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Effect of Strongyle on Haematological Parameters of Cattle in Maiduguri, Borno State, Nigeria.

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Abstract: *Study was conducted on the effect of gastrointestinal strongyle on the blood picture of cattle according to sex, age and breed using Maiduguri central Abattoir Borno State. The blood parameters considered in this study were the packed cell volume (PCV), haemoglobin concentration (Hb), Red blookd cell (RBC) count, white blood cells (WBC) count and the differential leucocyte count (DLC). A total of 153 cattle were sampled, 65 were found to be positive for strongyle ova, but analysis of the results show that males and females of different ages and breeds are equally susceptible to the gastrointestinal strongyle infection. The only significant variation in hematological parameters was observed in breeds.*
Keywords: *Bovine, strongylosis, full blood count.*

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I. Introduction

Bovine strongylosis consist of large group of nematodes that parasitizes the gastro intestinal tract of cattle such as *Haemonchus placei, Trichostrongylus axei, Cooperia punctata, Nematodirus fillicolis* etc which together belong to the super family *Trichostrongyloidea* (Mitchell et. al., 1985). Gastrointestinal helminths are ubiquitous parasitic agents of livestock especially ruminants and are known to limit cattle production in many areas and countries (Keyyu et al., 2005). Mortality of animals due to parasitic diseases may not be alarming at times but their indirect effects on livestock productivity and their zoonotic impact on human health are considerably greater (Nwosu et al., 2007; Ekong et al., 2012). Indirect losses associated with helminth infections include the reduction in productive potential such as decreased growth rate, weight loss, diarrhea, anorexia, and sometimes anaemia (Gonzalez and Gonzalez, 2004 ;Swai et al., 2006). The most important predisposing factors of helminth infections are grazing habits, climate, nutritional deficiency, pasture management, immunological status, vector, presence of intermediate host, and the number of infective larvae and eggs in the environment (Radostits et al., 1994).

II. Materials And Methods

Study Area

The study was conducted in Maiduguri the capital city of Borno State, Nigeria. Maiduguri has an area of about 69,436 km^2 and lies between latitude $11^0$32 North and $11^0$42 North and longitude $13^0$20 east and $13^0$25 East, temperature of 40-45^{o}c and rainy season of about 3-4 months (June- September) (Udoh, 1981; Mbaya *et. al.*, 2006).

Blood Collection

About 5ml of blood was collected from the severed jugular vein of each cattle into a sterile bijou bottle containing ethylenediametetracetic acid (EDTA) solution as an anticoagulant.

Faeces Collection

Faecal samples were collected per rectum using sterile polythene bag. A minimum of 10g of faeces was collected from each animal and each sample was placed in a cold flask and transported to the laboratory for processing.

Faecal Analysis

Qualitative test was carried out on each sample using the improved modified faecal floatation method (Hansen and Perry, 1990)

Determination of Packed Cell Volume (PCV)

The PCV was read by the use of a haematocrit reader as decribed by (Jain and Kelly, 1984).

Determination of Haemoglobin (Hb) Concentration

The concentration of haemoglobin was determined by cyanmethaemoglobin method as described by (Jain, 1993).

Determination of Red Blood Cell (RBC) Count

Red blood cells dilution solution and pipette from the haemocytometer kit were used (Brown, 1976).

Determination of White Blood Cell (WBC) Count

The procedure was carried out according to the protocol as described by (Brown, 1976).

Differential Leucocytes Count (DLC)

The differential leucocytes count was conducted as described by Coles (1986).

STATISTICAL ANALYSIS

The data obtained in the study were summarized as means and standard deviations using statistical model and Microsoft excel software.

Table 1: Result of gastrointestinal strongylosis of cattle and associated haematological changes (mean ± standard deviation) according to sex

Parameters Mean ± SD	Males		Females		Normal ranges (Schalm et. al., 1975)
	Number Examined (apparently healthy) 61	Number Infected 19 (31%)	Number Examined (apparently healthy) 92	Number Infected 45 (49%)	
1. PCV (%)	32 ± 5.1	30 ± 4.7	28 ± 4.8	24 ± 4.6	24 – 46
2. Hb (g/dL)	10.2 ± 2.0	8.8 ± 1.8	9.1 ± 1.9	7.9 ± 1.4	8 – 15
3.WBC($\times10^3$/µL)	9.1 ± 2.2	8.2 ± 1.6	7.5 ± 1.7	6.7 ± 1.4	4 – 12
4.RBC($\times10^6$/µL)	8.2 ± 1.3	7.9 ± 1.4	7.0 ± 1.1	6.0 ± 1.2	5 – 10
5. Neutrophils	1906 ±465.2	1742 ±433.7	1880 ±442.8	1600 ±398.1	600 – 4000
6. Eosinophils	923 ±285.6	1055 ±317.4	952 ±293.3	1053 ±323.5	0 – 2400
7. Basophils	0	0	0	0	0 – 200
8. Lymphocytes	5078±1162.8	4472 ± 968.2	4425 ± 924.5	3834 ±845.3	2500 – 7500
9. Monocytes	262 ± 62.8	223 ± 57.8	229 ± 58.2	209 ± 51.6	25 – 840

