



Ectoparasites Infestation on Goats (*Capra aegagrus hircus*) Examined in Swali Abattoir in Yenagoa Local Government Area, Bayelsa State, Nigeria.

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Article Information

Article # 10008

Received: 4th Jan. 2024

1st Revision: 9th Feb. 2024

2nd Revision: 24th Feb. 2024

Acceptance: 28th March 2024

Available online:

4th April 2024.

Key Words

Goats, Abattoir

Prevalence, Bayelsa

Ectoparasites,

Abstract

Goats harbour varieties of ectoparasites that affect their growth as well as hide quality. Their effects vary according to the parasite involved, the degree of infection, and other factors; and as a result, farmers and the country in general would suffer significant losses of income. This study investigated ectoparasites infestation on goats examined in Swali abattoir Yenagoa, Bayelsa State, Nigeria. Between February and June 2021, 400 goats (180 males and 220 females) were randomly selected on weekly basis and examined individually for the presence of ectoparasites with goat rearers' consent. Information on sex, age, and breed was obtained orally. Parasites were carefully collected by handpicking, preserved in specimen bottles labelled with age, sex, breed, and collection site; and identified using keys and descriptions. Data collected were analysed with χ^2 -test using version 22 of SPSS software. The study recorded a 1.25% prevalence of ectoparasites infestation on the goats examined. Female goats had a higher prevalence of infestation (60%) compared to males (40%), though the difference in infestation on the goats according to sex was not significant ($p > 0.05$). More prevalence of ectoparasite infestation in 2-years-old goats (1.69%) than in the 3-years-old goats (0.61%) was recorded. Sokoto breed of goats examined had the highest prevalence of infestation 3(1.87%). The results, however, showed infestation on the goats examined were independent of age and breed ($p > 0.05$). The study findings concluded that goats slaughtered in Swali abattoir harbour ectoparasites though at a low level. Therefore, well-coordinated and consistent control measure is needed to forestall further spread.

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Introduction

Goats are important livestock species globally, particularly in tropical and subtropical regions. Compared to larger animals like cattle, goats and other small ruminants have lower purchasing cost, higher fecundity and are easier to domesticate. Goat rearing is one of the most important aspects of agriculture in some parts of Nigeria which has made a tremendous contribution to Nigeria's economic development and growth by generating employment and supplementing household income (Adang *et al.*, 2015). Farmers rely heavily on goats for their livelihood since they provide meat, milk, hides and skin, hairs, horns, bone, and manures (Hassan *et al.*, 2011) and are used in religious rituals and medicine, as gift items (Sertse and Wossene, 2007).

Goats are commonly infested with ectoparasites such as ticks, lice, and mites and they are annoying pests because of their bites and movement over the skin and as vectors of disease pathogens in both humans and livestock. The effect of infestation by ectoparasites varies according to the parasite involved, the degree of infection, and other factors, and farmers and the

country in general would suffer significant losses of income (Yacob, 2014) which stem from productivity loss, skin diseases, or death in severe cases (Beyechea *et al.*, 2014). The damages done by these ectoparasites could lead to retarded growth, weight loss, and reduced productivity as feeding and digestion are inhibited (Anaeto *et al.*, 2009). Furthermore, ectoparasites are recognized to be important zoonotic agents that can spread disease from one animal to another and from one animal to a human (Ofukwu *et al.*, 2008; Yacob, 2014). The widespread occurrence of ectoparasite infestation may have been significantly influenced by the lack of good husbandry practices, poor veterinary care, favourable weather, low feed input, and lack of awareness of the consequences of ectoparasites by goat owners (Beyechea *et al.*, 2014).

