



# **A Preliminary Survey of Ectoparasites and Their Predilection Sites on Some Livestock Sold in Wadata Market, Makurdi, Nigeria**

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**Abstract:** An investigation of ectoparasites of some livestock sold in Wadata Market, Makurdi, Nigeria was conducted between August and October, 2014. Sixty (60) cattle, sheep, goat and poultry were examined. Visual screening, handpicking, use of forceps and brushing methods were employed and specific points where the ectoparasites were removed were noted. A total of 1,832 ectoparasites were recovered from the 240 livestock. Ticks had the highest prevalence of 1576(86%) followed by lice 134(7.3%) and fleas 122(6.7%). Mixed infestation was observed in all the livestock species examined. With respect to the sex the prevalence rate was not significantly different ( $P>0.05$ ). The ectoparasites preferred the abdomen in cattle, sheep and goat while in poultry they preferred the wings. Further research to assess the impact of these parasites on the health and production performance of the free-range domestic animals are strongly recommended.

**Keywords:** Ectoparasites, Livestock, Ticks, Lice, Flea, Makurdi, Infestation, Prevalence

## **1. Introduction**

Ectoparasites are organisms that live all or part of their lives on the surface of larger organisms (obligate or facultative) which they depend on for food, shelter and other basic needs to survive [1]. Ticks, mites, lice and fleas have been noted as ectoparasites of Livestock [2].

The mechanisms by which the parasites seek, identify, establish and maintain contacts with their host are sophisticated and complex [3, 4]. Some ectoparasites that affect sheep, goats, dogs, cattle and fowls include ticks, lice, mite, flies and fleas, and this infestation could result in skin damage [5].

Unfortunately, livestock production is not rated highly in

the third-world national economies because of the lack of measurable indicators. Production levels of rural poultry and animals in many African countries fall far below desirable levels [6]. In many cases, weight gain, number of eggs per fowl and number of offspring per year are very low, while mortality rates are relatively high. Several reasons, including mismanagement of animals, malnutrition, disease and parasite infestation, theft and predation account for the high mortality and low productivity [10, 11]. Among the numerous animal health problems is the prevalence of arthropod ectoparasites and their impacts on farm animals [7, 8].

It has been observed that ectoparasites do not only have direct effects on their host, they may also transmit pathogens, thereby acting as disease vectors [9]. Although these ectoparasites are not critical limiting factors, their presence can affect productivity in these animals and the economics of production [10]. It is reported that parasitism causes reduced growth, reduced egg and milk production, emaciation, anaemia and mortality [11, 12, 13]. All parasites causes intense irritation to the skin, skin damage, blood loss and severe anaemia, moreover they are important vectors of protozoan, bacterial, viral and rickettsial diseases [13, 14].

The reported negative impacts of ectoparasites on the productivity and welfare of livestock necessitated this study. This survey is aimed at determining the different species of ectoparasites that are common to livestock sold in Wadata Market, Makurdi, Benue State, Nigeria.

## 2. Materials and Methods

### 2.1. Study Area

The survey was conducted in Wadata market, Makurdi, the capital of Benue State, North central Nigeria. It is located in the Southern Guinea Savannah of Latitude 07°-15°S and 08°-45°N and Longitude 08°-15°W and 08°-40°E. It has an annual rainfall of 1,300mm. Wadata was chosen for the survey due to the routine high rate of livestock trade.

### 2.2. Sampling Method

The study animals (both male and female) were screened for ectoparasites using standard techniques [15]. The survey was carried out weekly from August to October, 2014 in the market.

#### 2.2.1. Physical Screening and Visual Inspection

Physical screening and visual inspection of the head, neck/dewlap, abdomen, trunk, legs, tail, pelvic and wings were performed to search for ectoparasites. Forceps were used to pick out ectoparasites from hidden parts of the body.

#### 2.2.2. Hand-Picking

With the aid of light surgical gloves, the ectoparasites were hand-picked by systematically searching the various body regions of the study animals. Ectoparasites obtained from the different animals, as well as the different body regions were kept separately in 70% alcohol in labeled collecting tubes for identification and counting.