Table 2: Result of Gastrointestinal strongylosis of cattle and associated haematological changes (mean ± standard deviation) according to age.

Parameters Mean ± SD	Adults (> 12 months)		Young (< 12 months)		Normal ranges (Schalm et. al., 1975)
	Number Examined (apparently healthy) 135	Number Infected 57 (42%)	Number Examined (apparently healthy) 18	Number Infected 4 (22%)	
1. PCV (%)	30 ± 4.7	27 ± 4.2	28 ± 4.3	28 ± 4.8	24 – 46
2. Hb (g/dL)	9.7 ± 2.1	8.4 ± 1.6	8.8 ± 1.7	8.2 ± 1.5	8 – 15
3.WBC($\times10^3$/µL)	8.3 ± 2.0	7.3 ± 1.8	7.0 ± 1.6	6.4 ± 1.7	4 – 12
4 RBC($\times10^6$/µL)	7.7 ± 1.8	6.7 ± 1.4	6.4 ± 1.1	6.2 ± 1.4	5 – 10
5. Neutrophils	1945 ±484.2	1896 ±472.3	1544 ±421.7	1523 ±417.2	600 – 4000
6. Eosinophils	902 ± 292.3	1175 ±348.1	862 ± 278.2	1024 ±318.9	0 – 2400
7. Basophils	0	0	0	0	0 – 200
8. Lymphocytes	4424 ± 881.2	4427 ± 879.1	4097 ± 823.4	3974 ± 787.6	2500 – 7500
9. Monocytes	260 ± 63.4	281 ± 72.8	179 ± 48.2	179 ± 53.6	25 – 840

Table 3: Result of Gastrointestinal strongylosis of cattle and associated haematological changes (mean ± standard deviation) according to breed.

Parameters Mean ± SD	Red Mbororo		Sokoto Gudali		Kuri		White Fulani		Normal ranges (Schalm et. al., 1975)
	Number Examined (apparently healthy) 101	Number Infected 36 (36%)	Number Examined (apparently healthy) 21	Number Infected 10 (48%)	Number Examined (apparently healthy) 12	Number Infected 7 (58%)	Number Examined (apparently healthy) 19	Number Infected 12 (63%)	
1. PCV (%)	30 ± 4.8	24 ± 5.7	28 ±4.2	23 ±5.1	28 ±3.8	29 ±5.0	25 ±4.7	22 ±5.3	24 – 46
2. Hb (g/dL)	9.8 ± 1.8	7.7 ± 2.0	7.9 ±1.9	7.6 ±2.1	10.3 ±1.6	10.4 ±1.8	7.9 ±2.0	7.6 ±2.2	8 – 15
3. WBC ($\times10^3$/µL)	8.5 ± 2.0	7.0 ±2.1	7.7 ±1.6	6.8 ±2.4	7.7 ±1.8	8.1 ±2.2	7.4 ±1.5	7.3 ±2.3	4 – 12
4. RBC ($\times10^6$/µL)	7.6 ± 1.2	6.0 ±1.8	7.2 ±1.1	6.3 ±1.4	7.3 ±1.5	7.8 ±1.6	7.1 ±1.6	6.7 ±1.2	5 – 10
5.	1993	1623	2016	1508	2164	2524	1694	1647 ±	600 –

Neutrophils	±474.8	450.3	±517.2	±421.5	±535.6	±572.1	±447.2		4000
6. Eosinophils	897 ± 224.6	1000 ±268.3	971 ±241.4	1084 ±302.4	1031 ±281.5	1479 ±327.9	975 ±298.4	1098 ±311.2	0 – 2400
7. Basophils	0	0	0	0	0	0	0	0	0 – 200
8. Lymphocytes	4424 ± 881.2	3932 ±788.6	4672 ±816.8	3876 ±824.2	4340 ±860.3	5286 ±1041.7	4208 ±882.1	3960 ±811.9	2500 – 7500
9. Monocytes	260 ± 63.4	233 ±61.4	291 ±84.6	262 ±68.9	253 ±53.7	320 ±92.4	231 ±58.8	2220 ±48.1	25 – 840

