

Helminthic Status of Olive Baboon (*Papio anubis*) and Hyena (*Croucuta croucuta*) in a University Zoo Park, Abeokuta, Nigeria.

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Abstract: Parasitic infections pose a threat to animals kept in captivity. The helminthic status of Olive baboon (*Papio anubis*) and Hyena (*Croucuta croucuta*) kept in Federal University of Agriculture Abeokuta (FUNAAB) Zoo Park in Ogun State Nigeria was studied. Freshly voided faeces were collected twice a week from resident mammals for 6 weeks. The concentration technique enlisted was formalin ethyl acetate method and direct microscopic examination. About 90% and 87% of the samples from the Olive baboons and hyena respectively had at least one helminthes parasite species. *Trichuris trichuria* had the highest prevalence of 100% among the Olive baboon population while *Fasciola hepatica* was the least prevalence of 33%. The Olive baboon had a parasite richness count of 2/3 while the hyena population had a parasite richness count of 5/12. These findings emphasize the need for improvement in routine de-worming process and adequate maintenance of hygienic environmental conditions of the zoo in order to forestall the dangers associated with the parasites among the mammals.

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Introduction

Intestinal helminth infections are the most common infections occurring throughout the developing world. They are transmitted either directly through fecal contamination with water, soil or food (Schulz and Kroeger, 1992). Zoological animals cover a wide array of animals, and are thus susceptible to infections of closely related species of livestock, domestic and humans. Wild animals have been documented to suffer from an array of common or shared pathogens with humans and livestock (Egbetade *et al.*, 2014). Due to their proximity to each other within the zoological garden, there is opportunity of transmitting diseases or parasites to species which would not normally come into contact with the pathogens and thus are highly susceptible to infection (Emikpe *et al.*, 2002).

Prevalence of helminth parasites have been documented in wild animals such as gray zebras, grasscutters, other primates other than humans, birds and other animals by (Mouria *et al.*, 2005; Opara and Fagbemi, 2008; Ajibade *et al.*, 2010; Ryan *et al.*, 2012;) which has a negative impact on the conservation and health of wildlife which could lead to a decline in abundance (Hotez *et al.*, 2008).

Infectious diseases are the third most important driver of population decline of wildlife after hunting and habitat degradation (Gillespie, 2006). There is no doubt that a regular program of gastrointestinal parasite surveillance and measures of control based on correct diagnosis, effective treatment and proper prophylaxis would certainly assist in reversing the situation of ill health in zoo animals. By trying to establish a profile of gastro-intestinal parasites in the zoo animals, valuable information will be obtained for the development of public health and preventive medicine (Opara *et al.*, 2010).

Egbetade *et al.*, (2014) provided the first information on gastrointestinal helminthes of wildlife at the Federal University of Agriculture (FUNAAB) Zoological Park, Abeokuta. Survey studies by Adeniyi *et al.*, (2015) and Opara *et al.*, (2010) reported presence of gastro-intestinal parasites in animals in three University Zoological Gardens in South-West Nigeria and the Zoological garden in Nekede, Owerri Southeast Nigeria respectively. This inadequate information and documentation on diseases and parasites of zoo animals is a major limiting factor in veterinary medical management in zoological gardens. However, there is a dearth of information on diseases

of zoo animals to reveal the transmission and impacts of pathogens of human origin especially protozoan, helminth and arthropod parasites on wildlife. The objective of this study was to investigate status of helminthic infections in selected mammals (*Papio anubis*) and (*Croucuta croucuta*) of the FUNAAB Zoo Park in Ogun State, South-West of Nigeria

Materials And Methods

• Study Area

The study was carried out on captive wild animals at the FUNAAB Zoo Park within the premises of The Federal University of Agriculture, along Alabata road, Abeokuta, Ogun State. The Zoo Park located on latitude 7° 13' 15'' N; longitude 3° 26' 51'' E; 181m above sea level, and commissioned on the 23rd May 2012 is managed by FUNAAB Zoo Park Directorate. The zoological garden has several sections and the animals are kept in sections according to species. Indoor and outdoor enclosures are cleaned on a routine basis with necessary prophylaxis. Animals are regularly de-wormed to curb parasitic infections. Natural features, such as branches, climbing structures, and platforms are used for enrichment of enclosures to promote animal well-being.

• Study Animals

Two resident species of mammals were used for the study comprising three Olive baboon (*P. anubis*) and two hyena (*C. croucuta*).

• Sample collection

Freshly voided faeces were collected with assistance of the animal handlers at the park within a six-week period. The sample collection did not in any way impact negatively on the welfare of the study subjects. The topmost part of the faeces was scooped to prevent contamination and were stored in well labelled 30ml sample bottles and kept in cool box-transport medium containing ice packs to the laboratory and refrigerated at 4°C and kept in 10% formalin for preservation and analysis.