Ticks, obligate blood-feeding ectoparasites, are economically-significant ectoparasites of livestock in the tropics regions, particularly Sub-Saharan Africa (Walker *et al.*, 2003). The productivity of livestock in Nigeria and around the world has been severely hampered by tick-borne infections (Nnabuife *et al.*,

2021). Different tick species are widely distributed, but they are most commonly found in nations with warm, humid conditions that support their reproduction (Kilpatrick *et al.*, 2007). The distribution and abundance of different tick species have been documented in different parts of the world and in Nigeria (Bryson *et al.*, 2002; De Matos *et al.*, 2009; Ogo *et al.*, 2012; Kamani *et al.*, 2013; Beyecha *et al.*, 2014; Ali *et al.*, 2015; Soundararajan *et al.*, 2018; Khan *et al.*, 2019 and Nnabuike *et al.*, 2021). Nevertheless, Rajput *et al.* (2006) found that only three genera; Amblyomma, Hyalomma, and Rhipicephalus; have the most impact on livestock health. They pose a major risk because they have been linked to the spread of many infections in both humans and animals, including bacteria, viruses, protozoa, and filarial nematodes (Dantas-Torres, 2008; Socolovschi *et al.*, 2008; Olson and Patz, 2010).

Although all animals should be free of ticks or at the very least treated with an acaricide before being transported, this is not always applied. Ticks may thus be transported, together with their hosts, to areas where neither they nor their hosts are endemic (Horak *et al.*, 2015). Goat are not reared in Yenagoa Local Government Area, Bayelsa State, but are bought from other parts of Nigeria to be slaughtered in the abattoir. Infestation could happen in transit due to crowded transport vehicles with which these goats are conveyed to Bayelsa and other places.

There is a dearth of information on the ectoparasite infestation of goats in Bayelsa state despite the consequences of infestation to animals and human beings. In light of this, this study was carried out with the view of providing baseline information and possibly suggesting control strategies to curb the threat ectoparasites infestation on goats in Bayelsa State.

Materials and Methods

Study Area

The study was carried out in Swali abattoir in Yenagoa Local Government Area, Bayelsa State. Swali abattoir is located in Swali community close to Ekoli creek, and it is the largest abattoir in Yenagoa. The area (Swali) is located at latitude 4° 55' 09" N and longitude 6° 16' 51" E. The abattoir has a part where the animals

are slaughtered which is upland and a section for washing of the slaughtered animals in the river. Approximately, 200 cows are killed on a weekly basis with most of the wastes discharged directly into the river water without treatment.

Sample Size and Sampling Technique: A total of 400 goats brought to the Swali abattoir for slaughter were randomly selected and examined individually between February to June 2021 using the handpicking method. Different body parts of the goats, which included the head, neck, ears, space between the legs, hooves, back, and legs, were examined for ectoparasites. Sampling was done after proper restraining, with the consent of the goat rearers, weekly between 6 am and 9 am before the goats were slaughtered at the abattoir. Information on the sex, age and breed of the goats examined was obtained orally from them at the point of sampling and recorded appropriately. Sexes of the goats as given by the owners were confirmed by noticeable differences in the genitalia; as males have elongated scrotal sac with two testicles between rear legs and the females possess udders (mammary glands) and a vaginal opening with a noticeable clitoris. Precautions were taken to ensure the mouthparts and appendages of the ectoparasites seen did not break during collection. Parasites collected were preserved in specimen bottles containing 70% Formalin, labelled with the age and sex of the goat, and the site of collection of the parasites. The parasites seen were identified according to keys and description by Walker *et al.* (2003).

Data Analysis: Chi-square (χ^2) test was used to test for significance in prevalence of ectoparasites infestation in relation to sex, age and breed of goats examined at 0.05% significant levels using SPSS version 22.

Results

A total of four hundred (400) goats were examined in the study and only five (5) goats were infested with ectoparasites, giving a prevalence of 1.25%. Only Tick (*Boophilus species*) was the ectoparasite identified (Table 1).

Table 1: Identification of Ectoparasite of Goats examined.

Parasite identified	Number examined	No. Infected (%)	Not infected (%)
<i>Boophilus species</i> (Tick)	400	5 (1.25)	395 (98.75)

Three female goats, 3(1.36%), out of the two hundred and twenty (220) female goats sampled were infected, 2(1.11%) of the one hundred and eighty male goats sampled were infected. Females had a higher prevalence of infestation (60%) compared to the males

(40%), though the difference in infestation on the goats according to sex was not significant ($p > 0.05$) (Table 2).