#### 2.2.3. Brushing

With this method, each study animal was placed on a piece of white calico and the ectoparasites systematically brushed off the feathers (for domestic fowls) and hair (for goats, cattle and sheep). The ectoparasites were recovered from the calico by dipping the finger into 70% alcohol and tapping gently with the finger. The ectoparasites were then detached into labeled collecting tubes. Ectoparasites from the different animals, as well as the different body regions were kept separately for identification and counting in the laboratory.

### 2.3. Identification

Identification was carried out at the Biological Science Laboratory, Benue State University, Makurdi using standard keys [2].

### 2.4. Data Analysis

All data were collected and recorded on a sheet of paper, simple percentages was first employed to analyze the data. With the use of Statistical Package for Social Sciences (SPSS) version 21, Microsoft Excel 2007, the data was analyzed; Analysis of Variance (ANOVA) was used to assess the differences in the prevalence of ectoparasites among sex and the different livestock. In all cases, 95% confidence interval and  $P < 0.05$  was set for significance.

## 3. Results

### 3.1. Overall Prevalence of Ectoparasites

Of the 240 livestock examined in the survey, a total of 1832 ectoparasites were recovered of which ticks had the highest prevalence of 1576(86%) followed by Lice 134(7.3%) and fleas 122(6.7%) (Table 1). Mixed infestation was observed in all the livestock species examined, of which 176 were found to be infested with one or more ectoparasites, the major parasites species found were Ticks (35%), Lice (10%) and Fleas (5%). In all four genera of Ticks (*Ixodidae*; *Amblyomma*, *Boophilus*, *Hyalomma* and *Rhipicephalus*) comprising of four species; five families of Lice (*Phthiraptera*- *Mallophaga* and *Anoplura*; *Linognathus*, *Menopon*, *Liperus*, *Gonicote* and *Bovicola*), two families of Flea (*Siphonaptera*; *Ctenocephalides* and *Echinophaga*). Among the Ticks, *Boophilus microplus* (54%), *Amblyomma variegatum* (22%), *Rhipicephalus sanguineus* (6%) and *Hyalomma truncatum* (5%) were the most prevalent. The Lice species encountered in this study were *Linognathus* (1%), *Menopon gallinae* (shaft louse) (1%), *Liperus caponis* (wing louse) (1%), *Gonicote giga* (1%) and *Bovicola vovis* (1%). The Fleas were *Ctenocephalides ovis* (6%) and *Echinophaga gallinacea* (1%).

### 3.2. Prevalence of Ectoparasites in Relation to Sex

The prevalence of ectoparasites species in male and females were found to be 71.67% and 78.33% respectively. It was not significantly different  $P > 0.05$ . Male cattle were more infested with lice 9(26.5%) compared to the females 3(11.8%). All the male and female cattle examined were infested with ticks 30(100.0%) each, while neither female nor male of the cattle was infested with fleas (Table 2). Males sheep 22(71.0%) were more infested with ticks compared to females 16(55.2%). Female birds (poultry) had a higher infestation rate 16(50.0%) compared to the males 3(10.7%) of lice. However, there was significant difference between the three ectoparasites groups  $P < 0.01$ .

Table 1. Prevalence of ectoparasites on livestock examined.

Ectoparasites	Livestock (N=240)								Total (%)	
	Cattle (60)		Sheep (60)		Goat (60)		Poultry (60)			
	No. infested	No. of ectoparasites	No. infested	No. of ectoparasites	No. infested	No. of ectoparasites	No. infected	No. of ectoparasites	No. infested	No. of ectoparasites
Ticks	60	891	38	416	26	269	-	-	124	1576(86.0)
Lice	12	21	5	34	2	9	19	70	38	134(7.3)
Fleas	-	-	6	44	9	60	3	18	18	122(6.7)
Total	72	912	49	494	37	338	22	88	180	1832

Table 2. Prevalence of Ectoparasites in Relation to Sex of the Livestock Examined.

