DOI: 10.21276/sjmps.2017.3.3.16

Saudi Journal of Medical and Pharmaceutical Sciences
Scholars Middle East Publishers
Dubai, United Arab Emirates
Website: http://scholarsmepub.com/

ISSN 2413-4929 (Print)
ISSN 2413-4910 (Online)

Original Research Article

Prevalence of Gastrointestinal Parasites and their impact in Domestic animals in Vom, Nigeria

Dogo, G. I. Abraham[1], Karaye, P. Gloria[1,] Patrobas, M.G.[1], Galadima, M.[3] and Gosomji, I.J.[2]
[1]Department of Veterinary Parasitology and Entomology, University of Jos, Jos, PMB 2084, Plateau State, Nigeria
[2]Department of Veterinary Anatomy, University of Jos, Jos, PMB 2084, Plateau State, Nigeria
[3]Department of Veterinary Surgery, Medicine and Radiology, University of Jos, Jos, PMB 2084, Plateau State, Nigeria

***Corresponding Author:**
Dogo, G. I. Abraham
Email: gonidogo@gmail.com

Abstract: In order to establish the prevalence and impact of helminths in domestic animals in Vom, Central Nigeria between January 2009 - December 2010, a total of 1,508 faecal samples from various breed of domestic animals viz: cattle, sheep, dogs, pigs, horses, rabbits and goats were carefully examined using formal ether concentration technique. Out of the 556 cattle faeces examined, 480(31.8%) were infected and positive for multiple helminthic infection, *Strongyle*-like eggs (43.2%) and *Eimeria bovis* (13.3%) *Moniezia* worms (0.5%). From 204 of Canine (dogs) faecal samples examined, 52 (3.5%) were infected. *Ancylostoma braziliense* (12.8%), *Troglotrema salmincolo* 0.5%). Caprine (Goats) faecal samples indicated *Eimera parvi* (19.3%) and *Nematodirus spathiger* (0.5%), *Oesophagostomum columbianum* (0.5%). Equine (Horse) samples indicated *Strongylus spp* (92.3%) while *Triodontophorus tenuicollis* (7.7%). In Laprine (Rabbits), *Eimeria stiedia* was (66.7%) while *E. intestinalis* was (33.3%). Ovine (Sheep) had *Eimeria species* (65.1%) and *Strongyle-like eggs* (66.3%) while *Taenia hydatigena* (1.2%); Swine (Pig) samples, *Oesophagostomum dentatum* (20.8%) and *Schistosoma suis* (0.4%) respectively. In all, 963 samples were positive for different parasites with the overall prevalence of 63.8%. The study revealed that gastrointestinal parasites and their eggs are still endemic in the study area which is indicative of a neglect of simple management practices which has a negative impact on Livestock production in Nigeria.

Keywords: Prevalence, Gastrointestinal Parasites, Domestic, North-Central Nigeria

INTRODUCTION

In Nigeria, it is well known that helminths and parasitic diseases are among the major factors that are responsible for the low profitability and efficiency of livestock production (Adejinmi *et al.*, [1]. The gastrointestinal tract (GIT) of animals harbor a variety of parasites particularly helminthes, which causes clinical and sub clinical parasitism. These parasites adversely affect the health status of animals and cause enormous economic losses to the livestock industry [2]. Other economic losses are poor work performance, involuntary culling, lower milk production, treatment costs and mortality in heavily parasitized animal [3]. The mature worms produce toxins that migrates to the red blood cells, which causes unthrifty anaemic condition while the Immature worms migration through the body tissues, open the way for bacteria and fungi complication [4]. 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 [5, 6]. The effect of helminth infections is determined by a combination of factors, of which the varying susceptibility of the host species, the pathogenicity of the parasite species, the host/parasite interaction, and the infective dose are the most important [7, 6]. Enormous economic losses have been associated with parasitic diseases such as Trypanosomiasis, Fascioliasis and parasitic gastroenteritis which are often neglected [8-10]. Environmental factors and vector abundance have been incriminated in the distribution of most parasitic diseases. Gastrointestinal parasites are common in both temperate and tropical countries, but more prevalent in warm countries where sanitation is poor and standard of living is low [11]. Fecal samples submitted to the diagnostic Laboratory. Helminthologyunit, National Veterinary Research Institute Vom, were screened for Gastrointestinal nematodes and eggs. The aim of this report is to provide information on the prevalence and significance of gastrointestinal parasites and their eggs in Vom and environs in Plateau state, Nigeria.

