Survey of Endo-Parasite Composition of Selected Wildlife Species and their Economic Importance

Oladapo O. Oduntan, Ph.D.* and Adebowale K. Taiwo, M.Sc.

Department of Forestry and Wildlife Management, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.

E-mail: oduntanoo@funaab.edu.ng*

ABSTRACT

This study examined the types and abundance of endoparasites on selected wildlife species at the Federal University of Agriculture, Abeokuta (FUNAAB) Zoological Park. A total of ten animals were sampled by collecting freshly voided feces from the animals and it was subjected to basic coprology test (direct microscopic examination and fecal flotation technique). Parasite detection was done by fecal analysis using flotation method. The most common parasite identified are *Ascarida galli, Coccidia oocyst, Eimeria spp., Ancylostoma spp., Strongle egg, and Ascaris spp*, In the carnivore section Civet cat has the highest load of parasite richness. In the primate section White putty nose and Patas has the highest load of parasite. In the aviary section, the African grey parrot has the highest load of parasite. Knowledge of the helminth parasites in wild animals is vital in formulating preventative veterinary protocols in captive exhibit..

(Keywords: zoological garden, wildlife management, disease, parasitology, animal health, conservation)

INTRODUCTION

Parasitic diseases play an important role for wild animals in captivity. In captivity, the health status of the animals depends on many factors like feeding, keeping conditions, animal management, and environmental conditions such as temperature and humidity (Goossensa*et al.,* 2005). The staff plays an important role in the transmission of parasites amongst animals in a zoo, through contamination carried by their shoes, clothes, hands, food, or with working tools. Another possibility of parasite transmission vector is the animals themselves, when they are moved from one enclosure to another, without proper parasite treatment.

Mixing different species brings additional risks of parasitic infections. In the wild, animals might have a natural resistance against parasitic infections or live in a balanced system with their parasites. But the change in environment and living conditions from freedom to captivity influences the animals' ecology and might increase the sensitivity for parasitic infections (Goossensa*et al.,* 2005). Parasitic diseases are one of the main causes of death in wild animals in captivity (Rao and Acharjyo, 1984). In addition, some parasites are zoonotic and are a risk to human health (Kashid*et al.,* 2003).

Both domestic and wild animals are hosts of a wide variety of parasite species. Although wild animals are usually infected with several species of parasites at once, they seldom suffer massive deaths, or epizootics, because of the normal dispersal and territorialism of most animal species. In the wild, natural resistance against parasitic diseases and a state of equilibrium between host and parasite generally prevent the development of clinical disease, unless in stress conditions (Mir *et al.,* 2016).

In contrast, domesticated animals are usually restricted to pastures or pens for long time, often with great stock density, so that parasite eggs, oocysts, cysts, and larvae become extremely abundant in the soil. This mechanism of rising parasite density is common for all animals bred for extended periods in one place, allowing for the parasites' life cycle to be renewed without barriers. Kumar et al., (2013) mentioned that parasite infections increase with the animal load per square surface unit and therefore, for a given piece of land, parasitic infections will quadruple if the stocking density doubles. This paper examined endo-parasite composition of selected wild animal species at FUNAAB Zoo Park.

Study Area

The study was conducted in dry season of the year 2019 at the FUNAAB (Federal University of Agriculture, Abeokuta) Zoological Park. It is located along Isolu, Alabata Road of Abeokuta in Ogun State. Fecal samples of the selected wild animals were collected from the Zoo Park.

Fecal Analysis

Feces were grossly examined for species-specific consistency, color, presence of proglottids, and adult worms. Direct microscopic examination (quick method) was carried out by placing a very small quantity of fecal dropping on a glass slide using a toothpick and emulsify with a drop of water and place a cover slip to view on the microscope (Suwansaksri*et al.*, 2002).

Concentration techniques adopted were; Formol ethyl acetate sedimentation method (Moges*et al.*, 2010) and Simple Salt (NaCl) Floatation as described by Gillespie (2006) and Parameshwarappa *et al*. (2012). Helminth ova were recorded and expressed as a percentage of samples screened for species and amongst orders. Parasite richness count for primate species were deduced by counting the number of nematode helminths discovered in the different species (Gillespie, 2006).

Fecal Flotation Solution

A small amount of fresh feces with quantity of 2g were added to 10ml of the floatation solution followed by thorough mixing. The suspension was poured through a fine mesh sieve (aperture 205 micron) into a test tube; more floatation solution was added to fill the test tube to the top.

A cover glass was placed on top of the surface of the liquid and the cover slip was left standing for about 30 minutes. The cover slip was removed vertically and place on a slide, and the slide was examined under the microscope for the presence of eggs.

RESULT

Results for the first week shows that, the Civet cat representing the carnivores in the study had the most load of nematode helminth with 700 egg per gram (epg) of *Ancylostoma spp.* (Table 10), followed by Patas monkey with 300 epg of *Strongyle* egg (Table 7), while Mallard ducks and Putty nose monkey contain the least load of helminthes with 200 epg of *Ascaridia gall*i and *Strongyle* egg respectively (Tables 4 and 7).

