

Prevalence of Gastrointestinal Parasites: Cases of Three Breeds of Cattle (Akou, Djafoun, Namchi) in the Faro Department (Cameroon)

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Abstract: In order to determine the prevalence of the main helminth diseases in cattle in the Faro Department (Northern Cameroon), a cross-sectional study was carried out. Data collection took place during the period from June 2025 to September 2025. A total of 200 domestic cattle of different sexes, breeds, and age groups were randomly selected for this study. Fecal samples were collected, and coproscopy was performed using the McMaster technique and the sedimentation method to determine gastrointestinal parasites. A significance level of $P=0.05$ was set for all data analyses. Significance level was set at $p\text{-value} < 0.05$. Following the examinations, the results showed that three species of gastrointestinal parasites were identified with varying overall average prevalences: *F. gigantica* (59.98%), *P. bovis* (46.4%), and *Trichostrongylus* spp. (52.55%). Average prevalences by location showed that cattle in the Tchamba area were the most heavily infested (58%). Generally, male cattle were most heavily infested with *F. gigantica* (64.1%) and *P. bovis* (48.7%), while female cattle were most heavily infested with *Trichostrongylus* spp. (55.7%). Average prevalences also showed that young cattle (2 months to 2 years old) were the most heavily infected in the four study locations, and that the Namchi breed was the most affected (45.6%). This study shows that helminth infections remain a major problem in animal health. Therefore, it is urgent to take measures to control these helminths in order to prevent enzootic instability.

Keywords: Prevalence, gastrointestinal parasites, coproscopy, Faro Department, Cameroon.

INTRODUCTION

The number of livestock raised in Cameroon is increasing gradually across all sectors. This increase averages 2% per year. Cattle numbers rose from 6,859,359 head in 2015 to 10,202,369 head in 2021 (INS, 2021). In 2023, meat production reached 130,100 tonnes, compared to 126,500 tonnes in 2022, representing an increase of 3% (Minepia, 2023). The 2023 annual production of meat and edible offal is estimated at 347,900 tonnes, representing a 6% increase compared to 2022 (327,400 tonnes). This represents an increase in the quantity of meat and edible offal across all sectors compared to 2022 (Minepia, 2023). Beef, estimated at 130,100 tonnes, remains the majority of production (42%). The Ministry of Livestock, Fisheries and Animal Industries of Cameroon reports that, with a quantity of 176,600 tonnes of milk in 2023, milk production had increased slightly by 2% compared to that of 2022 (Minepia, 2023). Despite the efforts made by the

Cameroonian government to improve beef production, stakeholders in the beef sector continue to face enormous difficulties (Atanga *et al.*, 2024). Parasites cause numerous difficulties in raising cattle, including decreased production (slowed growth, reduced feed efficiency and milk production) and health problems (weakened immune system, anemia, diarrhea, weight loss) (Atanga *et al.*, 2024). Gastrointestinal (GI) helminths are ubiquitous parasitic agents of livestock especially ruminants and are known to limit cattle production in many climatic areas and developing countries (Zvinorova *et al.*, 2016). These parasites hurt an animal's health and result in significant financial losses for the cattle sector in sub-Saharan Africa, and indeed worldwide. They are parasites that dwell inside their hosts' bodies, including the blood, liver, lungs, gallbladder, and intestinal tissues or cells. Most of the time, the infectious eggs or oocyst are conveyed along with the feces when an animal defecates; succeeding animals would become infected if they grazed in the

