

Prevalence of parasitic infections of horses in Maiduguri, Nigeria

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ABSTRACT Parasitic infections are economically devastating to horses, compromising their health and general performance. The prevalence of parasitic infections amongst one hundred and sixty horses was determined in this study. Faecal samples, blood and ticks were collected from the sampled horses and subjected to standard parasitological techniques for the identification of parasites. An overall prevalence of 30.0 % (48/160) was recorded for faecal helminth ova, with *Strongyle* ova been the most prevalent. An overall prevalence of 23.1% (37/160) was recorded for haemoparasites, with *Theileria equi* as the most prevalent 17.5% (28/160) followed by *Anaplasma* species 5.0% (8/160) and *Babesia caballi* 0.6% (1/160) as the least encountered. Lastly, the study recorded a prevalence of 25 (15.7%) for tick infestation and *Rhipicephalus* species was the most prevalent 14.4% (23/160). In conclusion, this study demonstrate that horses are host to a wide assemblage of parasites of economic importance. Therefore, strategic deworming, deticking and veterinary care are recommended to prevent undesirable effects on the health of the animals.

KEYWORDS: *Babesia caballi*, Seasons, Strongyles, *Theileria equi*, Ticks

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INTRODUCTION

Horses (*Equus equus caballus*) are hooved herbivorous mammals that belong to the family *Equidae* (Staszuk, 2022). The estimated global population of horses is about 124 million, with over 60% found in the developing countries, and in Nigeria, their number is put at over 200, 000 where majority are owned by traditional rulers and the government, and few owned by some individuals associated with royalty (Mayaki, 2017; Ola-Fadunsin *et al.*, 2018). Equines including horses are considered as hardy and resistant animals. Despite this belief, they are afflicted with a number of diseases, including parasitism which exerts a great deal of impact on their health and production (Ola-Fadunsin *et al.*, 2018). Some negative manifestations of parasitism in horses includes weight loss, anemia, icterus, retarded growth, unthriftiness, reduce work output and death in some cases (Umar *et al.*, 2013). Parasitism of horses could be internal as seen in gastrointestinal parasites such as trematodes, cestodes or nematodes (Wosu & Udobi, 2014). On the other hand, external parasites include ticks, mites, flea and lice. Interestingly, these external parasites serve as vectors to numerous pathogens which they transmit. Haemoparasitism in horses are majorly vector (arthropod) borne in transmission (Ola-Fadunsin *et al.*, 2018). In recent pass, a handful of studies have been conducted across several states in Nigeria on the occurrence of parasitism of horses with varying prevalence's (Ehizibolo *et al.*, 2012; Umar *et al.*, 2013; Oladipo *et al.*, 2015; Ola-Fadunsin *et al.*, 2018; Ola-Fadunsin *et al.*, 2019; Onyiche *et al.*, 2020). In Maiduguri, Borno state, there is paucity of information on the parasitic infections of horses. It is against this backdrop that this study was thus conducted.

METHODOLOGY

Sample Collection

Horses used for this study were mainly from stables of the Royal Palace, Nigeria Police Force, University of Maiduguri and those privately owned, all within the city of Maiduguri, Borno state Nigeria. Convenient sampling was adopted and a total of 160 horses were recruited.

Coprological Investigation

Exactly 5 grams of fresh faeces were collected from the rectum of sampled horses using hand gloves into sterile universal bottles, and transported to the Veterinary Parasitology Laboratory, University of Maiduguri and examined qualitatively using the saturated sodium chloride simple floatation and sedimentation techniques as described previously by Taylor *et al.* (2016).

Haemoparasitology

Exactly 2 ml of blood was collected from the jugular vein of each sampled horse using a hypodermic syringe with 18-gauge needle into ethylene diamine tetra-acetic acid (EDTA) coated bottles and examined using thin smears stained with Giemsa (Taylor *et al.*, 2016).

