

## PREVALENCE OF HAEMOPARASITES IN WEST AFRICAN DWARF GOATS OF SMALLHOLDERS HOUSEHOLDS IN IGBOORA, OYO STATE, NIGERIA

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### ABSTRACT

Haemoparasitism has been a major problem to livestock production, resulting in high morbidity and mortality, especially in small ruminants. This research examined the prevalence of haemoparasites in West African Dwarf (WAD) goats of smallholder households in Igboora, Oyo State, Nigeria. Study was carried out from the month of March to August, 2020. Blood samples were collected from the jugular vein of 232 goats from different households. Giemsa stained blood smears were prepared and examined under light microscope at  $\times 100$  objective using oil immersion, to screen for haemoparasites. Factors such as age, sex and body condition were considered as risk factors. Data was presented using descriptive statistics, Chi square test was used to determine significance between categorical variables at 95% confidence interval while OR was used to determine significance of risk factors. P values  $< 0.05$  were considered significant. The study revealed an overall haemoparasites prevalence of 68 (29.3%) in WAD goats. The haemoparasites encountered were *Anaplasma sp* 45 (19.4%) and *Babesia sp* 15 (6.5%), while four (1.7%) of the goats had a co-infection of both *Anaplasma* and *Babesia* genera. There was no significant difference ( $p > 0.05$ ) in the prevalence of haemoparasites among the different age groups, sexes and BCS of goats screened. The prevalence of haemoparasites recorded in this study could have a negative effect on the productivity of goats. We recommend tick control using suitable acaricides on goats in Igboora and regular examination of goats for haematological parameters is also encouraged, as it will enable early detection of infections and treatment.

**Keywords:** Haemoparasite, Prevalence, WAD Goats, Igboora

### INTRODUCTION

Livestock production is an indispensable prerequisite towards the sustainability of human development (Ajayi, 1982). Goats are important domestic animals and they contribute substantially to the production of meat, skin and milk (Adamu and Balarabe, 2012). They contribute to the socioeconomic value of the Nigerian Livestock Industry by providing a source of income and employment opportunities for smallholders of goats (Ukwueze and Kalu, 2015). Livestock diseases constitute a major obstacle to economic development and it also poses health risk to livestock productivity and profitability (Fabiya, 1987). Haemoparasites militates livestock production in tropical countries like Nigeria. They are reported to be the most prominent disease-causing agents of goats (Adejinmi *et al.*, 2004). Haemoparasites are responsible for about 60% loss of the whole population of animals generally and account for losses in goats and sheep ranging between 30 to 40% (Anyanwu *et al.*, 2016). Animals infected with haemoparasites are anaemic and emaciated, with poor performances and decrease in milk and meat production (Masiga *et al.*, 2002; Ngole *et al.*, 2003). These losses have been best attributed to *Anaplasma*, *Babesia*, *Theileria* and *Cowdria* species, due to the prevalence of the vectors (Anthony and Isoun, 1983).

The paucity of information available on the prevalence of haemoparasites in livestock, especially goats in Igboora, Ibarapa Central local government area of Oyo State necessitated this research in order to proffer preventive and control measures.

## MATERIALS AND METHODS

### Study area

Study samples were obtained from smallholders of West African dwarf (WAD) goats in Igboora, which lies in the savannah forest zone on latitude 7.43°N and longitude 3.48°E with an elevation of 140m above the sea level. The average minimum temperature in the study area is 58.9°C, the double maximum rainfall is about 214.3mm in June and 165.77mm in September.

### Study Design

A cross-sectional study design was used to determine the prevalence of haemoparasites in WAD goats raised by smallholders in Igboora, Oyo State. Simple random sampling technique was used to select goats from different flocks. Age, sex and body condition were assessed as associated factors for the occurrence of haemoparasites in goats.

### Sample size and sampling

The minimum sample size (n) required was determined according to Thrusfield (2007) using 95% level of confidence, the prevalence of 7% (Egbe-Nwiyi *et al.*, 2017) and desired absolute precision of 5%. i.e.  $n = Z^2 p (1-p)/d^2 = 100$  WAD goats. However, 232 WAD goats were examined to increase precision.

### Parasitological procedure

Blood samples were randomly collected from WAD goats kept by small holder from the months of March to August, 2020. Thin blood smears were prepared on clean glass slides and stained with Giemsa according to standard protocol described by Soulsby (1982). The stained blood films were examined with oil immersion using objective (×100) of a light microscope (Gupta and Singla, 2012). Identification of haemoparasites was performed using morphologic characteristics (Soulsby, 1982).

### Data analysis

Data were analyzed using Epi-Info version 3.5.1. Descriptive statistics such as frequencies and percentages were determined. Association between categorical variables and the outcome variable was assessed by calculating the odds ratios (OR). Chi-square ( $\chi^2$ ) test was used to determine statistical significance and the Confidence Interval was set at 95%CI, level of significance at  $P < 0.05$ .