Livestock	Sex	Total number of ectoparasites recovered (%)					
		Ticks		Lice		Fleas	
		No. exam	No. infested	No. exam	No. infested	No. exam	No. infested
Cattle	Male	30	30(100.0)	34	9(26.5)	30	0(0.0)
	Female	30	30(100.0)	26	3(11.8)	30	0(0.0)
Sheep	Male	31	22(71.0)	37	3(8.1)	37	2(5.4)
	Female	29	16(55.2)	23	2(8.7)	23	4(17.4)
Goat	Male	28	11(39.3)	40	0(0.0)	33	5(15.2)
	Female	32	15(49.9)	20	2(10.0)	27	4(14.8)
Poultry	Male	35	0(0.0)	28	3(10.7)	38	1(2.6)
	Female	25	0(0.0)	32	16(50.0)	22	2(9.1)
Total		240		240		240	

### 3.3. Predilection Site of Ectoparasites Species in the Different Livestock

A total of 1576 tick species, 134 lice species and 122 flea species were collected from different body parts of the livestock examined. Ectoparasites tend to prefer specific sites of attachment on the animal body. Ticks, Lice and Fleas preferred the abdomen in cattle, sheep and goat while in poultry the ectoparasites preferred the wings in comparison to other parts of the body. The figures below shows the species of ectoparasites found on the livestock according to the number collected from each species and the part of the body infested.

The result showed that the head and abdomen of the livestock had more infestation than other regions, having a total of 350 and 586 parasites found on them respectively. The predominant species of tick on cattle and sheep was *Boophilus microplus* with a frequency of (621,297), which was located more on the abdomen and head region. In goats', ticks' *A. variegatum* (186) was predominant, occurring more in the abdomen and head. The predominant lice species in cattle, sheep and goat was *Bovicola vovis* located more on the head with the exception of cattle where it is located more in the abdomen, while in poultry, *Menopon gallinea* was more predominant having a count of 38 being found mostly on the wing.

Table 3. Ectoparasites Recovered Predilection Site of the Livestock Examined.

Animals	Ectoparasite species recovered	No of ectoparasites recovered	Predilection site							
			Head	Neck	Abdomen	Trunk	Leg	Tail	Pelvic	Wing
Cattle (60)	<i>A. variegatum</i>	121	13	8	57	19	6	11	7	0
	<i>Boophilus microplus</i>	621	98	21	208	76	99	63	56	0
	<i>Hyalomma truncatun</i>	55	7	0	26	10	4	2	6	0
	<i>Rhiphicephalus sanguineus</i>	94	5	18	33	17	3	7	11	0
	<i>Bovicola vovis</i>	14	3	0	6	2	1	2	0	0
	<i>Linognathus sp</i>	7	3	2	0	0	0	2	0	0
Sheep (60)	<i>A. variegatum</i>	93	7	5	29	14	9	8	21	0
	<i>B. microplus</i>	297	69	13	105	42	21	20	27	0
	<i>H. truncatun</i>	26	10	0	8	4	2	0	2	0
	<i>Linognathus sp</i>	15	2	2	3	2	5	1	0	0
	<i>Bovicola vovis</i>	19	8	3	2	2	2	2	0	0
	<i>Ctenocephalides ovis</i>	44	15	11	8	8	0	2	0	0
Goats (60)	<i>A. variegatum</i>	186	55	17	65	9	2	3	35	0
	<i>B. microplus</i>	67	12	5	16	11	8	9	6	0
	<i>R. sanguineus</i>	16	5	0	7	2	0	0	2	0
	<i>Bovicola. Vovis</i>	9	7	2	0	0	0	0	0	0
	<i>Ctenocephalides ovis</i>	60	20	17	5	11	7	0	0	0
	<i>Menopon gallinea</i>	38	2	9	8	0	0	0	0	19
Poultry (60)	<i>Liperus caponis</i>	20	3	2	0	0	0	0	0	15
	<i>Goniocote giga</i>	12	4	0	0	0	0	0	0	8
	<i>Echinophaga gallinacean</i>	18	2	2	0	0	0	0	0	14
Total (240)		1832	350	137	586	229	169	132	173	56

