

# Common Gastro-Intestinal Parasites of Goats (*Capra aegagrus hircus*) from Mogadishu, Somalia

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## Abstract

This study was conducted in two districts in Mogadishu, particularly smallholders to determine the Common gastrointestinal (GIT) parasites of Somali Goats. During the last two years, researchers meet many cases of goats having diarrhea, anemia and loss of body weight. That is the reason to conduct this study. The methodology of this study is explanation research with using lab technician for studied current prevalence cases of gastro-intestinal parasite of goat in Mogadishu Somalia. Study areas were two districts (Dayniile and Wadajir) located in Mogadishu Benadir region, Somali. Researcher has collected sample of feces from Somali goats in smallholders and transported the fecal containing box to the laboratory Room at University campus. Researchers made examination of fecal using Direct Smear Fecal Exam and then used Light microscope for identification of parasite eggs and oocytes, with 10× or 40× objective magnification. Data analysis was percentage and P value  $\leq 0.005$ . **Result:** The result of this study revealed an overall prevalence of Gastro-intestinal parasites of Somali goats in the investigated area was 72.1% that means 62 samples were positive, and 24 samples were negative of gastro-intestinal parasites. *Haemonchus* spp (Nematodes) and *Coccidia* (*Eimeria* spp) were the most prevalent parasites recorded in all the 62 positive samples, having *Haemonchus* 23 (26.74%) and *Eimeria* spp 38 (44.19%); the second highest groups were all nematode with percentage *Strongyloides* 22 (25.58%), and *Trichostrongylus* 17 (19.77%). This study revealed statistically significant difference ( $P < 0.05$ ) in the common gastro-intestinal parasites on Somali goats, except the District Village which has  $P > 0.05$  that equals to  $P = 0.235$ . **Recommendation:** Researcher recommends making seasonal deworming to Somali goats in small holders which will reduce the prevalence and incidence of gastro-intestinal parasites in Somali goats.

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## Keywords

Gastro-Intestinal Parasites, Goats, Mogadishu, Somalia

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### 1. Introduction

Somali has many kinds of livestock which participate in increasing the local production and livelihood of many rural and urban communities. Goats are kept as the traditional way, both pure and mixing farming (which means husbanding both goats and sheep), and also there are small holders of goats in urban areas. Goats, representing an important source of animal protein in semi-arid countries such as Mali, seem to have benefited little from veterinary care and production improvement. Goats are often the main supply of daily meat in rural areas [1].

The gastro-intestinal parasite can cause reduction and loss of production of shoats, if not given treatment and prevention they can cause death. Some small ruminant parasites have directly related to human and can be serious to human health (zoonosis). As generally 11,692,227 goats live in Somalia, but there is lack of local goat estimation, we can't tell the number of goats of per district. This research will be the first study, which presents lists of common parasites of local Somali goats in Mogadishu. So this paper aims to determine the prevalence of gastro-intestinal (GIT) parasite on goats in two different areas [2].

There are two main types of goats in Somalia. These are the short-eared East African type and the Arab type with long ear and hair. The short-eared and hair Somali goats (**Figure 1** and **Figure 2**) are mainly white, although mixed colours, such as brown and black, also occur. The Somali has short hair and ears. The males are horned and the females are either horned or polled [3].

The Somali goats can tolerate prolonged periods of thirsty and can be watered once every three days, which means mostly they are nomadic pastoralists and their lives are mobile aspect searching pasture and water [4].