## RESULTS AND DISCUSSION

The results obtained from this study showed that out of 232 blood samples of WAD goats examined, 68 (29.3%) were positive for haemoparasites. The prevalence recorded in this study is higher than 7% and 24.83% reported in Nasarawa and Borno States respectively by Anyanwu *et al.* (2016) and Egbe-Nwiyi *et al.* (2017). The results further revealed the haemoparasite infection prevalence in various groups, based on age, sex and BCS in WAD goats (Table 1). The older goats showed a higher level of haemoparasitaemia (60 (29.4%) in this study than the yearlings 8(28.6%), though not statistically significant, which corroborates previous studies (Anyanwu *et al.*, 2016; Egbe-Nwiyi *et al.*, 2017). Further, the prevalence of haemoparasites was not significant with sex, however, it was higher in male goats 15 (30.6%) compared to female goats 53 (29%), an outcome that support previous studies (Anyanwu *et al.*, 2016; Egbe-Nwiyi *et al.*, 2017). Also, goats with good BCS had the highest haemoparasites prevalence 3 (50%) while goats with lean BCS had the least prevalence 2 (25%). The haemoparasites prevalence was not significant with the BCS.

The two (2) genera of haemoparasites identified in this study were *Anaplasma sp* 45 (19.4%) and *Babesia sp* 15 (6.5%). Furthermore, four (4) of the goats had a co-infection of both *Anaplasma sp* and *Babesia sp* 4 (1.7%). The occurrence of haemoparasites in WAD goats in this study may be associated with suitable microclimate favouring the propagation of their arthropod vectors (Jatau *et al.*, 2011). Also, most goats in Igboora are raised by smallholders under extensive or semi-intensive management systems, which increases their exposure to the arthropod vectors.

Both *Anaplasma sp* and *Babesia sp* were identified in this study as prevalent genera in WAD goats. This finding agrees with previous reports (Adamu and Balarabe, 2012; Anyanwu *et al.*, 2016; Egbe-Nwiyi *et al.*, 2017). The higher prevalence recorded for *Anaplasma sp* compared to *Babesia sp* corroborates other studies that have been carried out previously (Anyanwu *et al.*, 2016; Egbe-Nwiyi *et al.*, 2017). *Anaplasma sp* is a ubiquitous organism that has been reported in all the six continents (Rymaszewska and Grenda, 2008), most especially in the tropics and subtropics, due to the abundance of its tick vectors (Jongejan and Uilenberg, 2004). The low prevalence of *Babesia sp* recorded in

WAD goats in this study agrees with previous reports (Jatau *et al.*, 2011; Egbe-Nwiyi *et al.*, 2017). This finding could be attributed to the enzootic occurrence of babesiosis in indigenous animals in Nigeria. Sheep and goats usually develop strong immunity in early life and resist subsequent challenges favourably by preventing establishment of the parasite (Soulsby, 1982).

**Table 1: Prevalence of haemoparasites in WAD goats**

| Variable     | No. examined | No. infected (%) | OR(95%CI)      | P value |
|--------------|--------------|------------------|----------------|---------|
| <b>Age</b>   |              |                  |                |         |
| Yearling     | 28           | 8 (28.6)         | Ref            |         |
| Adult        | 204          | 60 (29.4)        | 1 (0.4-2.9)    | 1       |
| <b>Sex</b>   |              |                  |                |         |
| Female       | 183          | 53 (29)          | Ref            |         |
| Male         | 49           | 15 (30.6)        | 1.1 (0.5-2.2)  | 1       |
| <b>BCS</b>   |              |                  |                |         |
| Lean         | 8            | 2 (25)           | Ref            |         |
| Moderate     | 218          | 63 (28.9)        | 1.2 (0.2-12.7) | 1       |
| Good         | 6            | 3 (50)           | 2.8 (0.2-52)   | 0.7     |
| <b>Total</b> | <b>232</b>   | <b>68 (29.3)</b> |                |         |

**Table 2: Overall prevalence of haemoparasites in WAD goats (N=232)**

| Haemoparasites                            | No. of infected samples | Prevalence (%) |
|-------------------------------------------|-------------------------|----------------|
| <i>Anaplasma sp</i>                       | 45                      | 19.4           |
| <i>Babesia sp</i>                         | 15                      | 6.5            |
| <i>Anaplasma sp</i> and <i>Babesia sp</i> | 4                       | 1.7            |

## CONCLUSION AND RECOMMENDATION

This study has revealed the presence of important haemoprotozoan parasites in WAD goats, raised by small holders in Igboora. The prevalence of *Anaplasma sp* and *Babesia sp*, haemoparasites that are common causes of anaemia that can also result to decreased productivity of goats in Igboora and environs. We therefore recommend vector control, periodic screening and treatment of goats in Igboora with suitable antiprotozoal drugs to reduce the prevalence of haemoparasitic diseases, hence enhancing productivity of goat production.

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