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contaminated habitats; and humans might become infected through ingestion of contaminated food and water, close contact with the diseased animals, or other means (Dembelo *et al.*, 2023). Cattle are affected by various types of parasites including nematodes, trematodes, cestodes and coccidia, which are considered one of the major constraints to the productivity of many countries around the world (Ntonifor, 2013). These parasites not only affect animal health but also disrupt their reproductive and production capacities (Irfan *et al.*, 2023). While the majority of helminth parasites reside in the intestines, they can also be seen in the stomach, bile duct, lungs, liver and even gall bladder of ruminants (Keyyu *et al.*, 2005). Studies have shown that helminth parasites are by far the most serious causes of production losses in farmed ruminants (Ntonifor *et al.*, 2013; Ebene *et al.*, 2022; Elias *et al.*, 2024). Losses due to infection by GI parasites occur through mortalities, reduced production due to sub-clinical parasitism, and direct cost associated with control measures (Atanga *et al.*, 2024). In addition, these same observations have also been made by other authors, as they report that GI parasites cause considerable economic losses, reduced weight gain, digestive disturbance, lowered production, impaired reproductive performance, condemnation of affected organs and mortality in infected animals (Schutz *et al.*, 2012; Takang *et al.*, 2020; Verocai *et al.*, 2020). A prevalence ranging from less than 10% to more than 80% of gastrointestinal parasites such as nematodes (*Haemonchus* spp., *Oesophagostomum* spp., *Strongyloides* spp., *Trichostrongylus* spp., *Bunostomum* spp., *Chabertia* and *Trichuris* spp.); trematodes (*Fasciola*, *Paraphistomum*, *Dicrocoelium* spp.); cestodes (*Monezia* spp.); and protozoa (*Eimeria* spp.) have been reported in domestic ruminants in different regions of Cameroon (Komtangi *et al.*, 2025). Despite the growing demand for meat among the Cameroonian population, gastrointestinal parasites remain a major problem for livestock keepers globally. Gastrointestinal parasitic diseases of ruminants are endemic in Africa,

Cameroon and more particularly in the Faro department located in Northern Cameroon. This department is also characterized by a great diversity of human populations whose main activity is agriculture, with a mix of food crops and cash crops due to the lack of animal health monitoring and the livestock farming system practiced (semi-intensive and extensive). Gastrointestinal parasitic infections therefore remain a real public health problem and better understanding of the epidemiology of the infections is a prerequisite for a more effective control strategy, to achieve the improved productivity of cattle (Terfa *et al.*, 2023). The present study was initiated to learn about the different types of parasites infesting cattle in four localities of the Faro Department in Northern Cameroon in order to establish appropriate prophylactic measures.

MATERIALS AND METHODS

Study Area Overview

This research takes place in the North Region of Cameroon, specifically in the Faro Department, whose capital is Poli. The department lies between 8.1° and 9.1° North latitude and between 12.1° and 13.6° East longitude. It is bordered to the north by the Benoue Department (Garoua), to the south by the Adamawa Region (Ngaoundere), to the east by the Mayo-Rey Department, and to the west by the Federal Republic of Nigeria.

The climate in the Faro Department is semi-arid of the Sudanese type, characterized by low rainfall, a distinct dry season, and a single rainy season. The dry season lasts six months, from November to April, during which the Harmattan wind blows from north to south, creating a dry haze. The rainy season lasts from May to October, with August and September being the wettest months. The average annual rainfall was 1200 mm in 2015 (PCD-Faro, 2014).