Acarology

Ticks found on the body of the horses were collected using forceps and preserved in plastic bottles containing 70% ethanol, then taken to the lab for identification with the aid of dissecting microscope using standard taxonomic keys as described by Walker *et al.* (2003).

Statistical Analysis

Data obtained were expressed as percentiles or tested using the chi-square for any association between the variables at $p < 0.05$.

RESULTS AND DISCUSSION

The prevalence of parasitic infection in horses based on sex and season in Maiduguri is shown in Table 1. Based on faecal helminth ova, an overall prevalence of 48 (30.0%) was obtained with 37 (26.2%) and 11 (57.8%) for stallions and mares; 10 (12.5%) and 38 (47.5%) for the dry and rainy seasons respectively ($p < 0.05$). The prevalence of 30.0% for faecal helminth ova comprising mostly of strongyles, with a registered prevalence of 18(11.3%) compared with the other helminth ova ($p < 0.05$). Higher prevalence rates above 30.0% have been previously reported in other studies in Nigeria (Biu *et al.*, 2006; Pam *et al.*, 2013; Ola-Fadunsin *et al.*, 2019; Alaba *et al.*, 2022). Helminths generally produce insidious diseases in horses with risk factors attributed to management, climate, season and control strategies (Biu *et al.*, 2012). Helminthic infections are mostly prevalent in the wet season described as conducive for parasitic development and enhanced transmission of infective larvae (Saeed *et al.*, 2010). Other helminths encountered in this study including *Triodontophorus*, *Gastrodiscuss* and *Dictyocaulus* species has also been previously recorded in a similar study in Zaria, Nigeria (Useh *et al.*, 2005).

With regards to haemoparasites, the overall prevalence of 37 (23.1%) was recorded with 7 (8.8%) and 30 (37.5%) for the dry and rainy seasons; 31 (22.0%) and 6 (31.6%) for stallion and mares respectively ($p < 0.05$). *Theileria equi* was significantly ($p < 0.05$), the most prevalent haemoparasites 28 (17.5%) followed by *Anaplasma* spp. 8 (5.0%), while *Babesia caballi* 1 (0.6%) was the least encountered haemoparasite in this study. Higher prevalence rates (>35.0%) for all the aforementioned haemoparasites have been documented in Nigeria (Eze *et al.*, 2019; Alaba *et al.*, 2022). The higher

prevalence might be due to vector abundance and suitable biotic factors for their survival and transmission dynamics (Wannas *et al.*, 2012). *Theileria equi* is enzootic in the tropics and subtropics with risk factors described as sex, management systems, age, climate and control strategies (Garba *et al.*, 2011). In Nigeria, *T. equi* is endemic especially in the Northern States (Ehizobolo *et al.*, 2012; Garba *et al.*, 2011; Pam *et al.*, 2013; Onyiche *et al.*, 2020) and is responsible for equine piroplasmosis, a notifiable disease (Onyiche *et al.*, 2020). Higher prevalence of haemoparasitic infections in mares concurs with previous observation in Nigeria that male horses are less likely to be infected than females (Sanusi *et al.*, 2014; Eze *et al.*, 2019). However, it contradicts Sigg *et al.* (2010) and Vieira *et al.* (2013) who reported a higher prevalence in stallions and attributed their observation to stress arising from strenuous physical activities.

An overall prevalence of 25 (15.7%) was obtained for tick infestation with 4 (5.1%) and 21 (26.3%) for the dry and rainy seasons; and 19 (13.4%) and 6 (31.5%) for stallions and mares respectively ($p < 0.05$) (Table 1). *Rhipicephalus* species were most prevalent with 23 (14.4%) while *Boophilus* species 2 (1.3%) were least prevalent for both sex and seasons ($p < 0.05$). In Nigeria, ticks have been recognized as the most important ectoparasites of equines with increased relative abundance in the rainy season, with *R. evertsi evertsi* and *B. decoloratus* as the most prevalent (Ahmed & George, 1989). *Rhipicephalus evertsi evertsi* is a known vector of equine babesiosis, and DNA of *B. caballi* and *T. equi* has been detected in this tick species collected from Nigeria (Onyiche *et al.*, 2020).

