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PREVALENCE OF GASTROINTESTINAL HELMINTHS IN WEST AFRICAN DWARF (WAD) GOATS IN AN AGRARIAN AGRO-ECOSYSTEM

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ABSTRACT

*An investigation on the prevalence of gastrointestinal helminth parasites in goats was carried out in six different agrarian agroecosystems of Ikwo L.G.A of Ebonyi State, Nigeria. The objectives of the study were to determine the factors associated with the prevalence of the parasites and to identify the gastrointestinal helminths in faecal samples of WAD goats. Relevant information were collected from the respondents through well-structured questionnaire. A total of 180 random faecal samples were collected individually from goats of varying ages in the different zones. Microscopic examination of each sample was done by the sodium chloride floatation technique. Out of 180 faecal samples collected and examined, 118 (65.5 %) of them were infected by helminth parasites. This indicated a high prevalence of infection. Five major factors were identified to have been associated with the prevalence of the parasites namely: poor system of management, illiteracy, lack of deworming programmes, non-commercial purpose of keeping goats and very old farmers in the business. The following intestinal helminth parasites were found in goats in order of predominance: *Haemonchus contortus* (38.1 %), *Strongyloides papillosus* (19.4 %), *Trichostrongylus columbriformis* (15.2 %), *Oesophagostomum columbianum* (14.4 %), *Fasciola* species (10.1 %) and *Moniezia benedeni* (2.5 %).*

Keywords: Prevalence, Gastrointestinal helminths, WAD goats

INTRODUCTION

Goats although representing an important source of animal protein in Ikwo L.G.A of Ebonyi State (Nigeria), seem to have benefited little from the veterinary care and production improvement. Goats are often the main supply of daily meat in Ikwo Local Government Area. Although adapted to local climatic and nutritional conditions, economic production of small ruminants is hampered by infections and parasitic diseases coupled with inadequate management (Nawathe *et al.*, 1985). Gastrointestinal helminths are worm-like parasites of animal gut. Helminthiasis is one of the most important causes of mortality and morbidity in goats. It is caused by nematodes, trematodes and cestodes (Larson, 1999).

Several studies carried out on gastrointestinal helminthiasis of goats showed that the prevalence of the infections varies from place to place and according to the age groups of goats. Studies in various parts of the world have shown that the high incidence of these infections are seasonally related (Sykes, 1994). Although they occur in all age groups, they are found to be more prevalent in kids when exposed to contaminated feed and water (Waruiru *et al.*, 1994). In all these studies, the most common gastrointestinal helminths of goats are *Haemonchus contortus*, *Strongyloides papillosus*, *Trichostrongylus columbriformis*, *Oesophagostomum columbianum*, *Fasciola* species and *Moniezia benedeni*. The diseases are usually acquired by the ingestion of the infective eggs or larvae or by its penetration through the skin (Githigia *et al.*, 2001). Gastrointestinal nematodes of goats are roundworms

living in the abomasum, small intestine and large intestine of goats. Infection usually occurs primarily through contaminated feed and water, enhanced by poor hygiene (Gatongi, 1996).

Intestinal helminthiasis has for many years been recognized as a major problem in livestock rearing (Barger, 1997). Most goats infected have been shown to be asymptomatic or produce only mild symptoms, because of this they are often overlooked till serious complication or chronic clinical symptoms occurs (Rausch and Jentoft 2002). If the infective stages of helminths are present in the environment, then certain practices particularly with regards to hygiene and feed will result in greater exposure coupled with climatic factors. Gastrointestinal parasites are common in both temperate and tropical countries, but more prevalent in warm countries where sanitation is poor and standard of living low (Schmidt *et al.*, 2000).

Some of the pathological problems associated with gastrointestinal helminths include anaemia, diarrhoea, loss of weight, oedema, recumbency and consequently severe debility and finally death (Forse, 1999). In poorly managed system of goat keeping, or where infestation is massive, these parasites enhance all other ailments both intestinal and others making them acute and lethal (Finelle, 1973). Gastrointestinal worms in goats cause economic and nutritional hardship in poor farming communities. Intestinal parasites cause inefficient feed utilization leading to reduced growth rate in young animals, reduced weaning weights, low milk production, enhanced susceptibility to other diseases and poor meat out products (Barger, 1997).