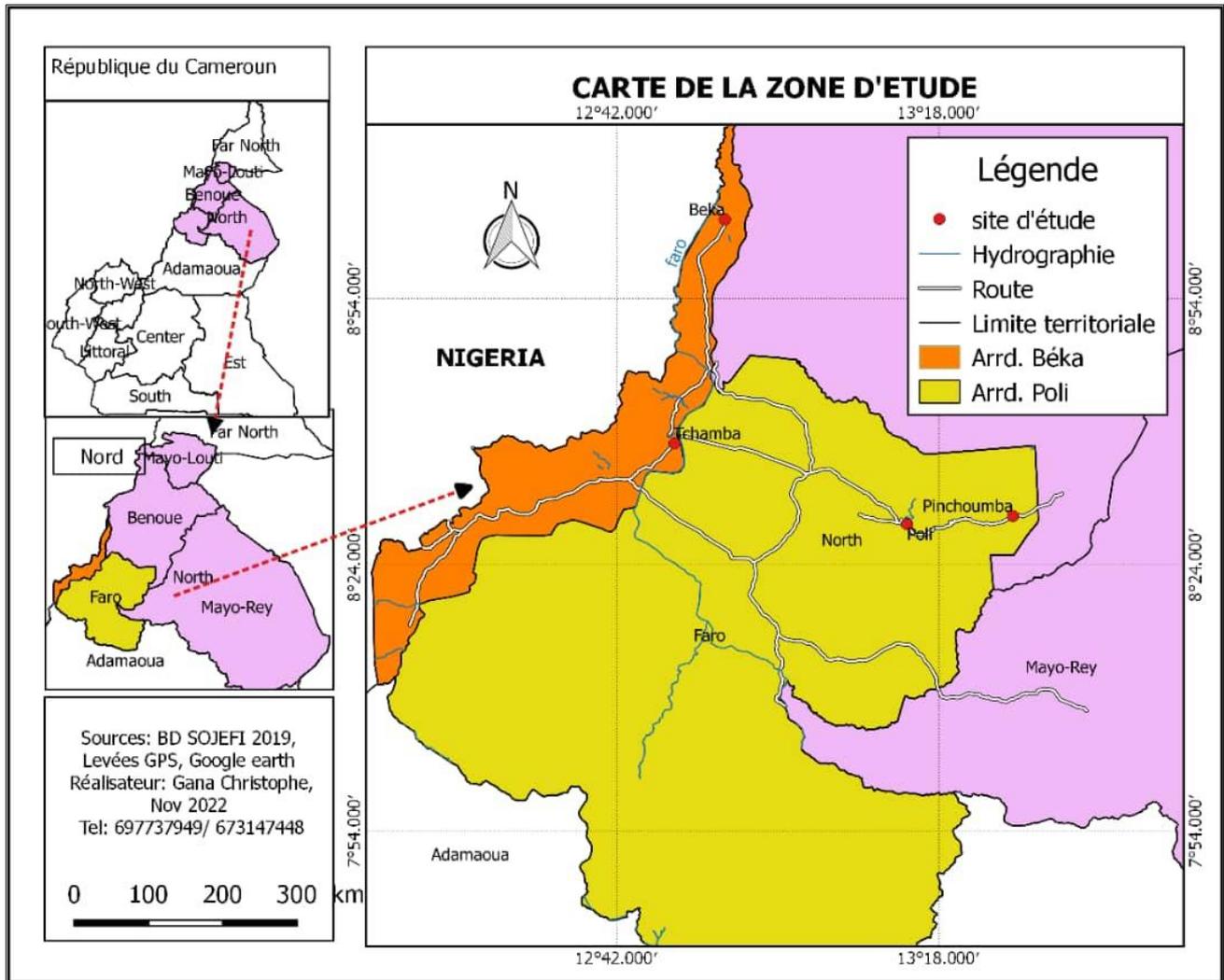


Figure 1: Map of the Faro Department

Sampling

Simple random sampling was used in this study. The selection of locations within the Faro Department was based on two villages per district. Animals were chosen randomly according to their availability and the consent of the herders.

The sample size was calculated with an expected prevalence of 25%, a precision level of 5%, and a 95% confidence interval (Rodriguez et al., 2014). The formula is as follows:

$$N = \frac{Z^2 \times P \times (1 - P)}{d^2}$$

Z: is the value of the Z score for a 95% confidence interval, i.e., 1.96

N: required sample size;

P: expected prevalence;

d: desired level of precision, 5%.

In Application:

$$N = \frac{1,96^2 \times 0,5 \times (1-0,5)}{(0,05)^2} = 192 \text{ animals}$$

Collection, Preservation and Transport of Fecal Matter to the MSEG Laboratory

Feces were collected between June 2025 and September 2025. Using rectal examination gloves, a sufficient quantity (15 to 20 grams in cattle and 5 to 10 grams in sheep and goats) was collected before the animals left their enclosures. This feces was then placed directly into medical-grade plastic bags and into a cooler containing dry ice. The maximum storage time is 48 hours at a temperature of 4°C (Bendiaf, 2011). Each sample is identified with a label bearing a number assigned to the animals (species, breed, age, sex). On average, 100 samples per visit were sent directly to the Parasitology Laboratory of the Special Mission for the Eradication of Glossina Flies (MSEG) in Adamaoua for analysis.

Coproscopic Analyses

Two types of coproscopic analyses were performed: a qualitative analysis (presence/absence of parasitic elements) and a quantitative analysis (counting of observed parasitic elements). The performance of each

fluid was evaluated and compared according to these two analyses.

Qualitative Analysis

Qualitative analysis consists of notifying the presence of parasitic elements (eggs, oocysts, larvae) observed on the slide after concentration on the surface of the latter.