Table 2 further shows the prevalence of ectoparasites on the goats examined according to age. Out of the two

hundred and thirty-six (236) two-years-old goats sampled, 4(1.69%) were infected, while 1(0.61%) out of the one hundred and sixty-three (163) three-years-old goats sampled were infected. The result showed

more prevalence of ectoparasites infestation in 2-years-old goats (1.69%) than in the 3-year-old goats (0.61%).

Table 2: Sex and Age-specific prevalences of Ectoparasites of Goats examined.

Sex	Number Examined	infected (%)		χ^2	P-Value
		infected (%)	not infected (%)		
MALE	180	2 (1.11)	178 (98.89)	0.051	0.821
FEMALE	220	3 (1.36)	217 (98.64)		
Total	400	5 (1.25)	395 (98.75)		
Age					
2 YEARS	236	4 (1.69)	232 (98.31)	0.923	0.336
3 YEARS	164	1 (0.61)	163 (99.39)		
Total	400	5 (1.25)	395 (98.75)		

Table 3 shows the prevalence of ectoparasites infestation according to breed. Among the three breeds of goats sampled in this study, the Sokoto breed of goats had the highest prevalence of 3(1.87%) out of the one hundred and sixty (160) sampled, while the

Kano breed of goats had the least infestation of ectoparasites with a prevalence of 1(0.63%) out of the one hundred and sixty (160) sampled. However, there was no significant difference in infestation rates in all the breeds ($p>0.05$).

Table 3: Prevalence of Ectoparasites of Goats examined according to breed

Breed	Number Examined	Status		χ^2	P-Value
		Infected No. (%)	Not Infected No. (%)		
Sokoto	160	3(1.87)	157(98.13)	1.020	0.602
Kaduna	80	1(1.25)	79(98.75)		
Kano	160	1(0.63)	159(99.37)		
Total	400	5(1.25)	395(98.75)		

Discussions

This study recorded a low prevalence of ectoparasites infestation (1.25%) of goats slaughtered in Swali Abattoir, Bayelsa State. The ectoparasites prevalence in this study is lower than that reported by Sarkar *et al.* (2010); Beyecha *et al.* (2014) and Odogu and Okaka (2016) who recorded a high prevalence of 72.8%; 49.7% and 61.59% respectively. Variations in prevalence could be ascribed to differences in season during which the study was conducted, variations in sample size, management, breed and health care of goats in the study areas, and the sensitivity of the diagnostic method used. The low prevalence of ectoparasites recorded in this study might be a result of the proper maintenance practice employed by rearers of the goats sampled, as they often bath the goats. This practice might have eradicated a good number of the parasites present. Also, goats are known to graze less and graze just within the home, compared to sheep and cattle that graze far into the bush, and hence, come in contact with more vegetation and subsequently more ectoparasites (Tongjura *et al.*, 2012).

Only one (1) species of ectoparasite was recovered and identified as Tick (*Boophilus species*). Nnabuife *et al.* (2021) in their study confirmed the susceptibility of goats to ticks infestation. Mekonnen *et al.* (2007); Sertse and Wossene (2007) and Beyecha *et al.* (2014) reported tick species as one of the most common ectoparasites of goats with variations in the prevalence rates. Compared to other ectoparasites that frequently jump, ticks are easier to find (Malla *et al.*, 2021). *Boophilus* species had been recorded by different researchers as one of the tick species encountered in their studies (Bryson *et al.*, 2002; Omudu and Amuta, 2007; De Matos *et al.*, 2009; Ekanem *et al.*, 2011; Seyoum *et al.*, 2015). This tick species had been reported as the most prevalent by Malla *et al.* (2021) and serves as a vector for several important disease agents of livestock and wildlife such as anaplasmosis, babesiosis etc. (Walker *et al.*, 2003). The incidence of ectoparasites in goats can be reduced by good hygiene and a semi-intensive rearing system (Hassan *et al.*, 2011; Ajith *et al.*, 2017).