For the necessary rational and sustainable control of these helminths, comprehensive knowledge of the epidemiology of the parasites in relation to the specific climatic, management and production environment is crucial (Barger, 1999). Livestock operations are meaningless without sound knowledge of the animal care and prevention and eradication of diseases (Ngoka, 1983).

The animal protein intake/caput/day in Nigeria is 3.25 g, this is one of the lowest in the world, indicating the seriousness of animal protein supply in Nigeria (Shaib *et al.*, 1997). The dwindling animal protein intake in the country is very pathetic and requires urgent attention. This situation therefore arouses the need to conduct this study on the prevalence of gastrointestinal helminthes of goats in Ikwo Local Government Area by examining faecal samples from goats within the area so as to provide more baseline data required for management of helminthiasis in goats.

MATERIALS AND METHODS

Study Area: The study was carried out in Ikwo Local Government Area, Ebonyi State, Nigeria. It lies approximately between longitudes 8° and 8° 18' East and latitudes 5° 58' and 6° 14' North. It is an agrarian community having been endowed with a large area of fertile land. Ikwo local government area has a population of approximately 183,265 people with an area of 725 km² (National Population Census, 1991). Ikwo is composed of six (6) major agrarian zones namely; Alike, Echara, Eka-Awoke, Mgbabo, Inyimagu and Okpuitumo all of which was randomly sampled during our study.

Sample and Sampling Technique: The zones for the study were purposively selected from the study area while farmers within the zones randomly sampled. A total of 18 farmers were selected, (3 farmers from each of the 6 agrarian zones). A total of 10 samples were taken from 10 goats kept by a farmer giving a total of 180 samples. For the background information on hygiene, feedtypes and management systems among others were sampled using closed ended questionnaires. 50 questionnaires per six agrarian zones were administered to the sampled goat farmers.

Feecal Sample Collection and Analysis: The study was carried out with goats of three age groups namely preweaning (1 - 6 months old), post weaning (7 - 18 months old) and adult goats (19 months and above). A total of 180 feecal samples were collected, representing 30 feecal samples from each of the 6 agrarian zones. Feecal samples were collected each morning between 7.30 and 8.30 am and immediately taken to the laboratory for analysis. Each specimen was examined visually for colour, consistency, mucus, blood and macroscopic parasites, all the findings were recorded appropriately. The saturated sodium cholride flotation technique was used (Cheesbrough, 1998).

A flat bottomed vial was one quarter filled with saturated solution of sodium chloride and 1 gram of feaces (or 2 ml of a fluid specimen) was added. The flat bottomed vial was filled with saturated sodium chloride solution and properly mixed. The feecal suspension was strained to remove large feecal particles. The suspension was returned to the vial standing in a completely vertical position on a table. A plastic pipette was used to add further solution to the vial and to ensure that it is filled to the brim. A clean glass slide was carefully placed on top of the vial and the whole arrangement was left undisturbed for about 20 minutes to give time for the eggs to float. The glass slide was carefully lifted from the vial by straight pull upwards. The entire preparation was examined systematically using the 10 x objective.

Statistical Analysis: Descriptive statistics, percentages and frequencies were used in analyzing the data.

RESULTS

Prevalence of parasites in relation to the ages of the farmers is shown in Table 1. The highest prevalence was recorded among the goats produced by farmers aged 60 years and above (71.0 %). The level of prevalence in the rest of the age distributions were as follows: 50 -59 years (66 %), 30 -39 years (38 %) and 20 – 29 years (37.5 %).

Table 1: Prevalence of Gastrointestinal helminths in goats in relation to age of farmers

Age of farmers	Total No of samples Examined	Total Number infected	Percentage (%) Infection
20 – 29 years	8	3	7.5
30 – 39 years	21	8	38
40 – 49 years	30	15	50
50 – 59 years	50	33	66
60 and above	83	59	71.0
Total	180	118	65.5

The prevalence of helminths by educational background of farmers (Table 2) showed that the goats produced by farmers who never attended school recorded the highest prevalence (70 %) followed by primary school (63.8 %), secondary school (62.5 %) and tertiary institution (60.8 %).