The fecal sample is homogenized, then 5 g is weighed and gradually dissolved in 50 mL of water. The mixture is filtered through a 250 µm sieve using a funnel, rinsed with a wash bottle, collected in a 100 mL graduated cylinder, and then transferred to a 50 mL conical Falcon-type tube. This tube is centrifuged at 1300 rpm for 3 minutes. The supernatant is discarded, and the pellet is resuspended with a few milliliters of flotation fluid and then transferred to a 10 mL test tube. The tube is filled with flotation fluid and centrifuged at 1700 rpm for 2 minutes. After this, more flotation fluid is added to create a meniscus onto which a coverslip is placed. After 3 minutes, the coverslip is placed on a slide, which is read directly. The reading is taken at 10x20 and 10x40 magnification within 15 minutes (Laurine, 2024).

Quantitative Analysis

The purpose of quantitative analysis is to estimate the number of parasitic elements per gram of feces. For this, we used a McMaster slide. The stool sample was homogenized, then 3 g were taken and dissolved in 42 mL of flotation fluid. The mixture was filtered through a 250 µm sieve placed over a funnel and

collected in a 100 mL graduated cylinder. The filtrate was homogenized by stirring with a magnetic stir bar for 3 minutes. The McMaster slide is then filled with approximately 1 mL (or about 0.5 mL per chamber) of the liquid taken halfway up the side of the graduated cylinder while still stirring. After 5 minutes, the parasitic elements are counted at 10x and 20x magnification in both gratings and both chambers. For each parasitic species, the results in parasitic elements per gram of stool were obtained by multiplying the number of parasitic elements counted in the nets by 50 and the number of parasitic elements found only in the chambers outside the nets by 15 (Laurine, 2024).

Statistical Analysis

The collected data were entered into Excel 2013, then processed and analyzed using SPSS version 25. ANOVA tests were used to compare means. Pearson's chi-squared test was used to assess the significance of any correlations between variables (Δ=.05). Significance level was set at p-value < .05.

The arithmetic mean of eggs peram (OPG) was calculated for each parasite class. The prevalence of parasites in each locality was also calculated using the formula below: Prevalence (%) = (number of infested animals / number of animals sampled) x 100.

RESULTS

Average parasite infestation rate of cattle in the four study locations.

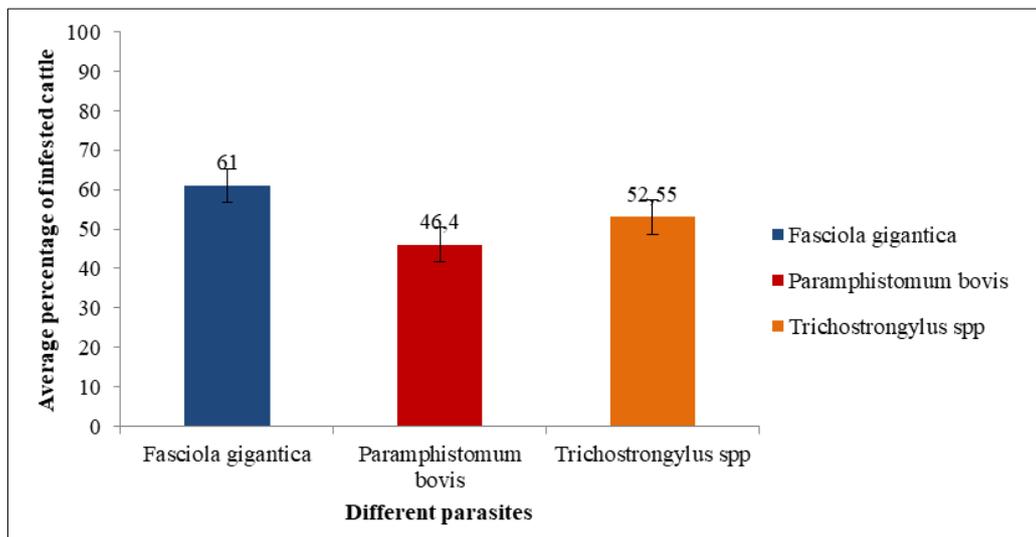


Figure 1: Infestation rates in cattle according to different parasites

Fecal examinations performed during the study period revealed the presence of eggs of three helminth species: F. gigantica, P. bovis, and Trichostrongylus spp. (Figure 1). The results show that out of 200 cattle whose feces were examined, 122 carried F. gigantica, representing an infestation rate of 61.0%; 92 carried P. bovis, representing an infestation rate of 46.4%; and 106

carried Trichostrongylus spp., representing an infestation rate of 52.55% (Figure 1).

