Prevalence of gastrointestinal parasites in slaughterhouse horses and donkeys from the North and Northeast of Colombia

Prevalencia de parásitos gastrointestinales en equinos (*Equus caballus*) y burros (*Equus asinus*) beneficiados del Norte y Noreste de Colombia

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Highlights

- Gastrointestinal parasitic diseases represent one of the most significant challenges affecting equines in developing countries.
- The most prevalent intestinal nematodes in equines include large and small Strongylus spp., *Parascaris equorum*, and *Oxyuris equi.*
- A high prevalence of gastrointestinal parasites was found in slaughtered horses and donkeys.

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ABSTRACT

Introduction. Gastrointestinal parasites represent one of the most significant health problems in equines, affecting welfare, production, and performance. **Objective.** The objective of this study was to report the prevalence of gastrointestinal parasites in horses (*Equus caballus*) and donkeys (*Equus asinus*) from different regions of Colombia. **Materials and methods.** A random sampling design was implemented on animals slaughtered at a processing facility located in Piedecuesta, Santander, Colombia. A total of 292 fecal samples from the digestive systems of the slaughtered horses and donkeys were collected. Fecal samples were processed using the McMaster coprological technique. In addition, the same number of livers was inspected for adult forms of *Fasciola hepatica*. **Results and discussion.** The overall prevalence of gastrointestinal parasites was 96.9% (283/292), with the highest values for *Strongylus* sp., followed by *Strongyloides* sp., *Trichostrongylus* sp., and *Parascaris equorum*. No significant differences were found according to sex, species, municipality, or department. In the present study, no adult forms of *Fasciola hepatica* were observed in the inspected livers. **Conclusion.** The high prevalence of gastrointestinal parasites found in this research could be controlled through effective health plans and antiparasitic control in animals from the regions under study.

RESUMEN

Introducción. Los parásitos gastrointestinales representan uno los problemas sanitarios más significativos en los equinos, alterando el bienestar, la producción y el rendimiento. **Objetivo.** El objetivo de este estudio fue reportar la prevalencia de parásitos gastrointestinales en equinos (*Equus caballus*) y burros (*Equus asinus*) procedentes de diferentes regiones de Colombia. **Materiales y métodos**. Se implementó un diseño de muestreo aleatorio en animales beneficiados en una planta de sacrificio, ubicada en el municipio Piedecuesta, departamento Santander. Se colectaron 292 muestras fecales tomadas directamente del sistema digestivo de los animales beneficiados. Las muestras fecales se procesaron mediante la técnica coprológica de McMaster. Además, se inspeccionaron la misma cantidad de hígados para buscar formas adultas de *Fasciola hepatica*. **Resultados y discusión.** La prevalencia global de parásitos gastrointestinales fue de 96.9% (283/292), siendo los valores más altos para *Strongylus* sp. seguidos de *Strongyloides* sp., *Trichostrongylus* sp. y *Parascaris equorum*. No se encontraron diferencias significativas según sexo, especie, municipio o departamento. En el presente estudio no se observaron formas adultas de *Fasciola hepatica* en los hígados inspeccionados. **Conclusión.** La alta prevalencia de parásitos gastrointestinales encontrada en este estudio pudiera ser controlada mediante efectivos planes sanitarios y de control antiparasitario en los animales procedentes de las regiones bajo estudio.

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INTRODUCTION

Gastrointestinal parasitic diseases represent one of the most significant challenges affecting equines in developing countries [1]. These conditions compromise the welfare, productivity, and performance of these animals worldwide, producing varying levels of harm depending on their nutritional and immunological status [2]. Such parasites reduce equine productivity, lead to weight loss, and, in severe cases, result in mortality [3]. The most prevalent intestinal nematodes in equines include large and small *Strongylus* spp., *Parascaris equorum*, and *Oxyuris equi* [4].

Studies conducted in Colombia have identified gastrointestinal parasites in equines and donkeys using coprological methods, reporting varying prevalence rates. The most commonly detected parasites include *Strongylus* spp., *Parascaris equorum*, *Anoplocephala perfoliata*, and *Oxyuris equi* in different regions of the country, such as the departments of Antioquia [5–8], Arauca [9,10], Caquetá [11], Caldas [12], Córdoba [13,14], Cundinamarca [15], Huila [16], Quindío [17], Santander [18], and Valle del Cauca [19]. Additionally, *Giardia duodenalis* has been identified in equines in Colombia using molecular techniques [20,21].