Table 2: Prevalence of gastrointestinal helminths in goats in relation to farmers educational background

Educational Qualification	Total No of sample Examined	Number infected	Percentage (%) Infection
Never attended School	70	49	70
Primary School	47	30	63.8
Secondary School	40	25	62.5
Tertiary institutions	23	14	60.8
Total	180	118	65.5

Prevalence of the parasites by religious background of farmers (Table 3) showed that the goats produced by the farmers embracing African Traditional Religion (ATR) had the highest prevalence (69.5 %), while the prevalence rate for the goats produced by Christians was (46.6 %). Goats produced for consumptions had the highest prevalence (73.1 %), followed by those kept for cultural and religious purposes (64.5%) while those produced for commercial purposes recorded the least prevalence (50 %) (Table 4).

Table 3: Distribution of Gastrointestinal helminths in goats in relation to religious background

Religion	Total samples Examined	Number Infected	Percentage (%) Infection
Christianity	75	35	46.6
African Traditional Religion	105	73	69.5
Total	180	118	65.5

Table 4: Prevalence of gastrointestinal helminths in goats in relation to the purpose of goat production

Purpose of keeping Goats	Number of samples Examined	Number Infected	Percentage (%) Infection
Commercial Consumption	36	18	50
Religious/Cultural	82	18	73.1
Total	180	118	65.5

Goats under extensive system of management had the greater prevalence (75 %), while those reared under semi-intensive of management followed with the prevalence rate of (62.5 %) (Table 5). The prevalence of infection was highest with goats that had no deworming schedule (70 %), followed by those dewormed once in a year (60 %) while those dewormed twice a year had the least prevalence (30 %) (Table 6).

Table 5: Distribution of gastrointestinal helminths in goats in relation to the system of management of goats

System of management	Total Number Examined	Number Infected	Percentage (%) prevalence
Extensive	44	33	75%
Intensive	-	-	-
Semi-intensive	136	85	62.5%
Total	180	118	65.5

Goats between the ages of 1 - 6 months had the highest infection prevalence (71.5 %), followed by those aged 6-12 months old (67.9 %) and those of 2 years and above (48.7 %) (Table 7). The distribution of infection showed that *Haemonchus* was the highest prevalent parasite (38.1 %) followed by *Strongyloides* (19.4 %), *Trichostrongylus* (15.2 %), *Oesophagostomum* (14.4 %), *Fasciola* (10.1 %) and *Moniezia* 2.5 % (Table 8). The highest prevalence was recorded among the goats from Mgbabo zone

(93.3 %), followed by Echara zone (80 %), Alike (70 %), Eka-awoke (63.3 %), Okpuitumo (50%) and Inyimagu (36.6 %) (Table 9).

Table 6: Distribution of gastrointestinal helminths in goats in relation to deworming schedule

Deworming schedule	Total Number of samples examined	Number Infected	Percentage (%) Infection
Once a year	40	24	60
Twice a year	10	3	30
Thrice a year	-	-	-
None	130	91	70

DISCUSSION

The result showed a relatively high prevalence (65.5 %) of gastrointestinal helminths among goats in Ikwo L.G.A. This observation agreed with the report of Assoku (1981) who made similar observation in Ghana and Verucrysee (1985) in Senegal. Six species of gastrointestinal parasites of goats were prevalent namely, *Haemonchus contortus* (38.1 %), *Strongyloides papillosus* (15.2 %), *Trichostrongylus colubriformis* (15.2 %), *Oesophagostomum columbianum* (14.4 %), *Fasciola species* (10.1%), and *Moniezia benedeni* (2.5 %). The high prevalence of *Haemonchus contortus* in this study was in line with the observation of Edward and Wilson (1958) in Mali. The variation in prevalence of intestinal helminthiasis in this study could be attributed to several factors including farmers level of education, age, religious belief, purpose of keeping goats, system of management and deworming schedule. This observation is in agreement with some factors reported by Barger (1997) in a Kenya flock. The reason for the high prevalence of the species of nematodes *Haemonchus contortus* and *Strongyloides papillosus* in the area may also be due to conducive environment which enhances the transmission of the worms in the area. There was variation in the level of helminthiasis in goats raised in different zones of Ikwo L.G.A. Among the zones Mgbabo recorded the highest prevalence (93.3 %), Echara (80 %), Alike (70 %), Eka-Awoke (63.3 %), Okpuitumo (50 %) and Inyimagu (36.6 %). The high rate of prevalence of infection among the goats studied could be attributed to poor management practices and lack of veterinary services.