**Table 4.** Percentage Population of the Different Species of Ectoparasites Recovered from the Livestock.

Livestock (No. examined)	Type of ectoparasite	Ectoparasite species	No of parasites recovered	Frequency of infestation (%)
Cattle (60)	Ticks	<i>Amblyomma variegatum</i>	121	15(25)
		<i>Boophilus microplus</i>	621	51(85)
		<i>Hyalomma truncatun</i>	55	4(6.7)
	Lice	<i>R. sanguineus</i>	94	14(23.3)
		<i>B. vovis</i>	14	8(13.3)
		<i>Linognathus</i>	7	4(6.7)
Sheep (60)	Ticks	<i>A. variegatum</i>	93	5(8.3)
		<i>Boophilus microplus</i>	297	39(65.0)
		<i>Hyalomma truncatun</i>	26	5(8.3)
	Lice	<i>B. vovis</i>	19	3(5.0)
		<i>Linognathus</i>	15	2(3.3)
		<i>Ctenocephalides ovis</i>	44	6(10.0)
Goats (60)	Ticks	<i>A. variegatum</i>	186	34(56.7)
		<i>Boophilus microplus</i>	67	5(8.3)
		<i>R. sanguineus</i>	16	2(3.3)
	Lice	<i>Linognathus</i>	9	2(3.3)
		<i>Ctenocephalides ovis</i>	60	9(15.0)
		<i>Menopon gallinea</i>	38	11(16.3)
Poultry(60)	Lice	<i>Liperus caponis</i>	20	9(15.0)
		<i>Goniocote giga</i>	12	7(11.7)
	Fleas	<i>Echinophaga gallinacean</i>	18	7(11.7)
Total			1832	

## 4. Discussion

The survey revealed a high prevalence of ectoparasites in the animals with highest infestation in cattle. Ticks were the major ectoparasite encountered. The present study finding is in agreement with reports in Umuahia, Eastern-Nigeria [16], and in Makurdi, Nigeria [13] as well as some other parts of the world [17]. The study showed that most of the livestock sold in Wadata Market were infested and this may have a negative impact on the output (milk, skin, meat, and egg) of the animals. In agreement with report of the world [17] there was statistically insignificant association between the ectoparasite prevalence and the sex of the livestock surveyed.

The preference for attachment sites on the host might be due to easiness for the ectoparasites to acquire blood meal [16]. This may be the reason why they attached more to the abdomen of the livestock.

The high prevalence of *Boophilus microplus* and *Amblyomma variagetum* is similar to other surveys [18, 19]. The few number of *R. sanguineus* found on cattle may be accidental. It is reported to be associated with dogs [20]. An earlier survey has related the presence of this species of tick on cattle to close contact of cattle with infested dogs [12].

High ectoparasites infestation has been associated with serious damage to hide and skin and is capable of destroying the milk and beef industry [22]. The infestation by ticks is capable of causing bacterial and fungal infestation and other forms of parasitism like screw-worm attack due to wounds emanating from tick bites on the animal skin. The ticks, fleas, lice and mites are capable of reducing the market value and the products from the hides and skins of these animals.

*Linognathus* sp found on goats in this survey is in similar to the finding of others [15]. Lice require the presence of hair

or feathers for development and survival [23], and this explains their prevalence in domestic fowls. In an earlier survey, many of the domestic fowls examined showed a high level of infestation by ticks [15] as opposed to what was discovered in this study. No tick was observed on poultry; probably the sellers use the appropriate control against ticks. *Echinophaga gallinacea* (Stick-fast flea) attack skin around eyes, the wattles and comb and other bare spots of poultry. In this study it was however found only beneath the wings.

## 5. Conclusion

From the survey, ticks, fleas, lice were identified as the major ectoparasites of the livestock in Wadata Market, Makurdi, Benue State. These parasites are considered to have a high infestation rate in the affected animals. Their presence should be considered serious regarding their negative effects on livestock, especially small ruminants and poultry. Information about ectoparasites prevalence has become necessary since these parasites also parasitize humans especially those who work in close contact with the animals. Further research to assess the impact of ectoparasites on the health and production performance of free-range and domestic livestock is recommended. The cost effectiveness of control strategies and thorough education of the sellers should be carried out by the relevant authorities.

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