Prevalence of Fasciola Gigantica, Paramphistomum Bovis and Trichostrongylus Spp in Cattle in the Faro

The average prevalence of F. gigantica infested cattle was 59.8%. The Tchamba locality had the highest

infestation rate (70.0%), and the Akou breed was the most infested at 63.1%. However, the difference between the prevalence rates in these localities was significant ($p < .05$). Cattle aged 3 to 5 years were the most infested (63.5%). The difference between the values for different age groups was significant ($p < .05$). Males were the most infested (64.1%).

The difference between the rates of the two sexes was significant ($p < .05$). On average, 46.4% of all cattle examined during the study period carried *P. bovis* eggs. The Pintchoumba locality had the highest infestation rate, with a prevalence of 52.5%. Animals aged three (3) to five (5) years were the most affected, with a prevalence of 47.4%. Males were the most heavily parasitized (48.7%).

Comparison of prevalence rates according to sex and age of cattle showed no significant difference between prevalence rates ($p > .05$). However, the difference was not significant ($p < .05$) between prevalence rates in different localities.

Fecal examinations also revealed the presence of *Trichostrongylus* spp. eggs, with an average

prevalence of 52.55% in the fecal samples examined. The locality of Poli had the highest prevalence (55.4%). The 2-month to 2-year age group was the most affected, with a prevalence of 72.9%. The difference between the prevalences of the different age groups was statistically significant ($p < .05$).

Females were the most infested (55.7%). Analysis by sex and location showed a significant difference between the different prevalence rates ($p < .05$).

P. bovis had an average prevalence of 46.4%, which is somewhat low in cattle during the study period. The Pintchoumba locality was the most heavily infested, with a prevalence of 52.5%. Animals aged three (3) to five (5) years were the most affected, with a prevalence of 47.4% (Table 1). Males were the most heavily parasitized (48.7%). Comparison of prevalence rates according to sex and age of cattle showed no significant difference between the prevalence rates ($p > .05$). However, the difference was also not significant ($p < .05$) between the prevalence rates of the different localities.

Table 1: Prevalence of gastrointestinal parasites in cattle according to location, sex, age class and breed

Prevalence (%), n = 200				
		<i>F. Gigantica</i> (α)	<i>P. bovis</i> (β)	<i>Trichostrongylus</i> spp (Ω)
Localities	Poli	63.0	43.1	55.4
	Pintchoumba	42.5	52.5	47.5
	Beka	64.4	40.0	53.3
	Tchamba	70.0	50.0	54.0
Sex	Male	64.1	48.7	48.7
	Female	59.0	44.3	55.7
Ages	[2months-2years]	56.3	41.7	72.9
	[3years-5years]	63.5	47.4	46.0
	[6years-7yerar]	53.3	46.7	53.3
	Akou	63.1	49.0	50.3
Races	Djafoun	62.5	37.5	62.5
	Namchi	42.1	36.8	57.9

With $\alpha = .05$; $\beta = 0.598$; $\Omega = 0.883$

Co-Infestation by Gastrointestinal Parasites in Cattle

The average prevalence of co-infestation by gastrointestinal parasites observed in this study was 53.7%, representing 108 cattle out of the 200 sampled. The Tchamba locality had the highest co-infestation rate (60.0%). Cattle aged 2 months to 2 years were the most co-infested (56.3%). Females had a higher rate of co-

infestation (55.5%), and the most co-infested breed was the Akou, with a prevalence of 55.7%.

The difference in prevalence between different localities and age groups was not statistically significant ($p > 0.05$). Table 2 below provides sufficient information on the co-infestation of these gastrointestinal parasites in cattle in our study area.

Table 2: Co-infestation in cattle

		Number	Prevalence(%)	P-value
Localities	Beka	24	53.3	0.702
	Poli	35	53.8	
	Tchamba	30	60.0	
	Pintchoumba	19	47.5	

		Number	Prevalence(%)	P-value
Ages	[2months-2years]	27	56.3	0.734
	[3years-5years]	74	54.2	
	[6years-7years]	7	46.7	
Sex	Male	42	51.9	0.615
	Female	66	55.5	
Races	Akou	83	55.7	0.288
	Djafoun	18	56.3	
	Namchi	7	36.8	

DISCUSSION

This study highlighted the presence of *F. gigantica*, *P. bovis*, and *Trichostrongylus* spp. The gastrointestinal parasite species identified in this study correspond to those previously identified in cattle by several other authors (Ebene *et al.*, 2022; Abass *et al.*, 2020; Mamoudou *et al.*, 2015; Ntonifor *et al.*, 2013) in different regions of Cameroon.