According to the national equine census, a total of 380,118 equines, including both males and females, were reported across the departments of Arauca, Bolívar, Cesar, Córdoba, and Magdalena [22]. However, data on the number of donkeys remains unavailable or unofficial. Furthermore, there is a scarcity of studies on gastrointestinal parasites in equines and donkeys in Colombia [13,14], as well as limited reports on gastrointestinal parasites in equines slaughtered for human consumption in the country [16], particularly in the northeastern regions. Therefore, the aim of this study was to report the prevalence of gastrointestinal parasites in equines (*Equus caballus*) and donkeys (*Equus asinus*) slaughtered in northern and northeastern Colombia.

MATERIALS AND METHODS

A randomized descriptive study was conducted at an equine slaughterhouse located in the municipality of Piedecuesta, department of Santander, Colombia. To achieve the study's objectives, a cross-sectional sampling design was employed to determine the prevalence of gastrointestinal parasites in equines (*Equus caballus*) and donkeys (*Equus asinus*). Samples were collected proportionally based on inventory data provided by the slaughterhouse.

Sample collection was carried out during eight visits over a four-month period in 2022, with two visits conducted each month. Samples were randomly collected based on the availability of digestive tracts on the sampling day. Approximately 38 animals were examined per visit, resulting in a total of 292 animals. Digestive tracts from equines and donkeys, specifically the large intestine, were utilized. Fecal samples ranging from 10 to 15 grams were directly collected from the intestine and placed into pre-labeled plastic containers. The samples were kept in containers with ice packs and transported to the clinical laboratory at the Vet Center Veterinary Clinic for processing. For each digestive tract, information on sex and place of origin was recorded.

The McMaster technique [23] was used for coprological examination to identify gastrointestinal parasite eggs. A sugar-salt flotation solution (saturated saline solution with 500 g of sugar) was used. Observations of parasitic forms were made using a binocular microscope with 10X and 40X magnification. Infection intensity was determined following the criteria described by [23]. Additionally, post-mortem examinations were performed on the livers of the 292 equines and donkeys. Cross-sections approximately 1 cm apart were made through the hepatic lobes and bile ducts to detect the presence of adult *Fasciola hepatica* [24].

The results were analyzed using descriptive statistics and the Chi-squared test (χ^2) to assess associations between variables (municipality, sex, species) and prevalence values. A significance level of 5% was applied. Statistical analyses were performed using SPSS software [25].

RESULTS

The overall prevalence of gastrointestinal parasites was 96.9% (283/292), with a prevalence of 97.8% (45/46) in donkeys and 96.7% (238/246) in horses **(Table 1)**. No statistical association was found between parasitic prevalence and animal species ($p > 0.05$).

Table 1. Comparison of overall gastrointestinal parasite prevalence by animal species.

Species	N	Positive	%	X^2	*p*
Donkeys	46	45	97.8	0.15	0.69
Equines	246	238	96.7		
Total	292	283	96.9		

No statistical significance ($p > 0.05$).

Of the total samples examined, 283 fecal samples tested positive for at least one parasite. *Strongylus* sp. eggs were the most frequently observed, followed by *Trichostrongylus* sp., *Parascaris equorum*, and *Strongyloides* sp. **(Table 2)**. Furthermore, when comparing parasitic prevalence by the sex of the animals, no statistically significant differences were found between males and females **(Table 3)**.

Table 2. Frequency and infection intensity of gastrointestinal parasites in horses and donkeys.

Parasite	Positive	%	Min. (epg)	Max. (epg)	Mean (epg)
Strongylus sp.	265	90.8	100	10,900	1,540
Trichostrongylus sp.	190	65.1	100	8,500	860
Parascaris equorum	22	7.5	100	1,100	400
Strongyloides sp.	2	0.7	200	1,100	650
Total	292				

Eggs per gram of feces (epg).

Table 3. Comparison of gastrointestinal parasite prevalence by animal sex.