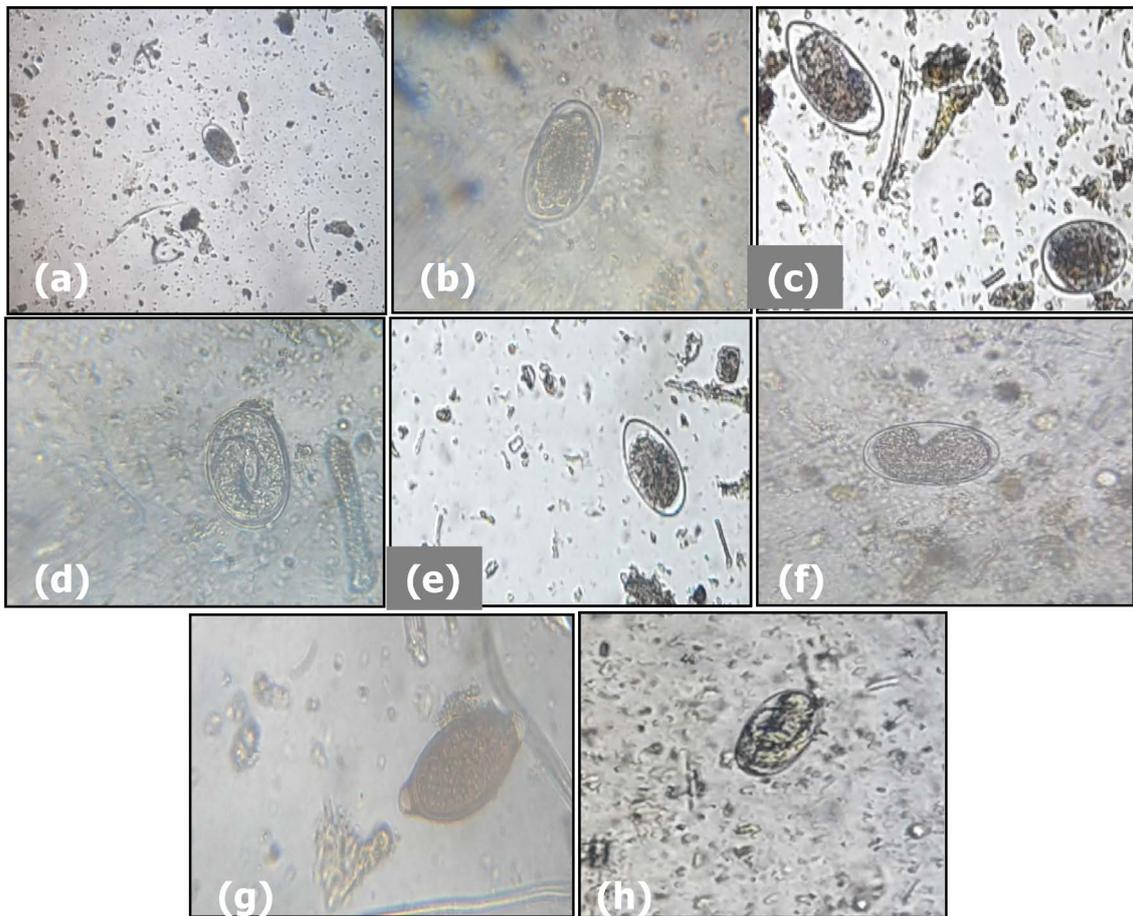
### 2. Materials and Methods

The methodology of this study was explanation research with using lab technician for studied current prevalence cases of gastro-intestinal parasite of goat in Mogadishu Somalia. Target population was take sample 110 Somali goats but selected and collected sample 86 goats instead of 110. Researcher used sample calculation of Confidence Level 95% and Confidence Interval 5%.

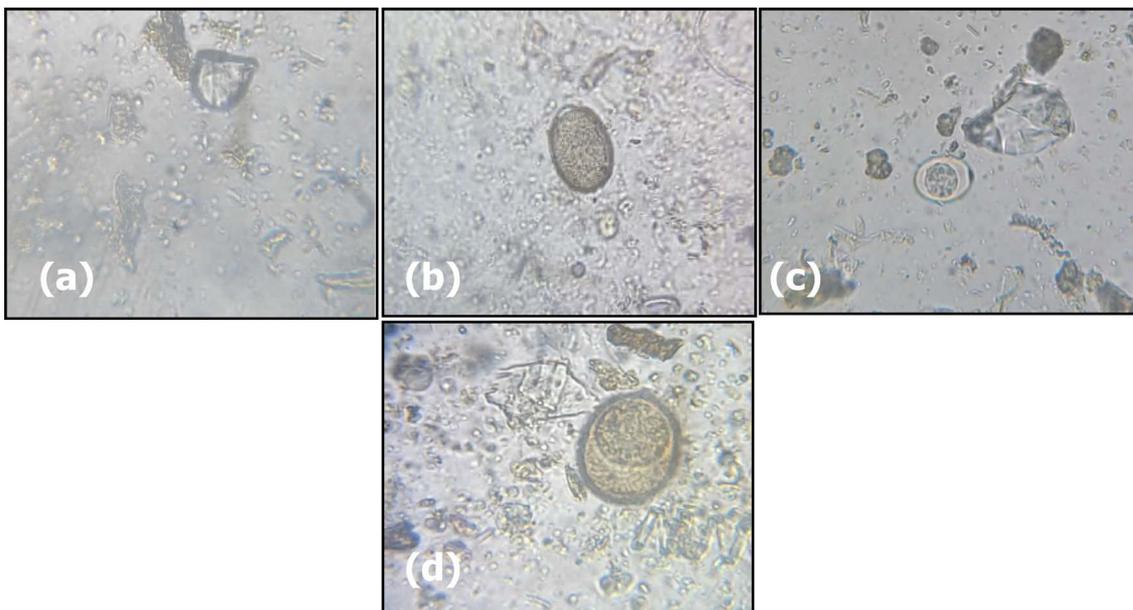
#### 2.1. Study Area

The study area was Mogadishu, which is the capital city of Somalia and located in Benadir region, the Benadir has seventeen districts. Two districts were included in this study such as Deynile and Wadajir. These districts are common areas with large scale (nomadic pastoralists) and small scale goat herds.

