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Gastrointestinal Helminths of Wildebeest (*Connochaetes taurinus*) in Captivity at Muyambo Park in Lubumbashi / DRC

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ABSTRACT

Several studies have been conducted for identifying and assessing according to the area, the gastrointestinal parasitic load in the wildlife. Recorded results have shown that the parasitic load varies from one area to another and from one animal to another. Furthermore, in tropical regions, climatic conditions favor the development of gastrointestinal helminthiasis in animals.

Knowing that in wildlife animals, including wildebeest (Connochaetes), living in their natural environment, the parasites frequency was reduced by the fact that pastures were large, it felt necessary to know the degree of helminthic infestation in the blue wildebeest (connochaetes taurinus) reared in captivity in a reduced space in Muyambo Park in Lubumbashi. For reaching this goal a descriptive and transversal study based upon Brumpt's sedimentation concentration technique has been done for analyzing stools from 20 blue wildbeest (connochaetes taurinus) living in captivity. Results showed 9 nematodes and one cestode wich are rated as follows according to their prevalence: Trichostrongylus spp (22,1%), Oesophagostomum spp (18,6%), Tænia spp (13,6%), Nematodirus ssp (10,7%), Strongylides spp (7,9%), Bunostomum spp (7,1%), Schistosoma spp (5,7%), Strongylodes spp (5,2%), Haemonchus spp et Ostertagia spp (5%) et Cooperia spp (4 ,2%). 2240 eggs per gram of feces(2240 /g) as eggs average number for approximately 1389 adult worms shows how severe is the infestation in these animals. Thus,

These results have showed a high degree of parasitism helmintic among these wildebeest resident of Muyambo Park. We suggest seasonal rotation of pastures to break the biological cycles of helminths.

Key words: *Helminths, Gastrointestinal, Wildebeest, Captivity, Muyambo Park.*

RÉSUMÉ

HELMINTHES GASTRO-INTESTINAUX DE GNOUS BLEUS (*Connochaetes taurinus*) EN CAPTIVITE A MUYAMBO PARK DE LUBUMBASHI/RDC

*Plusieurs études ont été menées en vue d'identifier et d'évaluer, selon le milieu, le parasitisme gastro-intestinal chez les animaux sauvages. Les résultats enregistrés ont montré que la charge parasitaire varie d'un milieu à un autre et d'un animal à un autre. En plus, dans les zones tropicales, les conditions géo-climatiques contribuent beaucoup au développement des helminthiases gastro-intestinales chez les animaux. Sachant que dans le milieu naturel, la fréquence des parasites chez les animaux sauvages dont les Gnous (Connochaetes**)** était réduite suite aux larges étendues des pâturages, Il s'est avéré nécessaire de connaître le degré du parasitisme helminthique chez les Gnous bleus (Connochaetes taurinus) élevés en captivité sur un espace réduit de Muyambo Park à Lubumbashi. Pour atteindre cet objectif, une étude transversale descriptive basée sur la technique d'enrichissement par sédimentation de Brumpt a été choisie pour analyser les matières fécales de 20 Gnous bleus (Connochaetes taurinus) en captivité. Les résultats obtenus ont mis en évidence 9 Nématodes et un Cestode qui sont par ordre de prévalence: Trichostrongylus spp (22,1%), Oesophagostomum spp (18,6%), Tænia spp (13,6%), Nematodirus ssp (10,7%), Strongylides spp (7,9%), Bunostomum spp (7,1%), Schistosoma spp (5,7%), Strongylodes spp (5,2%), Haemonchus spp et Ostertagia spp (5%) et Cooperia spp (4 ,2%). La moyenne d'œufs calculée de 2240/g de matières fécales pour un nombre approximatif de 1389 vers adultes, témoigne d'une infestation helminthique sévère de ces gnous. De ce fait, Nous suggérons la rotation saisonnière de pâturages pour casser les cycles biologiques des helminthes.*

