

PREVALENCE OF GASTROINTESTINAL PARASITES AND THEIR EFFECTS ON THE HAEMATOLOGICAL AND SERUM BIOCHEMICAL VALUES IN INFECTED ONE HUMPED CAMEL (*CAMELUS DROMEDARIUS*) IN THE SEMI- ARID REGION OF SOKOTO STATE, NIGERIA

¹Abdullahi M; ²Mohammed A. K ; and ³Okubanjio O. O.

¹Equine and Camel Research Programme, National Animal Production Research Institute, Ahmadu Bello University, Shika- Zaria, Nigeria

²Animal health Unit, National Animal Production Research Institute, Ahmadu Bello University, Shika Zaria, Nigeria

³Department of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, Ahmadu Bello University Zaria, Nigeria

Correspondence: abbankabeer@gmail.com (+2348039681419)

ABSTRACT

The objective of this study was to determine the prevalence of gastrointestinal parasites and their effects on the haematological and serum biochemical profiles in the dromedary camels in semi- arid region of northern Nigeria (12°N, 700 to 800mm annual rainfall). The study included apparently healthy 208 camels made up of 116 (55.8%) males and 92 (44.2%) females of varying age groups from seventy three 73 herds in seven Local Government Areas which were further categorized into border (Illela, Gada and Tangaza) and non-border (Gwadabawa, Kware and Goronyo) to Niger Republic and a municipal abattoir (Sokoto North) from Sokoto State. The four genetic strains of camels available were sampled (Ja, baki, bule and kurri). Faecal samples were taken through rectum and examined using floatation and sedimentation techniques for gastrointestinal oocysts/ parasites and their effects on blood profiles. The overall prevalence of gastrointestinal parasitic infections was 29.3%. Five gastrointestinal oocysts/ parasites detected were *coccidian* 'sp' (n= 10 or 16.4%), *Strongyle* 'sp' (n=24 or 39.3%), *Oxyuris* 'sp' (n=14 or 23.0%), *Trichuris* 'sp' (n=12 or 19.7%) and *Ostertagia* 'sp' (n=1 or 1.60%) and there were no multiple infections seen. There was significant increase (P < 0.05) in the value of eosinophils. There was also a statistical significant difference between infected and non-infected camels with significant increase in the values of Na⁺, Cl⁻ and HCO₃⁻. This study gives an indication of some of the common animal health challenges usually encountered under the extensive camel production system in a semi- arid zone of Nigeria and the need for effective animal health care.

Key words: camels, gastrointestinal parasite, prevalence, blood profiles, Sokoto State.

INTRODUCTION

Gastrointestinal parasites are known to affect the health of camels leading to Anaemia, abortion and death when burden is high. There are several reports of prevalence of gastrointestinal parasites of camels from some parts of Nigeria, Africa and Asia (Mahmuda *et al.*, 2014; Swai *et al.*, 2011 and Bathia *et al* 2010). Camel meat is currently becoming table meat in many parts of the world including Sokoto- Nigeria (where an average of 5 camels are slaughtered daily in Sokoto central abattoir) (Khalid *et al.*, 2015). Currently, there is an increase in the use of camel for farm work because of greater tractive efficiency when compared with work bulls and donkeys (Mohammed and Mansoor, 2013). The four genetic strains of camels available in the Nigeria-Niger corridor include; (Ja, baki, bule and kurri) (Abdussamad, *et al.*, 2015). This study was conducted to determine the prevalence of gastrointestinal parasites and their effects on the haematological and serum biochemical profiles in the dromedary camels from herds and those slaughtered in Sokoto State (semi- arid region of northern Nigeria).

MATERIALS AND METHODS

Purposive sampling method (based on availability of camel and farmer's consent and hence doesn't require determination of sample size) was used to sample 208 apparently healthy camels made up of 116 (55.8%) males and 92 (44.2%) females of varying age groups from seventy three 73 herds and a

municipal abattoir in seven Local Government Areas (Illela, Gada, Tangaza, Gwadabawa, Kware, Goronyo and Sokoto North) of the State.

About Five grams (5 g) of faeces were collected by inserting hand pre-dressed with sterile polythene bag. Content of the rectum was evacuated and inverted into the polythene bag.

Ten milliliters (10 ml) of blood was aseptically collected from jugular vein of 208 camels using a 16 gauge needle on a 20 ml syringe. Five milliliters was put into two separate bijoux bottles containing disodium salt of ethylene diamine tetra-acetic acid (EDTA) as anticoagulant for haematological analysis while the remaining 5 ml was put in to a test tube to harvest serum. The samples were transported on ice pack and processed at the Parasitology Laboratory, Department of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, Usmanu Dan Fodiyo University Sokoto, Nigeria.