Goats between the ages of 1 to 6 months old as indicated in the result had the highest prevalence (71.5 %) followed by those between 7 to 18 months old (67.9 %). Schmidt and Robberts (1985) reported that kids may have a higher risk of infection. The rate of infection observed may be as a result of the level of exposure of the kids to contaminated pasture, soil and water. This observation was in line with the report of Schmidt *et al.* (2000) on the influence of sanitation and environmental condition on transmission and egg development and survival of parasites egg and larva in agrarian agroecosystem.

Table 7: Prevalence of gastrointestinal helminths in goats in relation to age of goats

Age Group	Total number examined	Samples	Total number infected Zones						Percent (%) infection
			A	B	C	D	E	F	
Prewearing (1-6 months old)	88	63	12	13	12	14	5	7	71.5
Postweaning (7-18 months old)	53	36	6	7	5	9	4	5	67.9
Adult (19 months and above)	39	19	3	4	2	5	2	3	48.7
Total	180	118	21	24	19	28	11	15	65.5

Key: Zone A – Alike, B – Echara, C – Eka-Awoke, D – Mgbabo, E – Inyimagu, F – Okpuitumo

Table 8: Total prevalence of gastrointestinal helminths in goats in Ikwo LGA

Gastrointestinal helminths	Number of goats examined	Total number infected Zones						Percent (%) infection
		A	B	C	D	E	F	
<i>Heamonchus contortus</i>	180	8	9	6	10	5	7	38.1
<i>Strongyloides papillosus</i>	180	4	5	3	6	2	3	19.4
<i>Trichostrongylus columbriformis</i>	180	3	3	4	5	1	2	15.2
<i>Oesophagostomum columbianum</i>	180	3	4	2	4	2	2	14.4
<i>Fasciola hepatica</i>	180	2	2	3	3	1	1	10.1
<i>Moniezia benedeni</i>	180	1	1	1	-	-	-	2.5
Total	180	21	24	19	28	11	15	65.5

Key: Zone A – Alike, B – Echara, C – Eka-Awoke, D – Mgbabo, E – Inyimagu, F – Okpuitumo

Table 9: Total zonal prevalence of gastrointestinal helminths in goats in Ikwo LGA

Agrarian zones	Total number examined	Total number infected Parasites						Percent (%) infection
		H	S	T	O	F	M	
Alike	30	8	4	3	3	2	1	70
Echara	30	9	5	3	4	2	1	80
Eka-Awoke	30	6	3	4	2	3	1	63.3
Mgbabo	30	10	6	5	4	3	-	93.3
Inyimagu	30	5	2	1	2	1	-	36.6
Okpuitumo	30	7	3	2	2	1	-	50
Total	180	21	24	19	28	11	15	65.5

Key: H - *Heamonchus*, S - *Sgrongyloides*, T - *Trichostrongylus*, O - *Oesophagostomum*, F - *Fasiola*, M - *Moniezia*

Conclusion: This work has shown that there was a high prevalence of gastrointestinal helminthiasis in goats of Ikwo L.G.A. The high prevalence was as a result of illiteracy, poor management system, purpose of keeping goats, lack of veterinary services and sanitary condition. Most of the farmers adopted extensive system in the management of goats and no deworming schedule. The prevalence of infection also topped the list among the goats kept for consumption. Public enlightenment with respect to the management, hygienic practices and deworming of goats should be intensified for improved production of goats. Free veterinary examination and possible mass-treatment of helminthiasis in goats should be entrenched and implemented/enforced in goat management programme.