Mots-clés*: Helminthes, Gastro-intestinaux, Gnous, Captivité, Muyambo Park.*

INTRODUCTION

In antelopes, zoologic group the blue wildebeest belongs to as shown by Soulsby[12], 111 helminths species among which 87 nematodes have been spotted. Several studies considered climate, age, health state, physiologic state et diet as factors predisposing host to helmenthiasis[2]; Horak and al.[8]; Conradie[4]; Mutwiri[10]. According to Beleme and Bakone[1] in natural environment, the frequency of parasites in wild animals was reduced by wide grazing ground. Wildebeest in captivity in Muyambo park were living on a 100 hectare ground next to other herbivores. Parasitism being due to husbandry way and confinement[5], knowing the helminthic gastrointestinal infestation in blue wildebeest (*connochaetes taurinus*) living in the aforementioned park felt uttermost important. Based upon the hypothesis that the blue wildebeests living in Muyambo Park would be severely infested, the following study set the objective of identifying and determine the helminthic gastrointestinal parasitism extent in these animals living in partially confined conditions in this area.

MATERIAL AND METHODS

2. 1.*Study area*. This study was done on 20 blue wildebeest from Muyambo Park in Lubumbashi, in the Haut-Katanga Province in the Democratic Republic of the Congo (DRC). This park, in which other herbivores like giraffe, zebra, antelopes and other animals like primates and birds were also sheltered, was a 100 hectare fenced asset found along the Likasi main road.

The climate of Lubumbashi is Cw_7 according to the köppen climate classification, with alternating rainy (5 months: November-March) and dry (April-October) seasons. The GPS coordinates are 27°29'23, 0''South for latitude and 11°40'19, 1''East-Ouest for longitude. The altitude is 1248 meters. The mean temperature is 20°C (14, 6°C minimum- 36°C maximum). Annual rainfall is 1200 mm[6].

2. 2. *Animals*. Herbivores living in Muyambo Park were in groups and reared in a partially confined way. Their diet was exclusively based on grazing. There were not submitted to any medical check-up. Parameters like sex, age, bodyweight, health and physiologic state were not taken into account in this study.

2. 3. *Sampling*. Accessing the park was too conditional. The permission of accessing it was granted for August only for sampling stools. We sampled three times per week for 4 weeks. The resting areas were spotted at twilight time the day before and early in the morning on the sampling day. Fresh stools were picked up randomly caring not to take feces in direct contact with soil. Samples were kept in plastic bags and stored in an icebox and carried to the Veterinary Laboratory of Lubumbashi for analysis the same day. We could not sample wildebeest stools individually due to animals non-stop roaming. We rather picked feces collectively as Chartier and *al.*[3] and Menzies[9] advise.

2.4. *Fecal analysis*. We resorted to Brumpt's sedimentation concentration technique. This is an approximate technique unlike Mc Master's which is accurate and that could not be used in our research because of the lack of counting slides. However Brumpt's sedimentation concentration technique advantage was that it brought out both nemathelminths and plathelminths eggs. It is an advised technique in less equipped facilities like the ones we worked in.

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Here following method:

- Weigh 5 grams of feces collected from different parts of the sample
- Add some water to the fecal specimen, grind and stir it in order to have a suspension in the mortar
- Sieve the suspension with a tea strainer put on top a beaker
- Grind the strainer residuum and add some water to it before discarding the remainder
- Leave the solution to settle for 2 to 3 hours or centrifuge at 1500 r.p.m for 3 minutes (we had 62 ml of the solution before , but after discarding 30 ml of the supernatant we only remained with 32 ml of the suspension)
- Withdraw a drop of the suspension and put it on a slide then cover it with a cover slip

2. 5. *Identification and Egg counting* We used identification boards for identifying the ova, taking into account their shape (spherical or elongated), the thickness of the shell and their content (cells, morula, and larva). The eggs number per gram of feces was calculated using the following formula given by Fischer and Say[7]: **N= n × a × q.** **N** is eggs number per gram of feces (actual eggs number), **n** is examined slide eggs number (apparent eggs number) and **q** is the 32 ml of suspension for 5 grams of fecal specimen.

