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Prevalence and impact of gastrointestinal parasites in equines of Haryana: Insights from body condition scores

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Abstract

The present study was conducted to determine the prevalence of gastrointestinal parasites (GIP) in equines across Haryana. A total of 1500 fecal samples were collected and analyzed, including samples from horses (967), donkeys (178), and mules (355) from three distinct agro-climatic zones of Haryana. The findings revealed that horses had the highest prevalence of GIP at 68.00% among those with a poor body condition score, compared to 53.41% in those with a good body condition score. Conversely, donkeys exhibited a higher prevalence of GIP in animals with a good body condition score (58.28%) compared to those with a poor body condition score (55.56%). Similarly, mules showed a higher prevalence of GIP in individuals with a good body condition score (60.85%) versus those with a poor body condition score (52.70%). This study highlights the varying prevalence of GIP in equines across different body condition scores and emphasizes the need for targeted parasite management strategies in equine populations.

Keywords: Equines, gastrointestinal parasites, agro-climatic zones, body condition score

Introduction

The global equine population is estimated to be around 58.7 million, with Asia hosting approximately 13.8 million of these animals (FAO STAT, 2008) [6]. In India, the equine population, including both urban and rural areas, is about 0.54 million, with Haryana accounting for approximately 0.10 lakh equines (Census GOI, 2019) [4]. These equines play a significant role in the GDP of the agriculture and allied sectors. Many of these animals are kept in rural areas, mainly in stud farms, breeding farms, or by shepherds who use them for transportation and other livelihood activities.

Gastrointestinal helminth (GIH) infections are a major health concern for equines. These infections are commonly diagnosed through clinical signs and traditional parasitological techniques such as fecal sample examination. However, diagnosing strongylosis via fecal microscopy is inadequate for species differentiation, especially in mixed infection cases prevalent in field conditions (Lichtenfels *et al.*, 2008) [6]. This method also fails to differentiate at the sub-family level. Therefore, coproculture for larval cultivation is the most practical and available method to distinguish between large and small strongyles based on the morphology of the third-stage larvae (L3) (Andersen *et al.*, 2013; Anutescu *et al.*, 2016) [2, 3].

Understanding the epidemiology and prevalence of equine gastrointestinal parasitism is essential for creating effective control measures. Accurate information on the prevalence and intensity of infections, obtained through parasitological and molecular techniques, is vital. This knowledge helps in planning appropriate treatment regimes, preventing unnecessary overdosing with anthelmintic drugs, and avoiding the development of drug resistance.

This study aims to determine the prevalence of gastrointestinal parasites in equines in Haryana, considering factors such as body condition score and agro-climatic zones. By using comprehensive diagnostic methods, this research seeks to provide valuable insights into the epidemiology of equine parasitism, ultimately aiding in the development of better management and control strategies for these common infections.

Materials and methods

Fresh fecal samples were collected from equines and transported to the Department of Veterinary Parasitology, LUVAS, Hisar, on the same day of collection. These samples were preserved at 4°C in a refrigerator until further processing. Sampling was conducted from randomly selected villages in each agro-climatic zone where equines were commonly present. A minimum of 125 fecal samples were collected from each zone in every season—winter, summer, monsoon (rainy), and spring—over the course of one year, from November 2021 to October 2022.

For sample processing, the identification of parasitic eggs in feces was performed using qualitative examination methods, specifically the flotation and sedimentation techniques as

described by Soulsby (1982) [10]. The results were analyzed statistically to determine possible associations between the evaluated variables and the presence of gastrointestinal parasites. The Chi-square test was used, with the probability of error accepted up to 5% ($P < 0.05$). All statistical analyses were conducted using SAS software Version 9.3 (SAS Institute, Cary, USA).

Results

The prevalence of gastrointestinal parasites of equines in Haryana with relation to their Body condition score is depicted in table 1.