The study revealed that female goats were more infected than males, though the sex of the goats did not

statistically influence ($P > 0.05$) the prevalence of ectoparasites infestation. Similar report of female goats being more infected than males had been given by Obi *et al.* (2014) and Malla *et al.* (2021). This study result agrees, also, with the works of Idris and Umar (2007); Beyecha *et al.* (2014) and Nnabuife *et al.* (2021) who also recorded non-significant differences in the infection rates according to the sex of goats. However, this work disagrees with the report of Sarkar *et al.* (2010) and Ekanem *et al.* (2011) in which a higher prevalence was reported in the female goats with a significant difference. Contrasting report by Beyecha *et al.* (2014) recorded males to be more infected than females. Adang *et al.* (2015) hypothesized that some hormonal influence is associated with the higher prevalence of ectoparasitic infestations in females than in males. The non-significant difference indicated in this study might be because only penned goats were sampled. Veen *et al.* (2005) opined that high infestation of female ruminants with ectoparasites could be linked to their restraint either during lactation or gestation and this makes them less active and have low immunity. This opinion was given credence by Malla *et al.* (2021) report of tethered animals having highest infection rate.

From the study, it was revealed that the age of the goats had no significant effect ($P > 0.05$) on ectoparasites infestation, though young goats (two-years-old goats) were more infected than the older goats (three-years-old goats). Result of Noor *et al.* (2016) is in consonance with this study result that younger goats are more infected than the adult goats. The result is also in agreement with the works of Beyecha *et al.* (2014) and Seyoum *et al.* (2015) who recorded no age-related variations in prevalence. This work however contradicts the findings of De Matos *et al.* (2009); Ofukwu and Akwuobu (2010); Iposu *et al.* (2014) and Adang *et al.* (2015) who revealed statistically significant differences in the age of goats ($p < 0.05$), as more adult goats had higher infestation prevalence than the young goats. This discrepancy in the results could be due to varied number of young and adult goats sampled. The variation might also be because the goats sampled in this study are kept in the same penned condition.

Sokoto breed (1.87%) showed the highest prevalence of infestation and the least ectoparasites infestation on the Kano breed (0.63%), though the difference in prevalence was statistically non-significant ($P > 0.05$). Conversely, a significant association of prevalence of tick infestation with breed was recorded by Iposu *et al.* (2014). This study result may be because all breeds are usually kept together in the same pen, as Edoga (2005)

had reported host differences in susceptibility to ectoparasites in Nigeria. The rearing system has a significant role to play in the transmission and control of ectoparasitic infestation within the herd. The intensive grazing of animals permits direct contact with the animals and is essential for the transmission of a large number of ectoparasites (Taylor *et al.*, 2007). Goats are not reared in Yenagoa Local Government Area, Bayelsa State, but are bought from other parts of Nigeria to be slaughtered in the abattoir. Infestation could happen in transit due to crowded transport vehicles with which these goats are conveyed to Bayelsa and other places. Due to non-treatment of animals with an acaricide before being transported, ticks may thus be transported, together with their hosts, to areas where neither they nor their hosts are endemic (Horak *et al.*, 2015).

Conclusion

This study recorded low infestation of goats with only one parasite species, *Boophilus sp.* (Tick) identified. The study revealed that the ectoparasites infestation is not related to sex, age, and breed of the goats examined. The study also identified three different breeds Sokoto, Kaduna, and Kano with respective prevalences of ectoparasites, indicating that the source of goats is important during sampling. Continuous washing of the goats should be ensured, as this will help to maintain the low prevalence indicated in the area. The government should ensure proper sensitization on healthy measures to the goat rearers to enable the production of healthy animals for consumption in general.

Acknowledgments

The authors immensely appreciate the goats' rearers in Swali Market Abattoir for their consent. The support of Laboratory Technologists in the Department of Biology, Federal University Otuoke, Bayelsa State is sincerely appreciated.

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