mites					
<i>Psoroptes comunis</i>	13	18	41.9	58.1	32(64.0)
<i>Sarcoptes scabiei</i>	8	11	42.1	57.9	19(36.0)
Subtotal	21	29	42.0	58.0	50(100.0)

Result of distribution of ectoparasites species infection was presented in table 6 above. The most common species of ticks in the study area is

Rhipicephalus evertsi (42.4%). This was followed by *Amblyomma variegatum* (15.2%) while *Haemophysalis leachi leachi* is the least with 5.5%. in the class of lice,

linognathus spp is the commonest (68.6%) as compared with *Bovicola spp* (31.4%). *Psoroptes comunis* was recorded the most prevalent species of mites (64.0%) and *Sarcoptes scabiei* accounted for 36.0%.

DISCUSSION

The present study revealed overall incidence rates of 47.4% and 52.6% in sheep and goats respectively. It also revealed that ticks, lice, fleas and mites are common ectoparasites in jos north. These results were close to those of Dipeolu [6] and Abdullahi *et al.* [7] obtained for far Northern Nigeria.

In this study, sex and age of the animals were not significant factors ($P>0.05$) in ectoparasite infestation, similar to the reports of Ogbe [8] and Abdullahi *et al.* [7]. It, however, contradicts the earlier findings of Fagbemi [9] who reported that sheep were more susceptible to ectoparasite infestation than goats.

The results also revealed no association between sex or age and ectoparasitism. The infestation rates observed in the study areas were similar to the findings of Dipeolu [6] and Abdullahi *et al.* [10] for Bauchi area.

The higher rates of infestation obtained in this study may be due to poor management operations and the exposure of the animals to infested grazing areas. The market source for the sheep and goats which are normally more infested [11], may have also contributed to the infestation.

Ticks identified comprised of *Rhipicephalus evertsi*, *Amblyomma variegatum* and *Boophilus decoloratus* and are known to be capable of transmitting protozoan and rickettsial disease from animals to man [12, 6]. The mite *Sarcoptes scabiei* is highly infectious to man [13] 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 jos north, Nigeria. The incidence rates were higher in animals raised in extensive than those in 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.

CONCLUSION

Ectoparasites infestation remain one of the most alarming challenge in domestic animals and animal rearing industries by causing morbidity and motility of animals. The severity of the ectoparasites results in weight loss, depression, weakness, diarrhoea and impedance, thereby affecting the productivity of milk, meat(protein).Poor management and sanitary condition, overcrowding and illiteracy are some the factors that enhances the incident rate of the

ectoparasites in animals. Proper awareness should be created among livestock farmers on how to manage their animals. Good feeding practices of the livestock should be observed. Periodic and strategic ectoparasites control programme should be instituted by every livestock owner.

REFERENCE

1. Ayoade, J.A.(2005). Problems and prospect of small ruminant production in Benue state *proceeding of the Animal conference of Nigerian Society for Animal production*.
2. James –Rugu N.N. and Iwuala, M.O.E.(2000) . Ectoparasites of domestic animals o the Jos Plateau, *Nigeria Sci forum* 5:146-156.
3. Adu, I.F.(2000). Sheep farming in Nigeria. *Net Anim prod Res Inst bull Res Inst Bull* 3:19-46.
4. Teasdale, J. D., Segal, Z. V., Williams, J. M. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of consulting and clinical psychology*, 68(4), 615.
5. Walker, A.R, Bouattour, A.C.(2003). Ticks of domestic animals in African., A guide to identification of species, KTTD-2', *Bioscience Report*, London.
6. Dipeolu, O.O.(1975). Survey of blood parasite in domestic animals in northern Nigeria. Historical review (1923 – 1966). *Trop Anim Hlth Prod* 2: 49 – 52, 1975.
7. Abdullahi, U.S., Egbo, M.I., and 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 Nigerian Society for Animal Production, Michael Okpara University, Umudike*, March 19 – 23, 2000. pp. 280 – 281.
8. Ogbe, P.O.(1998). Factors affecting the presence and spread of ectoparasitism in sheep and goats in Agbowo area of Ibadan. *J Anim Prod* 5: 23 – 29.
9. Fagbemi, B.O.(1982). Effect of Ctenocephalides felis and Strongylus infestation on the performance of West African Dwarf goats and sheep. *Vet Qrtly* 4: 92 – 95, 1982
10. Abdullahi, O. S. (2000). A study of the strategic responses by Kenyan Insurance Companies Following Liberalization. *Unpublished MBA Project, School of Business, University of Nairobi*.
11. Sunderg, J.E. and Mack, S.J.(1985). Village production of West African Dwarf goats and sheep in south west Nigeria. *Trop Anim Hlth Prod* 17: 135 – 140, 1985.
12. Un-Swoth K. The ixodid parasites of cattle in Nigeria with particular reference to the northern territories. *Ann Trop Med Parasitol* 46: 331 – 335, 1952.

13. Soulsby, E.J.L.(1986). *Helminthes, Arthropods and protozoa of domesticated animals seventh edition*, bailere Tin Dall, London.
14. Iwuala, M.O.E and Okpala, I.(2000). Studies on the ectoparasitic fauna of Nigeria Livestock. I. Types and distribution pattern on host. *Bull Anim Hlith prod Afr* 26:339-349,