The results of our study reveal the presence of trematodes and nematodes, but the absence of cestodes and protozoa during the data collection period. Ntonifor *et al.*, in 2013, studied 277 cattle and found a 17% prevalence of *Fasciola* spp. in the Northwest Region of Cameroon, where rainfall is much higher than in the North Region where our study was conducted. The observation made is that the prevalence found by Ntonifor *et al.*, is three times lower than that found in our study. Thus, it is important to emphasize that the climate in the Faro Department is semi-arid of the Sudanese type, which is a low-rainfall climate with a marked dry season and a single rainy season (PCD-Faro, 2014).

An increased dry season in our study area certainly does not favor the development of gastrointestinal parasitic infections, but as the present study was carried out during the rainy season which is rather favorable to the development of parasites, this would also explain the high prevalence found in our study. Infections with *Fasciola* and *Paramphistomum* in cattle farming upshot in severe liver and rumen flukes, which can lead to emaciation, decreased milk output, reduced reproductive rates, and sometimes even fatality. Evidently, many scholars have discovered that the abundance of flukes rely on the population of intermediate snail hosts mainly of *Bulinus* and *Planorbis* (Rafiula *et al.*, 2011; Adedipe *et al.*, 2024; Yuwajita *et al.*, 2024). The spread of snail-borne Trematode infections depends heavily on these intermediate snail hosts. Additionally, the majority of farmers discharged their cattle into neighboring rivers for watering and feeding or providing chopped grass from rangelands for grazing as reported by Dembelo *et al.*, (2023).

Ntonifor *et al.*, in their work report that during the dry seasons, larva may develop successfully to infectious stages in faeces but might not emerge until moisture levels are optimal. Infected faeces continue to be passed out by the cattle until moisture is available

when pasture contamination can then rise rapidly (Ntonifor *et al.*, 2013). The presence of gastrointestinal parasites in cattle in these different parts of Cameroon could be explained by the presence of favorable environmental conditions necessary for the survival and development of the life stages of gastrointestinal parasites, as also reported by Hamid *et al.*, in their 2016 work. In addition, among the factors influencing the prevalence of strongyles, geographical conditions such as temperature, climate, rainfall, humidity, soil conditions, and agricultural management were also described by Knapp-Lawitzke *et al.*, (2016). The average prevalence of *Fasciola* found in this study is approximately three times higher (61.0%) than that obtained by Juan *et al.* in 2019, as Juan *et al.* found a prevalence of 22.3% in a study of 200 cattle in three municipalities in Colombia.

However, it should be noted that the *Fasciola* species differ, as we established the prevalence of the *gigantica* species while Juan *et al.*, worked on the *hepatica* species. The high prevalence may be due to feeding of fat directly from the ground. It is possible that the high incidence such parasite might be due to ingesting of gras directly from the ground. Cattle most heavily infested with *F. gigantica* and *P. bovis* are those between 3 and 5 years old. However, cattle between 2 months and 2 years old are most heavily infested with *Trichostrongylus* spp. According to Dembelo *et al.*, (2023) and Regassa *et al.*, (2006), the exposure and pathogenicity of GIT infections are greater in young animals than the matured ones, which was in line with our result found with *Trichostrongylus* spp.

Ntonifor *et al.*, for their part, report that generally, young stock animals had a slightly higher prevalence rate of GIT parasites compared to adults (Ntonifor *et al.*, 2013). Although the reasons for variations in parasite prevalence among animal age groups are difficult to determine precisely, they could be associated with the animals' immune status, variations in grazing area, and husbandry practices, as reported by Regassa *et al.*, (2006).