III. Result

A total of 153 cattle were sampled base on sex, age and breed. Out of the 61 apparently healthy males examined, 19 (31%) were found to be positive for strongyle ova. Also out of the 92 apparently healthy females examined, 45 (49%) were found to be positive for strongyle ova. All haematological parameters evaluated are within the normal ranges ($p>0.05$) except the haemoglobin concentration (Hb) of the infected cows (female) that was slightly below the normal range. Though the Hb concentration of infected males was in its lower limit, the absolute eosinophils count of both the infected males and females were at their high values. The packed cell volume (PCV) of infected female was at its lower limit.

In Table 2, out of the 135 apparently healthy adult cattle examined, 57 (42%) were found to be positive for strongyle ova. Also out of the 18 apparently healthy young cattle examined, 4 (22%) were found to be positive for strongyle ova. All the haematological parameters were within the normal ranges ($p>0.05$), though the absolute eosinophils count of both the infected adult and young cattle were at their high values. In Table 3, out of the 101 apparently healthy Red mbororo cattle breed examined, 36 (36%) were found to be positive for Strongyle ova. Out of the 21 apparently healthy Sokoto Gudali cattle breed examined, 10 (48%) were found to be positive for Strongyle ova, and out of the 19 apparently healthy white Fulani cattle breed examined, 12 (68%) were found to be positive for strongyle ova. The packed cell volume (pcv) of infected sokoto Gudali and the white Fulani cattle breeds are below the normal range while pcv of infected Red mbororo cattle breed was at its lower limit. The haemoglobin concentration (Hb) of infected Red mbororo, Sokoto Gudali and white Fulani were slightly below the normal range. The Hb of non infected Sokoto Gudali and white Fulani were also slightly below the normal range. The absolute lymphocyte count of Kuri breed was at its high value. The absolute eosniophils count of all the infected breeds were at their high values. All other parameters are within the normal ranges ($p>0.05$).

IV. Discussion

There was no significant difference in all the haematological parameters studied except that the PCV of infected Sokoto Gudali and White Fulani that were slightly below the normal range and the Hb of infected Sokoto Gudali, white Fulani and red mbororo that were also slightly below the normal range. These indicate that, the effect of the strongyle is more pronounce according to breed than age and sex, these agree with the findings of Prolamkarn et. al 1997. The result indicated that males and females of all ages from different breeds were equally susceptible to the infection by gastrointestinal strongyle. Some of these gastrointestinal tract parasites (especially *Strongyles*) are active blood suckers; where there is heavy parasitic burden, they caused anaemia (Burden et al., 2010). The results of this study shows that cattle of Maiduguri are commonly infested with a variety of gastrointestinal parasite species, with Strongyle ova having a prevalence of 34.4% which also agrees with the work of (Biu et al. 2009). The incidence of parasitic gastro-enteritis of ruminants is usually high especially those kept under traditional methods of husbandry, with insidious effects that undermine host health particularly when compounded by additional stress such as malnutrition, (Pal and Qayyum, 1993), a common penalty in this semiarid region of northeastern Nigeria (Biu et al., 2006). Though,this study has not revealed any significant difference in infestation and egg output among age,sex and breed of the ruminants investigated, (Biu et al., 2009).

V. Conclusion

It is therefore concluded that the PCV and Hb of cattle breed studied were slightly below the normal range, this indicate that the effect of the strongyle is more pronounce according to breed than age and sex.

VI. Recommendation

It is therefore recommended that further studies should be carried out on other gastrointestinal parasite to determine their effect on haematological parameters.

Reference

[1]. Biu A.A., Ahmed M.I., Mshelia S.S. (2006). Economic assessment of losses due to parasitic diseases at the Maiduguri abattoir, Nigeria. African . Scientist, 7:143-145

[2]. Biu., A. A., Maimunatu , A., Salamatu, A. F. and Agbadu, E. T. (2009). A faecal survey of gastrointestinal parasites of ruminants on the University of Maiduguri *Research Farm International Journal of Biomedicaland HealthSciences*. Vol. 5, No. 4Pp,175-179.

[3]. Brown, B.A. (1976). *Haematology. Principles and Procedures 2nd Edition*. Lea and Febiger, Philadelphia, pp. 56 – 81.