Wadajir district is one of the districts located along with the coast in Mogadishu



**Figure 1.** Egg shapes of different nematodes affecting Somali Goats in Mogadishu. (a) *Haemonchus* sp (b), *Dictyocaulus* sp. (c). *Nematodirus* sp and *Haemonchus* sp (d) *Strongyloides* sp., (e) & (f). *Trichostrongylus* sp, (g). *Trichuris* sp, (h) *Dictyocaulus* sp. Used Direct Smear Fecal Exam.



**Figure 2.** Other Egg shapes of some trematoda (*Fasciola* only), Cestoda (*Moniezia* only) and Coccidia affecting Somali goats in Mogadishu. (a) *Moniezia* sp. (b) *Fasciola* sp., and (c) & (d), *Eimeria* sp. Used method of *Direct Smear Fecal Exam*.

Benadir region, we visited three villages belongs to this district namely Tima cade, Janaral Da'ud and Hawo tako. While Deynile is one of the largest district located in southeast of Mogadishu Benadir region, but research collected sample to three village within it, namely Odweyne, CC deynile and Ciise Cabdi.

## 2.2. Study Population

The study population was adult Somali goat (short eared goat with white coat), (*Capra aegagrus hircus*), of smallholders in two the districts Daynile and Wada-jir in Mogadishu Somalia. So research made collection of feces and examined for the presence of eggs or oocysts of gastro-intestinal parasites.

## 2.3. Study Time

This study was first started feces collection and examination the period between 24 July up to the 1 Nov. 2018, after that time researcher started data analysis and interpretation.

## 2.4. Sample Collection

Researchers have collected sample of feces of goats with the help of students of veterinary medicine at Jobkey University, Researcher used plastic gloves to collect the fecal sample directly in the rectum of goats and put in container box. For that box we wrote date, place, and sex of animal for identification method and transported the fecal containing box to the laboratory Room in University campus. In that day researcher put in refrigerator in 18 h before examination (means we exam next day morning).

## 2.5. Examination of Sample

The procedure was Direct Smear Fecal Exam as mentioned Johannes Kaufmann 2013, but little simplified [5], which is to take some fecal sample and put in a beaker (plastic), add sodium chloride then mixing and filter (tea filter) after that take small drops and put in the glass slide and covered with cover slide. Light microscope was used for identification of parasite eggs and oocytes, with 10x or 40x objective magnification. After that researcher took one picture for each unique Parasites using cell phone camera (Samsung Jace 1) then collected and cut into frame.

## 2.6. Data Analysis

First Researcher listed all parasite eggs and Oocytes, then used quantitative methods e.g. percentage, and classified with base on region and sex, presented variation in both types, Researcher used P value at confidence level was 95%, P value  $\leq 0.005$ . Both MS Excel Windows<sup>®</sup> 2007 data base and SPSS (Version 16) were used to store and analyze it.

## 3. Results

### 3.1. Prevalence Rate

Examinations of fecal samples got the common prevalence of Gastro-intestinal

parasitic infections in goats of Benadir regions Somalia (**Table 1**). The prevalence of Somali goat gastro-intestinal parasites in the investigated area was 72.1%. Researcher found the prevalence varies among the two different districts and their villages, the gastro-intestinal parasite found to be more prevalent in Ciise Abdi (Daru salam) (deynile district), having free grazing areas with significantly ( $P = 0.000$ ), the Janaral da'ud (wadajir district) and Cc daynile was same prevalence rate with 82% both of them, the Tima cade village (wadajir district) has prevalence rate 75% and the last village Odweyne (deynile district) has lowest prevalence rate of gastro-intestinal parasites with 43%, with all having significantly ( $P = 0.000$ ).

The number of male goats was 53 goats, more than female 33 goats (**Table 2**), but prevalence of parasite were high in female goats having with 79% (26/33), while male goats have prevalence of parasite 68% (36/53).