Furthermore, several other studies report that gastrointestinal parasites are more common in cattle in poor body condition than in those in good body condition (Squire *et al.*, 2013, Cheru *et al.*, 2014). Indeed, young animals, with their very precarious immunity, are more susceptible to parasites, as noted by Wymann (2005). It

has been also reported that high infestation of the endoparasites may be triggered by many contributory management factors like, rearing practices, feeding, watering resources, housing, general health care including deworming (Ahmed *et al.*, 2023, Tanjung and Thahira, 2021). The results of the work of Ahmed *et al.*, in 2023 reported that the prevalence was higher in cattle above 3 year of age (83.00%) followed by 1-3 years (77.70%) and lowest in animals below 1 year of age (54.00%).

Regarding the parasites *F. gigantica* and *P. bovis*, our results corroborate those obtained by Ahmed *et al.*, (2023), as the highest prevalences are found between 3 and 5 years of age. However, with *Trichostrongylus* spp., our observations differ, as our results show that young cattle are more likely to be infested than adults. The results contained show that males were the most parasitized (48.7%), this result obtained is different from that found by Dembelo *et al.*, in 2023 who report that female and male cattle were infested at almost the same level with a prevalence of 64.5% and 67.9% respectively. These results show that both male and female cattle are susceptible to gastrointestinal parasite infestation.

The average prevalence of gastrointestinal parasite co-infestation observed in this study was 53.7%. Cattle aged 2 months to 2 years were the most co-infested (56.3%). The difference in prevalence between different locations and age groups was not statistically significant ($p > .05$).

The phenomenon of parasite co-infection in cattle is very common when the conditions for parasite development are present. Gastrointestinal parasitic diseases of ruminants are still endemic in Cameroon in particular and in Africa in general. Moreover, in a study published on the Epidemiology of Gastrointestinal Parasites of Cattle in and Around Hosanna Town, Southern Ethiopia, Dembelo *et al.*, in 2023 reported that out of 400 samples of bovine feces examined, the major parasites observed were Strongyle type (18.25%), Paramphistomum (9.5%), Fasciola (8.25%), Toxocara (3.25%) and Eimeria (2.75%). They found that major classes of parasites recorded include Trematodes, Nematodes, Cestodes, and Protozoa and that there was a high relationship between risk factors such as age, body condition, and management system with the prevalence of GIT parasites (Dembelo *et al.*, in 2023).

A significant contributor to morbidity and decreased productivity in cattle has been identified as the mixed infection phenomenon (Dembelo *et al.*, in 2023). Consequently, the immune system of the host is suppressed by mixed infections, which makes the host more vulnerable to other illnesses or parasites (Dembelo *et al.*, in 2023).

Parasitic co-infections in cattle are caused by factors related to the environment (pastures, sanitary conditions) and the susceptibility of the animal (health status, age). Poor hygiene and unsanitary conditions increase the likelihood of fecal-oral parasite transmission. Gastrointestinal parasites are common in pastures, where cattle ingest contaminated larvae via grass.

Cattle in contact with wetlands are more exposed to parasites such as the liver fluke, which uses an aquatic snail as an intermediate host. An animal weakened by recent illness or experiencing nutritional deficiencies is more vulnerable to parasitic infections. In calves, low immunity can make them more susceptible to parasites. Different life cycles for each parasite mean that animals can be exposed to multiple parasitic agents simultaneously. Another form of digestive tract co-infection represented by Eimeria (70%), Bunostomum (55%), *Trichostrongylus* (40%) and *Strongyloides* (27%) was also reported by Ibrahim *et al.*, (2025).

CONCLUSION

At the end of our study, we were able to demonstrate the presence of nematodes and trematodes in randomly selected domestic animals in the Faro region of northern Cameroon. The identified parasites were *F. gigantica*, *P. bovis*, and *Trichostrongylus* spp. These parasites have a significant impact on productivity. Therefore, strong and concerted action by public and private authorities remains essential to contain, and even eradicate, gastrointestinal parasitic diseases. This work represents an important step forward in minimizing economic losses in ruminants by providing information that will help farmers implement appropriate management techniques.

Conflicts of Interest: The authors have declared no conflict of interest.

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Authors' Contributions: This work was carried out in collaboration among all authors. Author NTMH conceptualized the study, while author KJ, SA and AA finetuned the concept. Authors NTMH collected and analyzed data and wrote the first draft of the manuscript. Author ND supervised the research process. All authors read and approved the final manuscript.

Data Availability: The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval: No applicable.

Consent to Participate: No applicable.

Consent to Publish: No applicable.

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