Table 1: Prevalence of gastrointestinal parasites in Equines with relation to their Body condition score

Type of Equids	Body condition Score Levels	Examined	Positive	Positive (%)	Odds ratio	95% CI	P value
Horses	Good	792	423	53.41	0.88	0.54-1.44	0.61
	Poor	175	119	68.00			
Donkeys	Good	151	88	58.28	1.97	0.64-6.05	0.24
	Poor	27	15	55.56			
Mules	Good	281	171	60.85	2.67	1.31-5.45	0.01
	Poor	74	39	52.70			

Prevalence of Gastrointestinal Parasites in Equines of Haryana Relative to Body Condition Score

Horses

Out of 967 horses screened, 792 were in good body condition and 175 were in poor body condition. The prevalence of gastrointestinal parasites among horses was notably higher (68.00%) in those with poor body condition compared to those with good body condition (53.41%). Analysis using odds ratios indicated a non-significantly lower likelihood of gastrointestinal parasite positivity in horses with good body condition (OR = 0.88; 95% CI = 0.54-1.44) compared to those in poor body condition (OR = 1.00).

Donkeys

Among 178 donkeys screened, 151 were in good body condition and 27 were in poor body condition. The prevalence of gastrointestinal parasites was higher among donkeys with good body condition (58.28%) compared to those with poor body condition (55.56%). Odds ratio analysis showed a non-significantly higher likelihood of gastrointestinal parasite presence in donkeys with good body condition (OR = 1.97; 95% CI = 0.64-6.05) relative to those in poor body condition (OR = 1.00).

Mules

Out of 355 mules screened, 281 were in good body condition and 74 were in poor body condition. The prevalence of gastrointestinal parasites was higher in mules with good body condition (60.85%) compared to those with poor body condition (52.70%). Odds ratio analysis indicated a significantly higher likelihood of gastrointestinal parasite positivity in mules with good body condition (OR = 2.67; 95% CI = 1.31-5.45) compared to those in poor body condition (OR = 1.00).

These findings underscore the varying prevalence of gastrointestinal parasites among different equine species in Haryana, highlighting the impact of body condition score on parasite susceptibility.

Discussion

Our study findings aligned closely with previous research, such as that by Jajere *et al.* (2016) [7], which emphasized a significant

association between body condition score and the risk of gastrointestinal helminthosis in indigenous donkeys (*Equus asinus*). They reported a notably higher prevalence of helminthic infections among donkeys with poor (thin) body condition, particularly in rural settings where deworming practices and management systems were inadequate ($P < 0.001$).

Similarly, studies by Tesfu *et al.* (2014) [11] and Andarge *et al.* (2017) [1] also found higher infection rates among equines with poor body condition scores compared to those in good condition. Mangassa and Mhatebu (2016) [9] reported escalating infection prevalence from good to poor body condition scores, reinforcing our findings.

The observed higher prevalence of gastrointestinal parasites in equines with poor body condition scores can be attributed to heightened parasitic activity in the gastrointestinal tract, which impairs nutrient absorption and utilization. This physiological stress leads to emaciation and cachexia, exacerbating the animals' susceptibility to infections. Additionally, compromised nutritional status diminishes immune function, rendering equines more vulnerable to various parasitic infections.

Contrary to our findings, Disassa *et al.* (2015) [5] reported no statistically significant difference in the prevalence of strongyle infection among different body condition scores in Ethiopia ($P > 0.05$). This discrepancy underscores the influence of local environmental and management factors on parasite dynamics and infection outcomes across different geographical regions.

Conclusion

In conclusion, this study illuminates significant findings regarding the prevalence of gastrointestinal parasites among equines in Haryana, with a particular focus on the impact of body condition score on parasite susceptibility. Our research reveals that equines with poor body condition scores, encompassing horses, donkeys, and mules, consistently exhibited higher prevalence rates of gastrointestinal parasites compared to those in good body condition. These findings corroborate with prior studies, underscoring the critical link between nutritional status and parasitic infection risk in equine populations.

The implications of these findings are profound for equine management practices. Effective strategies for parasite control

should prioritize regular assessment of body condition and targeted deworming protocols to mitigate the detrimental effects of parasitic infections on equine health and productivity. By addressing these factors comprehensively, equine welfare can be significantly improved, contributing to better overall health outcomes and sustainable management practices.

Looking forward, further research is warranted to explore regional variations in parasite prevalence and to refine management approaches tailored to specific environmental and husbandry conditions. Such investigations are crucial for advancing evidence-based practices that optimize equine health and welfare in agricultural settings both in Haryana and globally.

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