• Examination of Samples

Faecal samples were grossly examined for species-specific consistency, colour and presence of proglottids and adult worms. Direct microscopic examination was adopted by placing a very small quantity of fecal droppings on a glass slide emulsify with a drop of water and placed on a cover slip to view. Concentration technique with formalin ethyl acetate sedimentation method (Lim *et al.*, 2008) was also used, and presence of helminth ova identified and recorded.

• Data Analysis

Presence of helminth ova was recorded and expressed as a percentage of samples screened for species and amongst orders. Parasite richness count for primate species was deduced by counting the number of nematode helminths discovered in the different species (Gillespie, 2006).

Results

Out of 60 fecal samples collected from Olive Baboons and Hyena and examined, 51(88.3%) were infected with various helminths ova. From the Olive Baboons population, 32 (88.9%) out of the 36 samples contained one or more parasite species. From the 24 hyena samples, 21(87.5%) contained one or more parasite species (Table 1).

Trichuris trichuria was observed to be the most abundant parasite among the olive baboon population with a parasite richness count in 18 out of 36 samples examined with a $p > 0.05$ significance while the least abundant parasite observed was the *Fasciola hepatica* with a parasite richness count with only one out of 36 samples (Table 2). Hookworm ova were observed to be more among the hyena population while *A. lumbricoides* had the lowest parasite count.

T. trichuria had the highest prevalence in Olive baboon population as it was found in all the 3 animals (Table 3), followed by *Strongyloides spp* and *A. lumbricoides* with *F. hepatica* being the least prevalence of 33%. Hookworm and *Strongyloides spp*. Had the highest prevalence of 100% *T. trichuria* and *A. lumbricoides* both had a prevalence of 50%.

Table 1: Cumulative prevalence of helminths parasites among the animals studied

Mammals	Total Fresh Fecal Samples Collected	Total Parasite Count (%)
Olive Baboon	36	32 (88.9)
Hyena	24	21 (87.5)
Total	60	51 (88.3)

Table 2: Prevalence of Helminths parasites among the Olive Baboons and Hyenas

Number of Animals	Total Samples	Parasites Identified	Parasite count
Olive Baboons	3	36	<i>Strongyloides</i> 10/36 (27.7) <i>Trichuris trichuria</i> 18/36 (50) <i>Ascaris lumbricoides</i> 3/36(8.3)
Hyena	2	24	<i>Trichuris trichuria</i> 4/24 (16.7) <i>Strongyloides spp</i> 5/24 (20.8) <i>Ancylostoma duodenale</i> 10/24 (41.7) <i>Ascaris lumbricoides</i> 2/24 (8.3) <i>Trichuris trichuria</i> 4/24 (16.7)

Table 3: Prevalence of Helminth in the Olive Baboon and Hyena Population

Parasites	Ratio	Prevalence (%)
Olive Baboon		
<i>Strongyloides</i>	2/3	66
<i>Trichuris trichuria</i>	3/3	100
<i>Ascaris lumbricoides</i>	2/3	66
<i>Fasciola hepatica</i>	1/3	33
Hyena		
<i>Strongyloides</i>	2/2	100
<i>Trichuris trichuria</i>	½	50
<i>Ascaris lumbricoides</i>	½	50
<i>Ancylostoma duodenale</i>	2/2	100

Discussion

Results from the study confirm earlier reports by Egbetade *et al.*, (2014) that helminths parasites are present but with varying levels among the Zoo animals, but that *T. trichuria* was found in both *P. anubis* and *C. crocuta*. Opara *et al.*, (2010) working in Nkede, South-East Nigeria observed similar prevalence but opined that parasitic diseases are common to zoo carnivores in countries of warm and tropical climates due to the factors such as light, temperature and humidity that favors the development of parasites. Also to note is the fact that Park workers cleaning cages and enclosures could act as a vehicle for cross transmission. Also, the animals serve as some potential reservoirs that could transmit gastrointestinal helminthes to zoo keepers and possibly visitors through physical contacts.

The assessment of health status of animals in Nigeria is based on evaluation of physical outlook as infection with helminthes is asymptomatic except when the worm load is heavy. Although animals appeared healthy at FUNAAB Zoo and did not show any observable signs of helminthosis, it is essential to monitor these trends as just physical appraisals could be misleading at times (Egbetade *et al.*, 2014).

Conclusion

Helminthosis in zoo animals is a manageable condition when proper chemo-prophylaxis and strict sanitation standards enforced, so effective treatment

programmes to prevent parasitic infections in the animals under captivity are advocated to prevent zoonosis.

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