Table 1. Prevalence of Parasitic infection of Horses based on Seasons and Sex

Variables/categories	Seasons (No (%))		Sex (No (%))		Total (%)
	Dry (n = 80)	Rainy (n = 80)	Stallions (n = 141)	Mares (n = 19)	Total (n = 160)
Helminths Ova					
<i>Dictyocaulus arnfieldi</i>	1 (1.3)	4 (5.0)	4(2.8)	1 (5.2)	5 (3.1)
<i>Gastrodiscus aegyptiacus</i>	2 (2.5)	1 (1.3)	3 (2.1)	0 (0)	3 (1.9)
<i>Strongylus</i> + <i>Trichonema</i> species	0 (0)	1 (1.3)	1 (0.7)	0 (0)	1 (0.6)
<i>Strongyloides</i> species	0 (0)	1 (1.3)	1 (0.7)	0 (0)	1 (0.6)
<i>Strongyles</i> species	0 (0)	18 (22.5)	14 (9.9)	4 (21.0)	18 (11.3)
<i>Strongylus</i> species	2 (2.5)	6 (7.5)	6 (4.2)	2(10.5)	8 (5)
<i>Triodontophorus tenuicollis</i> + <i>Gastrodiscus</i> species	0 (0)	1 (1.3)	0 (0)	1 (5.2)	1 (0.6)
<i>Trichonema</i> species	5 (6.3)	4 (5.0)	8 (5.6)	1 (5.2)	9 (5.6)
<i>Strongylus</i> species + <i>Gastrodiscus aegyptiacus</i>	0 (0)	1 (1.3)	0 (0)	1 (5.2)	1 (0.6)
<i>Triodontophorus</i> species	0 (0)	1 (1.3)	0 (0)	1 (5.2)	1 (0.6)
Total	10 (12.5) ^a	38 (47.5) ^b	37 (26.2) ^a	11 (57.8) ^b	48(30.0)
Haemoparasites					
<i>Babesia caballi</i>	1 (1.3)	0 (0)	1 (0.7)	0 (0)	1 (0.6)
<i>Anaplasma</i> species	0 (0)	8 (10)	6 (4.3)	2 (10.5)	8 (5.0)
<i>Theileria equi</i>	6 (7.5)	22 (27.5)	24 (17.0)	4 (21.1)	28 (17.5)
Total	7 (8.8) ^a	30 (37.5) ^b	31 (22.0) ^a	6 (31.6) ^a	37 (23.1)
Ticks					
<i>Boophilus</i> species	1 (1.3)	1 (1.3)	2 (1.4)	0 (0)	2 (1.3)
<i>Rhipicephalus</i> species	3 (3.8)	20 (25.0)	17 (12.0)	6 (31.5)	23 (14.4)
Total	4 (5.1) ^a	21 (26.3) ^b	19 (13.4) ^a	6 (31.5) ^a	25 (15.7)

Total values with different superscripts are statistically significant ($p < 0.05$)

CONCLUSION

Findings from this study indicate that horses are host to a wide assemblage of parasites including gastrointestinal (*Strongylus*, *Gastrodiscus*, *Strongyloides*, *Dictyocaulus arnfieldi* and *Trichonema* species), haemoparasites (*Babesia caballi*, *Theileria equi* and *Anaplasma* species) and ticks (*Rhipicephalus* and *Boophilus*). Also, seasons and sex were recognized as two important risk factors that influences the occurrence of parasitism in horses. The presence of these parasites will negatively impact on the wellbeing of horses and therefore, we recommend that horses should be periodically checked by veterinarian to minimize the undesirable effects associated with the presence of these parasites.

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