Fischer and Say[7] and Menzies[9] think there is a correlation between counted eggs number and approximate number of adult worms present in the body. In this study we used 0, 62 as correlation coefficient suggested by Okombe[11].

RESULTS

The following table shows the result of the research

Table I. Actual eggs number, eggs average number and adult worms number

Species	Number of actual eggs (12 days) and %	Eggs average number/g of feces (n*a*q/12	Adult worms
Bunostomum spp	10 (7.1%)	160	99.2
Cooperia spp	6 (4.3%)	96	59.5
Haemonchus spp	7 (5%)	112	69.4
Nematodirus spp	15 (10.7%)	240	148.8
Oesophagostomum spp	26 (18.6%)	416	257.9
Ostertagia spp	7 (5%)	112	69.4
Schistosoma spp	8 (5.7%)	128	79.3
Strongylides spp	11 (7.9%)	176	109.1
Taenia spp	19 (13.6%)	304	188.4
Trichostrongylus spp	31 (22.1%)	496	307.5
Total	**140 (100%)**	**2240**	**1389**

Analysis of the above table brings out 9 genera of nematodes and one genus of cestodes. 2240 is the average number of eggs per gram of feces and 1889, the approximate number of adult worms infesting 20 blue wildebeest (*Connochaetes taurinu*) living in partially confined conditions in Muyambo Parck. *Oesophagostomum spp* and *Trichostrongylus spp* were the most common genera with respective frequencies of 18, 6% and 22, 1%.

DISCUSSION

Brumpt's sedimentation concentration technique used in this research, allowed us to find 9 nematodes genera and one cestode genus. among the nematodes, we identified the following genera : *Trichostrongylus spp* (22,1%), *Oesophagostomum spp* (18,6%), *Taenia spp* (13,6%), *Nematodirus spp* (10,7), *Strongylides spp* (7,9%), *Bunostomum spp* (7,1%) *Schistosoma spp* (5, 7%), *Haemonchus*

spp and *Ostertagia spp* (5%) The only cestode genus was Cooperia *spp* (4, 3%).

These results are almost similar to those of Soulsby[12] who noticed in antelopes that, out of 111 helminths species, 87 were nematodes. Our average helminths eggs number per gramme of feaces for approximatly 1389 adult worms was 2240. This value was slightly superior to Mutwiri's[10], who found 2220 eggs/g of faeces in Thomson's gazelles (*Gazella thomsonii*). Our adult worms number was superior to 407 and 588 of Conradie[4], found in his research in blue wildebeest (*Connochaetes taurinus*) and black wildbeest (*Connochaetes gnou*), but less than 1610 for adult worms from the reseach of Horak and *al.*[8] done in blue wildebeest (*C. taurinus*) in South Africa.

The high number of parasites, expressing the severe parasitism in gnus living in Muyambo Park, seems to confirm the theory of Beleme and Bakone[1] according to which the wider is the pasture the lesser is parasitism.

For Dakkak and Ouhelli[5], the coprological diagnosis, although having multiple drawbacks, brings out important information. Eggs number per gram of feces higher than 600, reveal an number of adult worms, sufficiently enough to cause physiological disturbances. The average eggs number, 2240 per gram of feces, calculated from wildebeest reared in Muyambo Park, shows that these animals were severely infested although no apparent clinical sign related to physiological disturbance was observed in them.

CONCLUSION

Wildebeests living in partially confined conditions in Muyambo ¨Park, were infested by 9 genera of nematodes and only one genus of cestodes. The average eggs number per gramme of feaces was 2240, for 1389 as an approximate number of adults worms. We advised the manager of the park no to trust the apparent good health state of these animals, but to issue a consistent deworming schedule.

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