**Table 1.** Prevalence of gastro-intestinal Parasites in Somali Goats from Mogadishu, Somalia.

		Prevalence		
		N	N of P + ve	Percentage %
	Cc daynile	11	9	82%
Dayniile	Ciise Abdi (Daru salam)	22	19	86%
	Odweyne	21	9	43%
	Tima cade	12	9	75%
	Janaral da'ud	11	9	82%
Wadajir	Xawa tako	9	7	78%
Total		<b>86</b>	<b>62</b>	<b>72.1</b>

Source: Primary data.

**Table 2.** Prevalence of Gastro-Intestinal Parasites on Male and female Somali goats.

		Prevalence		
		N	N of P + ve	Percentage%
Sex	Male	53	36	68%
	Female	33	26	79%
		86	62	

Source: Primary data.

### 3.2. Nematodes

The nematodes infections were found to be the second most prevalent rate after coccidian. Six different species of nematode were identified those includes *Haemonchus* 23 (26.74%), *Dictyocaulus* 4 (4.65%), *Strongyloides* 22 (25.58%), *Trichostrongylus* 17 (19.77%), *Trichuris* 4 (4.65%) and *Nematodirus* 4 (4.65%). the Highest parasites in nematode groups as you show in **Table 3**, *Haemonchus* 23

(26.74%), the second one was *Strongyloides* 22 (25.58%), third parasite was *Trichostrongylus* 17 (19.77%), and the other three parasites were have same percentage rates, *Dictyocaulus* 4 (4.65%), *Trichuris* 4 (4.65%) and *Nematodirus* 4 (4.65%).

In this study, also mentioned villages of two districts (daynile and wadajir), the highest villages according to the prevalence of nematode was Ciise Abdi (Daru salam) which has 37.16% (26 out of 70).

### 3.3. Trematoda, Cestoda and Coccidea

As the study declares in **Table 4**, researcher finds only one species in each of three groups trematoda, Cestoda and protozoan with corresponding *Faciola*, *Moniezia* and *Coccidia* respectively. *Faciola* (trematoda) was found only one goat at General da'ud (wadajir district) with 1 out of 11 case of parasites, *Moniezia* (Cestoda) was showed in five different villages with different percentage for

**Table 3.** Prevalence of Nematoda worm in Somali goats in Mogadishu Somalia.

	Nematode Crosstabulation						Total
	Nematode						
	Dictyocaulus	Strongyloides	Trichuris	Haemonchus	Trichostrongylus	Nematodirus	
Cc daynile	1 (9.09%)	2 (22.0%)	1 (9.09%)	5 (45.45%)	2 (18.18%)	1 (9.09%)	11
Ciise Abdi (Daru salam)	2 (9.09%)	8 (36.36%)	3 (13.64%)	6 (27.27%)	7 (31.81%)	1 (4.55%)	22
Odweyne	0 (0.00)	3 (14.29%)	0 (0.00)	5 (23.81%)	1 (4.76%)	1 (4.76%)	21
Tima cade	0 (0.00)	3 (25.0%)	0 (0.00)	0 (0.00)	2 (16.67%)	0 (0.00)	12
Janaral da'ud	0 (0.00)	3 (27.27%)	0 (0.00)	5 (45.45%)	2 (18.18%)	0 (0.00)	11
Xawa tako	1 (11.11)	3 (33.33%)	0 (0.00)	2 (22.22%)	3 (33.33%)	1 (11.11%)	9
<b>Total</b>	4 (4.65%)	22 (25.58%)	4 (4.65%)	23 (26.74%)	17 (19.77%)	4 (4.65%)	86

Source: Primary data

**Table 4.** Trematoda, Cestoda and Protozoa.

	Trematoda, Cestoda and Protozoa			Total	
	Trematoda <i>Fasciola</i>	Cestoda <i>Moniezia</i>	Protozoa <i>Coccidia</i>		
	Cc daynile	0 (0.0%)	0 (0.0%)		6 (54.55%)
Ciise Abdi (Daru salam)	0 (0.0%)	3 (13.64%)	8 (36.36%)	22	
village	Odweyne	0 (0.0%)	1 (4.76%)	8 (38.1%)	21
Tima cade	0 (0.0%)	2 (16.67%)	7 (58.33%)	12	
Janaral da'ud	1 (9.09%)	4 (36.36%)	7 (63.64%)	11	
Xawa tako	0 (0.0%)	1 (11.11%)	2 (22.22%)	9	
<b>Total</b>	1 out of 86	11 out of 86	38 out of 86	86	

example CC daynile was not present any of Moniezia, Ciise Abdi (Daru salam) (daynile) was found 3 cases of positive Monizia (3 out of 22), Odweyne (daynile) and Xawa tako (wadajir) have same percentage rate with only 1 case, (1 out of 21) in Odweyne, (1 out of 11) and last village was Tima cade (wadajir) was 2 case out of 12 in the total collected data in the village.