In the laboratory, fecal floatation and sedimentation techniques as described by Charles, (2002) were used to examine for eggs and oocysts in all the fecal samples collected. Other investigations carried out were; red blood cell count which includes, total red blood cell (RBC), determination of packed cell volume (PCV), hemoglobin (Hb) measurement and erythrocytic indices which includes mean corpuscular volume (MCV), the mean corpuscular hemoglobin (MCH) and the mean corpuscular hemoglobin concentration (MCHC), as described by, (Mosby and Margi, 1995). Also, examined were white cell counts which include, WBC, neutrophils, eosinophils, lymphocytes, monocytes and basophils as described by Mosby and Margi (1995).

The serum biochemical profiles were also analyzed as described by Mosby and Margi, (1995):

Liver Function Tests (Tests for Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkanine phosphatase (ALP), Determinations of Serum Albumin and Globulin).

Renal Function Tests (Determinations of Serum Urea and Creatinine).

Determination of Electrolytes Levels (Na^+ , K^+ , Cl^- , HCO_3^- and Ca^{2+}).

Prevalence:

$$P = \frac{\text{Number of positive samples}}{\text{Total sample analyzed}} \times 100$$

The obtained data was analyzed using statistical package for social science (SPSS IBM, 2011) version 20.0 as follows:

Chi square test: To test for association between variables and infections.

T-test: To compare the haematological and serum biochemical values between infected and non-infected camels.

Probability values of less than 0.05 ($P < 0.05$) were considered statistically significant.

Results

Out of the 208 camels examined, 116(55.7%) camels were males while 92(44.3%) were females. A total of 90(43.2%) were young, 25(12.1%) were growers while, 93(44.7%) were adults from seventy three 73 herds in seven Local Government Areas which were further categorized into border (Illela, Gada and Tangaza) and non-border (Gwadabawa, Kware and Goronyo) to Niger Republic and a municipal abattoir (Sokoto North) from Sokoto State. The four genetic strains of camels available were sampled (Jabaki, bule and kurri).

Discussion

The finding of slightly higher prevalence of GIT parasites in adult camels (32.3%) from table 1, in this study is in line with the finding of Bathia *et al.*, (2010) who reported higher prevalence of GIT parasite eggs/oocysts in age categories (>3-10) than (<3 years) and (>10 years) camels. However, The occurrence of helminthosis in camels at the age range of less than 3 years may suggests a possibility of early **INTRODUCTION** of young camels to grazing fields and subsequent increase in larval uptake (Mahmuda *et al.*, 2014).

Table 1: Overall prevalence of gastrointestinal parasites in relation to Sex and Age

of camels in study areas in Sokoto State, Nigeria.

Variable	Total number examined	Positive n(%)	χ^2	P-value
Sex				
Male	116	34(29.3)	0	0.995
Female	92	27(29.3)		
Total	208			
Age				
<5 years	90	24(26.7)	0.714	0.700
5 years	25	7(28)		
>5 years	93	30(32.3)		
Total	208			

Not significant at $P > 0.05$

There was significance difference ($P < 0.05$) between infected and non-infected camels in the value of eosinophils (Table 2). This could be attributed to the fact that, eosinophilia is typically seen during parasitic infection. This occurs when the body responds by moving eosinophils into the area and releasing a variety of toxins (Ekiz, 2013).

Table 2: Differential leucocyte values for infected and non- infected camels with gastrointestinal parasites in study areas in Sokoto State, Nigeria.

Parameter	Infected Mean $\pm$ SEM	Non infected Mean $\pm$ SEM	P- value	Significance
WBC($\times 10^6$ /mm ³)	14.278 $\pm$ 0.337	14.326 $\pm$ 0.315	0.9180	NS
Neutrophils (%)	33.544 $\pm$ 1.286	33.236 $\pm$ 0.784	0.8390	NS
Lymphocytes (%)	49.277 $\pm$ 0.698	47.443 $\pm$ 0.644	0.0550	NS
Monocytes (%)	6.114 $\pm$ 0.472	5.911 $\pm$ 0.197	0.6920	NS
Eosinophils (%)	11.934 $\pm$ 0.387	4.876 $\pm$ 0.295	0.0000	S
Basophils (%)	1.049 $\pm$ 0.160	1.183 $\pm$ 0.895	0.4670	NS

Significant at $P < 0.05$

The significance difference ($P < 0.05$) between infected and non-infected camels with decrease in the value of Na^+ , Cl^- and HCO_3^- in the infected camels could be attributed to the loss in these electrolytes in body fluid as a consequence of diarrhea due to infection with GIT parasites .