It was also shown in the result for the second week that, both the Civet cat and Mallard ducks had the most load of endoparasites with 300 epg of *Ancylostoma spp* and *Ascaridia galli,* respectively (Tables 5 and 11), followed by Putty nose monkey, Patas monkey, and Common Ostrich were infected with 100 epg of *Ascaris spp*, *Strongyle* egg, and *Ascaridia galli,* respectively (Tables 5 and 8), while the African grey parrot was infected with 100 epg of *Coccidia oocyst* and *Eimeria spp.* (Table 5).

Results for the third week showed that, Vervet monkey and Civet cat were found to be infected with 500 epg of *Strongyle* egg and *Ancylostoma spp,,* respectively (Tables 9 and 12). African grey parrot was infected with 500 epg of *Coccidia oocyst* and *Eimeria spp.* (Table 6), Patas monkey was also infected with 200 epg of *Strongyle spp.* (Table 9), and while White putty nose monkey and Mallard ducks had the lowest point of parasite with 100 epg of *Strongyle spp.* and *Ascaridia galli,* respectively (Tables 6 and 9).

Results for the three weeks showed that white geese, Mona monkey, and Common jackal harbor no helminthes.

Table 13 shows the distribution of intestinal helminth infections among the selected wild animals in which African grey parrot and White putty nose monkey were infected with eggs of two different parasite species (mixed infection), although at different intensities. Mallard ducks and Common ostrich were infected with eggs of the same parasite species, while Patas monkey and Vervet monkey were also infected with eggs of the same endoparasite.

The prevalence of soil transmitted helminthes revealed that *Strongyle* species had the highest prevalence among the selected wildlife species 30%, *Ascaridia gilli* recorded 20%, while *Coccidia oocyte, Eimeria spp., Ascaris spp., and Ancylostoma spp.* recorded the lowest prevalence with 10% as shown in Table 14

Table1: Classification of Selected Birds Used for the Study in FUNAAB Zoo Park.

Common name	Scientific name	Family	Order
African Grey Parrot	*Psittacus erithacus*	Psittacidae	Psittaciformes
White Geese	*Chen caerulescens*	Anatidae	Anseriformes
Mallard Duck	*Anas platyrhynchos*	Anatidae	Anseriformes
Common Ostrich	*Struthio camelus*	Struthionidae	Struthioniformes

Table 2: Classification of Selected Primates Used for the Study in FUNAAB Zoo Park.

Common name	Scientific name	Family	Order
Mona Monkey	*Cercopithecus mona*	Cercopithecidae	Primates
Patas Monkey	*Erythrocebus patas*	Cercopithecidae	Primates
Vervet Monkey	*Chlorocebus pygerythrus*	Cercopithecidae	Primates
White Putty Nose	*Cercopithecus nictitans*	Cercopithecidae	Primates

Table 3: Classification of Selected Carnivores Used for the Study in FUNAAB Zoo Park.

Common name	Scientific name	Family	Order
Civet Cat	*Civettictis civetta*	Viverridae	Carnivora
Jackal	*Canis aureus*	Canidae	Carnivora

Table 4: Floatation Analysis of the Selected Birds for Week 1.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	African Grey Parrot	*Psittacus erithacus*	-ve	-
2	White Geese	*Chen caerulescens*	-ve	-
3	Mallard Duck	*Anas platyrhynchos*	200 epg	*Ascaridia galli*
4	Common Ostrich	*Struthio camelus*	-ve	-

Table 5: Floatation Analysis of the Selected Birds for Week 2

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	African Grey Parrot	*Psittacus erithacus*	100 epg	*Cooccidia oocyst*
				Eimeria spp.
2	White Geese	*Chen caerulescens*	-ve	-
3	Mallard Duck	*Anas platyrhynchos*	300 epg	*Ascaridia galli*
4	Common Ostrich	*Struthio camelus*	100 epg	*Ascaridia galli*

Table 6: Floatation Analysis of the Selected Birds for Week 3.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	African Grey Parrot	*Psittacus erithacus*	500 epg	*Cooccidia oocyst*
				Eimeria spp.
2	White Geese	*Chen caerulescens*	-ve	-
3	Mallard Duck	*Anas platyrhynchos*	100 epg	*Ascaridia galli*
4	Common Ostrich	*Struthio camelus*	-ve	-

Table 7: Floatation Analysis of the Selected Primates for Week 1.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Mona Monkey	*Cercopithecus mona*	-ve	-
2	Patas Monkey	*Erythrocebus patas*	300 epg	*Strongyle* egg
3	Vervet Monkey	*Chlorocebus pygerythrus*	-ve	-
4	White Putty nose	*Cercopithecus nictitans*	200 epg	*Strongyle* egg

Table 8: Floatation Analysis of the Selected Primates for Week 2.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Mona Monkey	*Cercopithecus mona*	-ve	-
2	Patas Monkey	*Erythrocebus patas*	100 epg	*Strongyle* egg
3	Vervet Monkey	*Chlorocebus pygerythrus*	-ve	-
4	White Putty nose	*Cercopithecus nictitans*	100 epg	*Strongyle* egg