In addition, there were protozoa infections which was the highest parasite researcher founded Coccidian with percentage 38 (44.19%), it was most common in young Somali goats in all districts and their villages, General da'ud (wadajir district) was highest village having with 7 (63.64%) out of 11, Tima cade (wadajir) was highest rate with 7 (58.33%) out of 12, Ciise Abdi (Daru salam) (daynile) and Odweyne (daynile) same frequency but different in percentages, 8 (36.36%) and 8 (38.1%) respectively, the lowest rate was Xawa tako (wadajir) with 2 (22.22%).

This **Table 5** shows you P value of all data in SPSS one-Sample test 4.32. Researcher had test value 3, so the result had P value or Sig. (2-tailed) = 0.000 which means the test is significant, because researcher used the rule below, If  $P > 0.05$  the test is not significant (the sample is not significantly different than  $\mu = 3$ ). In conclusion, the analysis of the of sample test showed that the dominant answer of that questions are significance no difference at all except District vil-lages have P value = 0.235, which indicates that there are difference in villages

**Table 5.** Significance P value.

One-Sample Test						
Test Value = 3						
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Type of sex?	-30.643	85	0.000	-1.616	-1.72	-1.51
District villages	1.196	85	0.235	0.198	-0.13	0.53
Dictyocaulus	-45.816	85	0.000	-1.047	-1.09	-1.00
Strongyloides	-26.536	85	0.000	-1.256	-1.35	-1.16
Trichuris	-45.816	85	0.000	-1.047	-1.09	-1.00
Haemonchus	-26.400	85	0.000	-1.267	-1.36	-1.17
Trichostrongylus	-27.727	85	0.000	-1.198	-1.28	-1.11
Fasciola	-87.000	85	0.000	-1.012	-1.03	-.99
Nematodirus	-45.816	85	0.000	-1.047	-1.09	-1.00
Moniezia	-31.135	85	0.000	-1.128	-1.20	-1.06
Coccidia	-26.768	85	0.000	-1.442	-1.55	-1.33

Source: Primary data.

and no significance.

There were mix infections which have percentage 34 cases with (39.5%), of total gastro-intestinal parasites on Somali goats in Mogadishu, Somalia.

#### 4. Discussion and Conclusion

This study, examined 86 fecal samples of revealing an overall prevalence of Gastro-intestinal parasites of Somali goats in the investigated area, was 72.1% that means 62 samples were positive, and 24 samples were negative of gastro-intestinal parasites, and also there are mixed infections having more than two parasites in one sample, and 34 samples were mixed (39.5%).

*Haemonchus* Spp (Nematodes) and *Coccidia* (*Eimeria* spp) were the most prevalent parasites recorded in all the 62 positive samples, having *Haemonchus* 23 (26.74%) and *Eimeria* spp 38 (44.19%); the second highest groups were all nematode with percentage *Strongyloides* 22 (25.58%), and *Trichostrongylus* 17 (19.77%). Similar study like Yusof, A. M., & Isa, M. L. M. (2016) in Malaysia found GINs and *Eimeria* were widely distributed in the goats leading to higher risk of morbidity and mortality [6]. In Pakistan, Gadahi, J. A., *et al.* (2009) found the prevalence of the haemonchosis was significantly higher in goat compared with sheep [7]. In Cameroon, Ntonifor, H. N., *et al.* (2013) found Strongyle nematodes and *Eimeria* spp. were the most prevalent parasites recorded in all the three groups of animals [8]. In Norway, Domke, A. V. M., *et al.* (2013) found *H. contortus* and *Nematodirus battus* have a wider geographical distribution to the north than expected, and described to our knowledge the northernmost occurrence of *H. contortus* in the Nordic countries [9].

Although the animal looks health, some of them have poor body condition, which apparently cause to less production and to be weak animal, and also it is possible to have high morbidity, but not making any surveillance to detect the cases. This study revealed statistically significant difference ( $P < 0.05$ ) in the common gastro-intestinal parasites on Somali goats in Mogadishu, Somalia (Table 5), except the District Village which has  $P > 0.05$  that equals to  $P = 0.235$ .

The any researchers willing to undertake further studies in this area advised to make survey of parasite control practices on Somali goat farmers and select the small holder in the above mentioned two districts.

Researcher recommends making seasonal deworming to animals in small holders and other nomadic pastoralism, which will reduce the prevalence and incidence of gastro-intestinal parasites in Somali goats, to make mobilization of small holders about how to use suitable anti-parasitic drugs and best time they recruit.

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### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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