MATERIAL S AND METHOD

Study area

Description of the study area The research was carried out in Jos South Local Government Area of Plateau State, which is located around Coordinate 9º 46'N 8º 48'E/9.767º N, 8.800º E and the area of 5,104 km2 (1,971m2).The major ethnic group are Berom beside other major settlers like Hausa, Igbo, Yoruba, Miango and Tarok etc. The major animals found include birds, dogs, sheep, goats, cattle, rabbits, rats etc. The area has a temperature of 30.4º C in March and 12.7º C in January by Plateau State government Press release, 2010 as cited by [12].

Sample Processing and Analysis

In this study, about 1508 faecal samples (about 10g) were submitted in clean specimen bottles for diagnosis within (Jan 2009 to Jan 2010). On arrival, a solution of 10% formalin was added to it for fixation. Each of the bottles was clearly labelled. For each labelled bottle, the breed of the animal from which the sample was collected were practically observed and recorded. All samples collected were processed in the Helminthology laboratory of the National Veterinary Research Institute Vom for examination. The fecal samples collected were analyzed and microscopically examined using the sedimentation and floatation methods of Faecal egg count and helminths identification as described by [13].

Laboratory Examination

The fecal samples were grossly examined for the presence of adult parasite. Microscopic Examination was also carried out using direct normal saline method and Iodine method.

Direct Fecal Smear Method

A drop of (0.85 %) normal saline was placed at the centre of a clean grease free slide and a small portion of the stool was picked by applicator stick and smear was made and covered with a cover slip and examined under the microscope using × 10 and × 40 objectives respectively.

Iodine Method

A drop of 1% iodine was placed at the Centre of a clean grease free glass slide and a small portion of the feces was emulsified in the drop using applicator sticks. The smear was covered with a cover slip and examined under the microscope using × 40.

Formal Ether Sedimentation Technique

The formal ether sedimentation technique was employed to analyze the collected samples for intestinal parasites. About 1g of faces is placed in 10ml of 10 % formal solution in a screw capped bottle and shaken vigorously to mix then filtered with a wire sieve into a centrifuge tube, 3- 5ml of diethyl ether was added to the supernatant. It was centrifuged at approximately 200 × g for five minutes. A stick was used to loosen the layer of fecal debris from the side of the tube. The tube was inverted to discard the ether, fecal debris and formal solution. The bottom of the tube was tapped to suspend the sediment and a drop of the sediment was placed on clean grease free glass slide and covered with cover slip and examined microscopically using ×10 and × 40 objectives.

Statistical analysis

The Graph pad prism version 4.0 for windows was used to analyze the distribution of gastrointestinal parasites in feaces of domestic animals setting the bovine species as the reference group.

RESULTS

The results of this study are presented in tables 1-8 showing the overall prevalence of the gastro-intestinal parasites of various livestock from January 2009 - December 2010. A total 1508 faecal samples were examined and 963 samples were positive for different gastrointestinal parasites with a prevalence of 63.8% as shown in Table 1.

Table-1: The prevalence of gastrointestinal parasites in feaces of domestic animals from January 2009 – December 2010 in Vom

Animal Species	No. Examined	No. +ve	Percentage +ve	Prevalence	OR	CI at 95%
Bovine	556	480	86.33	49.8%	Reference	-
Canine	204	52	25.49	5.4%	0.05417	0.03641-0.0806
Caprine	212	85	40.09	8.8%	0.1060	0.0735-0.1528
Equine	13	12	92.30	1.2%	0.0132	0.0017-0.1030
Laprine	3	2	66.67	0.2%	0.3167	0.0284-3.537
Ovine	86	58	67.44	6.0%	0.3280	0.1966-0.5472
Swine	226	152	67.26	15.8%	0.3252	0.2250-0.4701
TOTAL	1508	963	63.86	100%		