Table 4: T-test Group Statistics for Serum Biochemical Profiles between Infected and Non-infected Camels with GIT Parasites

Parameter	Infected Mean $\pm$ SEM	Non infected Mean $\pm$ SEM	P- value	Significance
ALT(u/l)	17.204 $\pm$ 0.038	17.266 $\pm$ 0.035	0.2370	NS
AST(u/l)	63.985 $\pm$ 2.315	64.208 $\pm$ 1.321	0.9340	NS
ALP(u/l)	81.082 $\pm$ 2.847	82.236 $\pm$ 2.089	0.7440	NS
U/nitrogen (mg/dl)	4.988 $\pm$ 0.253	5.792 $\pm$ 0.313	0.0480	NS
Creatinine(mg/dl)	78.229 $\pm$ 2.910	73.278 $\pm$ 1.714	0.1460	NS
Albumin(g/l)	31.541 $\pm$ 0.703	32.510 $\pm$ 0.480	0.2580	NS
Globulin(g/l)	34.332 $\pm$ 0.854	35.102 $\pm$ 0.459	0.4300	NS
Na^+ (mmol/l)	131.475 $\pm$ 0.66	139.755 $\pm$ 1.339	0.0000	S
K^+ (mmol/l)	4.954 $\pm$ 1.264	7.567 $\pm$ 0.873	0.0920	NS
Ca^{2+} (mmol/l)	2.437 $\pm$ 0.331	3.365 $\pm$ 0.800	0.2850	NS
Cl^- (mmol/l)	94.704 $\pm$ 1.717	103.748 $\pm$ 1.287	0.0000	S
HCO_3^- (mmol/l)	19.901 $\pm$ 0.621	25.102 $\pm$ 0.294	0.0000	S

There was significance difference ($P < 0.05$) between infected and non-infected camels in the value of Na^+ , Cl^- and HCO_3^- .

CONCLUSION

The gastro intestinal parasites that affect camels in Sokoto State were; *coccidian* 'sp', Strongyle 'sp', *Oxyuris* 'sp' and *Trichuris* 'sp' with respective prevalence as; *coccidian* 'sp' 10 (16.4%) Strongyle 'sp' 24 (39.3%), *Oxyuris* 'sp' 14 (23.0%), *Trichuris* 'sp' 12 (19.7%) and *Ostertagia* 'sp' 1 (1.60%).

RECOMMENDATION

Other basic research on gastrointestinal parasitic infections of camels in the study area is recommended.

REFERENCES

- Abdussamad, A.M., Charruau, P., Kalla, D.J.U and Burger, P.A. (2015). Validating local knowledge on camels: Colour phenotypes and genetic variation of dromedaries in the Nigeria-Niger corridor. *Livestock Science* 18(1)131–136.
- Bathia, B. B., Pathak, K. M. C and Junyal, P. D (2010). *The gastrointestinal parasites of camel*. 3rd Revised Edition. Kalyani publishers, India. Pp. 37- 40.
- Charles, M (2002). *Diagnostic Parasitology for Veterinary technicians*. 3rd edition. Hendrix Ed Robinson publishers- Mosby.Pp.79- 82.
- Ekizaed, E. E., and Yalcintan (2013). Comparison of certain haematological and biochemical parameters regarding pre-slaughter stress in saanen, maltese, gokceada and hair goat kids. *Journal of the faculty of veterinary medicine, istanbul university*, 39(2), 189-196.
- Mahmuda, A., Mohammed, A. A., Alayande, M. O., Habila, Y. I., Lawal, M. D., Usman, M., Raji, A. A., Saidu, B., Yahaya, M. S and Suleiman, N (2014). Prevalence and distribution of gastrointestinal parasites of working camels in Sokoto metropolis, *Veterinary World*, 7(3): 108-112
- Mohammad, H. R and Mansour, A. G (2013). Common gastrointestinal parasites of indigenous camels (*Camelus dromedarius*) with traditional husbandry management (free-ranging system) in central deserts of Iran.*Journal of Parasitological Diseases* 37(2): 225–230.
- Mosby and Margi. S (1995). *Veterinary Clinical Laboratory Procedures*. 2nd edition Pp. 35- 38
- Khalid, A., Mushta, Q. A and Caroline, W(2015). Ethnoveterinary medicinal plant knowledge and practice among the tribal communities of Thakht-e-Sulbaiman hills, West Pakistan, doi:10.1016/j.jep.2015.05.022.
- Swai, E. S., Moshly, W., Mshanga, D., Lutatina, J and Bwanga, S (2011). Intestinal parasitic infections of camels in the agro and pastoral areas of northern Tanzania. *Livestock Research for Rural Development*, 23: (5)
- Statistical Package for Social Sciences (2011). IBM version 20. 0. IBB component U.S.A