Sex	N	Positive	%	X^2	*p*
Hembras	129	124	96.1	0.487	0.48
Machos	163	159	97.5		
Total	292	283	96.9		

No statistical significance ($p > 0.05$).

The comparison of parasitic prevalence by municipality and department revealed no significant associations with these variables. The highest prevalence rates were observed in the departments of Bolívar and Magdalena, followed by Arauca, Cesar, and Córdoba. Additionally, no adult forms of *Fasciola hepatica* were detected in the livers examined during the study **(Table 4)**.

Table 4. Comparison of gastrointestinal parasite prevalence by municipality and department.

Department	Municipality	N	Positive	%	X^2	*p*
Arauca	Arauca	34	34	100	2.56	0.487
	Pinillos	14	14	100		
Bolívar	Morales	19	19	100		
	Arenal	5	5	100		
Cesar	Agustín Codazzi	9	9	100		
	Montería	23	21	91.3		
Córdoba	Lorica	31	30	96.8		
	Sahagún	20	18	90		
	Fundación	25	25	100		
	Aracataca	29	29	100		
	Algarrobo	21	21	100		
Magdalena	Banco	6	6	100		
	Plato	14	14	100		
	Santa Ana	42	38	90.5		
Total		292	283	96.9		

No statistical significance ($p > 0.05$).

DISCUSSION

This study reports the prevalence of gastrointestinal parasites in equines (*Equus caballus*) and donkeys (*Equus asinus*) slaughtered in the departments of Arauca, Bolívar, Cesar, Córdoba, and Magdalena in northern and northeastern Colombia. It is also the first study to investigate the potential presence of adult forms of *Fasciola hepatica* in these animals in Colombia.

The overall prevalence of gastrointestinal parasites observed in equines and donkeys was 96.9%. These findings are consistent with other studies conducted in the Bogotá savanna and the departments of Santander and Huila using coprological tests [15,16]. However, studies in the departments of Caldas, Florencia, and Valle del Cauca, Colombia, reported lower prevalence rates [8,11,12,19]. In the fecal samples analyzed, *Strongylus* sp. eggs were the most frequently observed, followed by *Strongyloides* sp., *Trichostrongylus* sp., and *Parascaris equorum*. These results align with findings reported by other researchers in Colombia [7,8,9,11,12,15,16]. However, other studies have identified *Trichostrongylus* sp. eggs as the most frequent [26]. No cestode eggs or protozoan cysts were detected in the samples analyzed.

It is important to note that coprological techniques relying on direct observation of parasitic forms under a light microscope have low diagnostic sensitivity [27,28]. Consequently, some parasite genera may have gone undetected, potentially leading to false negatives.

Regarding sex as a variable, a similar prevalence of gastrointestinal parasites was observed in males and females, which is consistent with findings reported by [16]. However, other studies have found statistically significant differences in prevalence by sex [8,9,11,7].

The absence of health records for the animals sent for slaughter in this study may explain the high parasite burdens observed. Nonetheless, similar studies in Colombia, where owners reported some form of health management plan, also found high gastrointestinal parasite burdens in equines and donkeys [11,15,16,17,26]. These findings suggest deficiencies in antiparasitic programs and equine management practices, as well as potential parasite resistance to the anthelmintics used [29].

Although no adult forms of *Fasciola hepatica* were detected in the livers examined, this study represents the first investigation in Colombia targeting this parasite in equines. Further research is warranted in equines originating from areas endemic to this trematode in Colombia. Notably, *F. hepatica* has been reported in equines from Chile and Argentina [30,31].

CONCLUSIONS

A high prevalence of gastrointestinal parasites was found in equines (*Equus caballus*) and donkeys (*Equus asinus*) slaughtered and originating from the departments of Arauca, Bolívar, Cesar, Córdoba, and Magdalena, Colombia. Therefore, it is crucial to implement health and antiparasitic control programs for animals from the studied regions. *Strongylus* eggs were the most frequently observed in this study, and no adult forms of *Fasciola hepatica* were detected in the inspected livers.

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ETHICAL CONSIDERATIONS

The study was conducted in accordance with national ethical standards. Informed consent was obtained from the management of the slaughter and processing facility where the study was conducted.

DECLARATION OF COMPETING INTEREST

The authors have declared no conflict of interest.

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