Table 9: Floatation Analysis of the Selected Primates for Week 3.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Mona Monkey	*Cercopithecus mona*	-ve	-ve
2	Patas Monkey	*Erythrocebus patas*	200 epg	*Strongyle* egg
3	Vervet Monkey	*Chlorocebus pygerythrus*	500 epg	*Strongyle* egg
4	White Putty nose	*Cercopithecus nictitans*	100 epg	*Strongyle* egg

Table 10: Floatation Analysis of the Selected Carnivores for Week 1.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Civet Cat	*Civettictis civetta*	700 epg	*Ancylostoma spp.*
2	Jackal	*Canis aureus*	-ve	-

Table 11: Floatation Analysis of the Selected Carnivores for Week 2.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Civet Cat	*Civettictis civetta*	300 epg	*Ancylostoma spp.*
2	Jackal	*Canis aureus*	-ve	-

Table 12: Floatation Analysis of the Selected Carnivores for Week 3.

S/N	Label (Animal)	Scientific Name	Faeca Egg Count/Gram	Identification
1	Civet Cat	*Civettictis civetta*	500 epg	*Ancylostoma spp.*
2	Jackal	*Canis aureus*	-ve	-

Table 13: Distribution of Endo-parasite in Selected Captive Animals Surveyed in FUNAAB Zoo Park.

Animal/Parasite	*Ascarida galli*	*Coccidia galli*	*Eimeria Spp.*	Strongyle Egg	*Ascaris Spp.*	*Ancylostoma Spp.*	Total Parasite observed
African Grey Parrot	0	+(2)	+(2)	0	0	0	2
White Geese	0	0	0	0	0	0	0
Mallard Duck	+(3)	0	0	0	0	0	1
Common Ostrich	+(1)	0	0	0	0	0	1
Mona Monkey	0	0	0	0	0	0	0
Patas Monkey	0	0	0	+(3)	0	0	1
Vervet Monkey	0	0	0	+(1)	0	0	1
White Putty nose	0	0	0	+(2)	+(1)	0	2
Civet Cat	0	0	0	0	0	+(3)	1
Jackal	0	0	0	0	0	0	0

0 no worm or cyst observed; + worm or cyst present; Number of egg/worm counts in parenthesis

Table 14: Prevalence of Endo-Parasite Infection in Surveyed Wild Animals of FUNAAB Zoo Park.

Endo-parasite	Number of wild animals examined	Number of wild animals infected	Percentage of infections (%)
Ascaridi agilli	10	2	20
Coccidia oocyte	10	1	10
Eimeria spp.	10	1	10
Strongyle spp.	10	3	30
Ascaris spp.	10	1	10
Ancylostoma spp.	10	1	10

DISCUSSION

Results from this study shows that the animals in captivity at the FUNAAB Zoo Park harbor parasites which are of great importance to their health and also that of the staffs and visitors in the zoo especially with the presence of *Ascaridi agilli* which have direct life cycle and can exist insignificant number within the colon putting the animal in a risk of weight depression and can also bring about retarded growth in captive bird (Egbetade *et al*., 2014). Non-invasive studies of wildlife parasites can readily provide data on presence or absence, richness, and prevalence of parasitic infections, thus should not report intensity (Gillespie and Chapman, 2006). Ostriches (*Struthio camelus*) at FUNAAB Zoo Park have enough floor space and have created a spot to defecate which is far from their feeding spots. This may have contributed to the low prevalence of nematode helminths in these birds. There was presence of *Strongyle* egg in the primates. *Strongyle spp.* is an intestinal worm that causes number of symptoms in animals; such as weight loss, abdominal pain, diarrhea etc., and it is soil transmitted. Various studies have suggested that parasite transmission may be occurring between non-human primates and humans (Philipps *et al*. 2004).

CONCLUSION AND RECOMENDATION

Nematode helminths were detected among inmates at FUNAAB Zoo Park. The level of helminth is neither alarming nor unusual. This level is comparable to what is obtainable in most zoos. Screened inmates at the Zoo Park did not show any clinical signs or pathology which suggests mild to moderate infection at sub clinical level. The current level of hygiene at FUNAAB Zoo Park is adequate but there is room for improvement. Rate of de-worming of inmate in the zoo may be increased to further bring the presence of endo-parasites to barest minimum.

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ABOUT THE AUTHORS

Dr. Oladapo Olukoya Oduntan is an Associate Professor of wildlife management. He holds a Ph.D. degree from the University of Ibadan in year 2007. Dr. Oduntan is the immediate past head of department of forestry and wildlife management at the Federal University of Agriculture, Abeokuta. His area of specialization is wildlife extension and human dimension.

Mr. Taiwo Kabir Adebowale is an Assistant Lecturer in the Department of Forestry and Wildlife Management of the Federal University of Agriculture, Abeokuta. He holds a Masters of Wildlife Management from the same institution in 2009. His area of specialization is wildlife extension and human dimension.

SUGGESTED CITATION

Oduntan, O.O. and A.K. Taiwo. 2021. "Survey of Endo-Parasite Composition of Selected Wildlife Species and their Economic Importance". *Pacific Journal of Science and Technology.* 22(2): 207-212.