[4]. Burden F. A., Du Toit N., Hernandez-Gil M., Prado-Ortiz O., Trawford A. F.(2010). Selected health and management issues facing working donkeys presented for veterinary treatment in rural Mexico: some possible risk factors and potential intervention strategies. *Tropical Animal Health and Production*. 2010;42(4):597–605. doi: 10.1007/s11250-009-9462-0. [PubMed] [Cross Ref]

[5]. Coles EH (1986). *Veterinary Clinical Pathology*. 4th Ed., W.B. Saunders Company, Philadelphia, London and Toronto.

[6]. Ekong, P. S., Juryit, R., Dika, N. M., Nguku, P. and Musenero, M. (2012) "Prevalence and risk factors for zoonotic helminth infection among humans and animals—Jos,Nigeria, 2005–2009,"*The Pan African Medical Journal*,vol.12, article 6,.

[7]. Gonzalez, R. and Gonzalez, A. C. (2004) "Alternatives for the control of gastrointestinal nematodes in sheep*," in Proceedings of the European Population Forum* (EEPF'04), Matanzas,Cuba,.

[8]. Hansen J, Perry B. (1990).The epidemiology, diagnosis and control of gastrointestinal parasites of ruminants in Africa. P.O. Box-30709, Nairobi, Kenye: *The International Laboratory for Research on Animal Diseases*;. p.107.

[9]. Jain CJ: (1993) *Essentials of Veterinary Hematology*. Philadelphia, Lea and Febiger, 1993, pp 19-53.

[10]. Jain, C.J., and Kelly, W.R. (1984): *Veterinary Clinical Diagnosis 3rd Edition*, Bailliere Tindall London, pp 312-335.

[11]. Keyyu, J. D., Monrad, J. Kyvsgaard, N. C. and Kassuku, A. A. (2005) "Epidemiology of Fasciola gigantic and amphistomes in cattle on traditional, small-scale dairy and large-scale dairy farms in the southern highlands of Tanzania," *Tropical Animal Health and Production*,vol.37, no.4,pp. 303–314,.

[12]. Mbaya, A.W.; Nwosu, C.O.; Aliyu M.M. and Ahmed, T. (2006): A Comparative Study of Gastrointestinal Parasites of Captive and Free-Living Wild Animals in the Semiarid Zone of the North Eastern Nigeria. *Nigerian Journal of Experimental and Applied Biology* 1:59-63.

[13]. Mitchell, G.B.B et al., (1985). Resource veterinary science, 38,197.

[14]. Nahed-Toral, J., opez-Tirado, Q. L., Mendoza-Mart´ınez, G., Aluja-Schunemann, A. and Trigo-Tavera, F. J. (2003) "Epidemiology of parasitosis in the Tzotzil sheep production system," *Small Ruminant Research*,vol.49, no.2,pp.199–206,.

[15]. Nwosu, C. O., Madu, P. P. and Richards, W. S. (2007)"Prevalence and seasonal changes in the population of gastrointestinal nematodes of small ruminants in the semi-arid zone of north-eastern Nigeria,"*Veterinary Parasitology*,vol.144,no. 1-2,pp.118–124,.

[16]. Pal, R.A. and Qayyum, M. (1993). Prevalence of gastro intestinal nematodes of sheep and goats in upper Punjab Pakistan. *Pakistan Veterinary Journal* 13 (3): 138-141

[17]. Prolamkarn, W., Pandey,V.S., Ngampongsai, W., Choldumrongkul, S., Saithanoo, S., Rattanachon, L. and Verthust, A.(1977). Genetic resistance of three genotypes of goats to experimental infection with Haemonchus contortus. *Veterinary Parasitology* 8: 79-90.

[18]. Radostits, O. M., Blood, D. C. and Gay, C. C. (1994) "Diseases caused by helminth parasites," inVeterinary Medicine: *A Textbook of Diseasesof Cattle,Sheep,Pigs,Goats and Horses*, pp. 1223–1230,Bailliere Tindall, London, UK, 8th edition.

[19]. Schalms, O.W.; Jain, N.C. and Carrol, E.J. (1975): *Veterinary Haematology, 3rd Edition*, Philadelphia: Lea and Febiger. Pp, 197-199.

[20]. Swai,E.S., Mtui, P.F., Mbise, A.N., Kaaya E., Sanka, P. and Loomu, P.M. (2006)"Prevalence of gastrointestinal parasite infections in Maasai cattle in Ngorongoro District, Tanzania," *Livestock Research for Rural Development*,vol.18,no.8.

[21]. Udoh, R.K. (1981): *Geographical Region of Nigeria.* Heinemann Education Books Ltd. Ibadan Nigeria.

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