REFERENCES

- ASSOKU, K. G. (1981). Studies of Parasitic Helminthes of sheep and goats in Ghana. *Bulletin of Animals Health and Production in Africa*, 29: 1 – 10.
- BARGER, I. A. (1997). Control by Management. *Veterinary Parasitology*, 72: 493 - 506
- BARGER, I. A. (1999). The role of epidemiological knowledge and grazing management for helminth control in small ruminants. *International Journal of Parasitology*, 24: 41 – 47.
- CHEESBROUGH, M. (1998). *District laboratory practice in tropical countries, Part 1*. Cambridge University Press, Cambridge. 233 pp.
- EDWARD, E. E. and WILSON, A. S. (1958). Epidemiological observations on helminth infections of calves in southern Ghana. *Journal of Helminths*, 32: 95 – 120.
- FINELLE, P. (1973). Parasitic disease problems of livestock production in Africa. In: LEMON, D. (Ed). *The Proceedings of International Symposium on Animal Production in the Tropics* 3rd ed. Lanarkshire, UK, October 1983 - September 1984.
- FORSE, B. (1999). *Where there is no veterinary*. 1st edition. Macmillan Press Limited, London 380 pp.
- GATONGI, P. M. (1996). Epidemiology and control of haemonchosis of small ruminants in semi-arid Kenya. *Kenya Agricultural Research Institute Information Bulletin*, April 1996 Number 17: 1 – 334.
- GITHIGIA, S. M., THAMSBORG, S. M., MUNYUA, W. K. and MAINGI, N. (2001). Impact of gastrointestinal helminthes on production of goats in Kenya. *Small Ruminant Research*, 42: 21 - 29.
- LARSON, M. (1999). Biological Control of Helminths.

- International Journal of Parasitology*, 72: 493 – 506.
- NPC. (1991) Population Census of the Federal Republic of Nigeria. NPC (National Population Commission), Abuja, Nigeria.
- NAWATHE, D. R., SOHAEL, A. S. and UMO, I. (1985). Health management of a dairy herd on the Jos Plateau (Nigeria). *Bulletin of Animal Health and Production in Africa*, 33: 199 - 205
- NGOKA, D. A. (1983). *School and College Animal Health for Nigeria*. National Printing Works, Umuahia, Nigeria 26 pp.
- RAUSCH, R.C and JENTOFT, V.L. (2002). Studies of the helminth fauna of Alaska. *Journal of Parasitology*, 43: 1 – 8.
- SCHMIDT, G. D. and ROBERTS, L. S. (1985). *Foundation of Parasitology* 3rd ed: Time Morrow and Mosly College Publishers, St. Louis 95 pp.
- SCHMIDT, G. D., ROBERTS, L. S. and JANOVY, J. (2000). *Foundation of Parasitology*. McGraw-hill, Boston, Massachusetts, 670 pp.
- SHAIB, B. P., ALIYU, A. and BAKSHI, J. S. (1997). Nigeria National Agricultural Research Strategy Plan, 1996-2000, Department of Agricultural Sciences, Federal Ministry of Agriculture and Natural Resources, Abuja, 108 pp.
- SMYTH, J. D. and DAVID, C. (1995). In vitro cultivation of *Fasciola hepatica* Meta Cocar of *Microphaslus simitia* *Parasitology* 88: 244 - 7.
- SYKES, A. R. (1994). Parasiticism and production in Farm Animals. *Animal Production*, 59: 155 – 172.
- VERCRUYSEE, J. (1985). The seasonal prevalence of inhibited development of *Haemonchus contortus* in Senegal. *Verterinary Parasitology*, 17: 159 - 163.
- WARUIRU, R. M., GICHANGA, E.J., KIMORO, C. O. and KARANU, F. N. (1994). The prevalence of gastrointestinal nematodes, coccidia and long worms in 01, mangogo dairy goats. *Bulletin of Animal Health and Production in Africa*, 42: 291 – 295.