$X^2 = 312.7$ $P<0.0001$

Furthermore, Coccidian oocyst, the only protozoan parasite encountered had a prevalence of 13.3% in Bovine 19.3% ; in Caprine 19.3%, 66.7% and 33.3% in Laprine 65.1%; in Ovine (sheep) and 18.6% in Swine; Tables 1, 3, 4,5,6,7 and 8. Mites were observed accidentally in samples from Canine as sarcocystis species with a prevalence of 5.4%, *Demodex canis* was 0.5% and *Sarcoptes* mites 1.5% in Table 3. Bovine had

the highest prevalence of 31.8% of gastrointestinal parasites followed by swine with 10.1%, Caprine with 5.6%, Ovine 3.9% and Canine 3.5%, Laprine while Equine had the least prevalence of 0.1% and 0.8% respectively. Based on the species, in each breed, Strongylus-like eggs and Stongyle worms had the highest prevalence in Equine of 92.3% and Ovine 66.3%,; Bovine 43.2% and in caprine12.3%.

Table-2: Helminth species identified in Cattle in Vom, Plateau State Nigeria

Parasites Species	**No. Positive**	**Prevalence**
Ascaris vitulorum	3	0.5%
Bunostomum phlebotomum	21	3.8%
Eimeria bovis	74	13.3%
Fasciola gigantica	38	8.6%
Moniezia benedeni	4	0.7%
Moniezia expansa	2	0.4%
Oesophagostomum radiatum	25	4.5%
Paramphistomum cervi	60	12.1%
Strongyloides papillosus	9	1.6%
Syngamus laryngeus	4	0.7%
Strongyle-like eggs	240	43.2%
Total	**480**	**100%**

Table-3: Prevalence of gastrointestinal parasites in Dog in Vom

Parasites Species	**Positive**	**Prevalence**
Ancylostoma braziliense	20	12.8%
Isospora spp	11	6.4%
Taenia ovis	1	0.5%
Toglotrema salmincolo	1	0.5%
Toxocara canis	4	2%
Demodex canis	1	0.5%
Sarcoptic mites	3	1.5%
Sarcocystis spp	11	5.4%
Total	**52**	**100%**

Table-4: Prevalence of gastrointestinal parasites in goats in Vom

Parasites Species	**Positive**	**Prevalence**
Dicrocoelium dendriticum	5	2.4%
Eimera parvi	31	19.3%
Fasciola gigantica	6	2.8%
Haemonchus contortus	2	0.9%
moniezia benedeni	10	7.1%
Nematodirus spathiger	1	0.5%
Oesophagostomum columbianum	1	0.5%
Paramphistomium cervi	5	2.4%
Strongyloides papillosus	8	3.8%
Strongyle-like eggs	16	12.3%
Total	**85**	**100%**

Table-5: Prevalence of gastrointestinal parasites in Horse feaces in Vom

Parasite identified	**Positive**	**Prevalence**
Gastrodiscus egyptiaticus	2	15.4%
Strongylus spp	12	92.3%
Trichonema spp	6	46.2%
Triodontophorus tenuicollis	1	7.7%
Total	**21**	**100%**

Table-6: Prevalence of gastrointestinal parasites in Rabbit feaces in Vom

Parasites Species	**Positive**	**Prevalence**
Eimeria stiedai	2	66.7%
Eimeria intestinalis	1	33.3%
Total	**3**	**100%**

Table 7: Prevalence of gastrointestinal parasites in sheep feaces in Vom

Parasites Species	**Positive**	**Prevalence**
Bonustomum trigonocephalum	2	2.3%
Cysticercus tenicollis	1	1.2%
Dicrocoelium dendriticum	2	2.3%
Eimeria species	36	65.1%
Fasciola gigantica	10	11.6%
Haemonchus contortus	1	1.2%
Moniezia expansa	4	8.7%
Moniezia benedeni	2	2.3%
Oesophagustomum columbianum	1	1.2%
Paramphistomum cervi	4	4.7%
Strongyloides papillosus	5	5.8%
Strongyle-like eggs	17	45.3%
Taenia hydatigena	1	1.2%
Total	**58**	**100%**

Table-8: Prevalence of gastrointestinal parasites in Pig feaces in Vom

Parasites Species	**Positive**	**Prevalence**
Ascaris lumbricoides	10	4.4%
Eimeria species	32	18.6%
Metastrongylus apri	5	2.2%,
Necator spp	23	10.2%
Oesophagostomum dentatum	41	20.8%
Paragonimus westermanii	28	12.4%
Schistosoma suis	1	0.4%
Stephanurus dentatus	11	4.9%
Total	**152**	**100%**

DISCUSSION

The current study showed that, all the breed of animals in this study area were infected with a wide variety of gastrointestinal parasites including nematodes, cestodes, trematodes and protozoa. The overall prevalence of (63.8%) is higher than the prevalence (50.1%) found in similar studies from Makurdi, Nigeria [14]. Majority of the animals in this study had multiple parasitic infections, similar to the observations made by Swai *et al* [15]. The study was as well able to come up with some important findings such as; a. Prevalence of gastro-intestinal parasites of the genera *Strongyles, Moneizia, Fasciola, Bunostomum, Oesophagustomum, Ascaris and Amphistome* among the cattle in the area with Strongyles and *Eimeria* oocyst being the most prevalent (43.3% and 13.3%). The highest prevalence of gastrointestinal parasites was nematodes this finding is similar to studies carried out by various authors [14, 16, 17]. The high prevalence of gastrointestinal parasites in small ruminants as a whole agrees with most reports [18-22]. The higher prevalence rate in sheep and goats in the study area might be due to poor management systems. The increase in overall rate of gastrointestinal parasites may be attributed to the variation in climate which is necessary for development of infective larvae as also reported by Ntonifor *et. al.* [22] in ruminants in Cameroon. In Swine, high prevalence were recorded for the genera Eimeria, strongyles and Oesophagustomum with Strongyles and Oesophagustomum having the highest prevalence of 20.8% , 18.6% this record contrast the observations made by Karaye *et al.,* [23] who recorded a low prevalence of 14%, 12.5% and 7.5% in four local Government of Nassarawa State Nigeria. The differences in prevalence of gastrointestinal helminthes in this study, may also be associated with differences in environmental conditions, stocking rate, nature of their diet immunity status [24]. Fifty two (52) of the 204 examined dogs were infected with different species of intestinal parasites of both helminthes and protozoa Taxa. The presence of ectoparasites is consistent with other authors in other studies, where fleas and ticks were the most commonly found taxa [25-27]. *Ancylostoma braziliences* had the highest prevalence of 12.8 %. This is a significant prevalence level and an indicator of the level of

pollution of the soils of the study areas. *A. braziliences* is a parasite with high zoonotic potential however, *Ancylostoma caninum* which is another significant gastrointestinal parasite as observed by Elom *et al.* [4] was not discovered in this study. The observed infection with the two *Eimeria* spp in the rabbit breed in this study, is a common finding as reported by several authors Abdel-Azeem *et al.*, [28] who studied the prevalence of coccidian in domestic rabbits in Egypt and observed E. intestinalis (7%) and E. stiedai (5%) and Khider *et al*.,[29]. The prevalence of strongyle spp in Equine was 92.8%. This figure is less than the findings of Yoseph *et al* [30], Muleta [31], Wosu, [32], Fikru et al [33] who reported prevalence of 100%, 100%, and 98.2% in Equine of Wonchi, highlands of Wollo province and western highlands of Oromia in Ethiopia. Trichonema spp was the next most prevalent helminth with 46.2% which is a common helminth reported both in horses and donkeys [34].

CONCLUSION

In conclusion, the high prevalence rate of gastro-intestinal parasites infection revealed by this study indicate a neglect of simple management practices aimed at controlling gastro-intestinal parasites infections. There is an urgent need to educate and encourage livestock farmers in the case study area on the routine use of anthelminthic. It is also recommended that further studies on the economic impact of these parasites on livestock production in Nigeria should be carried out. In addition, it is necessary to assess the current control strategies to improve production.

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