

## STUDY ON PREVALENCE OF GASTRO INTESTINAL HELMINTHS OF LARGE AND SMALL RUMINANTS IN DISTRICT TANDO ALLAHYAR, SINDH

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### Article Info



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### Abstract

The present study was conducted to determine the prevalence of gastrointestinal helminths in large and small ruminants reared in District Tando Allahyar, Sindh, Pakistan. A total of 640 fecal samples were collected from cattle (n=365), buffaloes (n=95), goats (n=135), and sheep (n=45) and examined using standard parasitological techniques. Overall, 472 animals were found positive, showing a prevalence of 73.75%. Species-wise analysis revealed the highest prevalence in goats (81.48%), followed by buffaloes (74.73%), cattle (71.78%), and sheep (64.44%). Statistical analysis indicated a significant association between host species and infection rate ( $\chi^2 = 8.64$ ,  $p = 0.034$ ). Age-wise prevalence showed significantly higher infection rates in adult animals compared to younger groups in both large ( $\chi^2 = 12.18$ ,  $p = 0.006$ ) and small ruminants ( $\chi^2 = 9.27$ ,  $p = 0.026$ ). The predominant parasites identified were *Eimeria* spp., *Ascaris* spp., *Strongyle* spp., *Fasciola* spp., *Trichuris* spp., *Moniezia* spp., and *Schistosoma bovis*. The high prevalence indicates poor management practices and favorable climatic conditions for parasite survival. Strategic deworming, improved farm hygiene, and regular monitoring are recommended to reduce economic losses associated with gastrointestinal helminthiasis.

**Keywords:** *Gastrointestinal helminths, Prevalence, Ruminants, Eimeria* spp., *Age-related infection, Sindh, Pakistan.*

## Introduction

Livestock plays a pivotal role in improving the socio-economic status of rural communities in Pakistan. It serves as a major source of income, employment, and nutritional security for smallholder farmers. According to the Economic Survey of Pakistan (2021), agriculture contributes 19.2% to the national GDP, while the livestock sector alone accounts for 60.1% of the agricultural value added and approximately 11.8% of the overall GDP. The population of cattle and buffaloes has been estimated at 51.5 and 42.4 million heads, respectively, producing approximately 61,720 million tons of milk annually (Memon et al., 2021). These figures highlight the economic importance of ruminant livestock in Pakistan. Despite its economic significance, livestock productivity is severely constrained by parasitic infections, particularly gastrointestinal endoparasites. Poor awareness among rural farmers regarding strategic deworming practices, combined with inadequate housing, protein and mineral deficiencies, contaminated water sources, and poor sanitation, predisposes animals to heavy parasitic infestations (Dagnachew et al., 2011). Both endoparasites and ectoparasites contribute to morbidity, mortality, reduced milk and meat yield, and increased treatment costs (Din et al., 2020; Dagnachew et al., 2011; Di-Cerbo et al., 2010). Consequently, parasitic diseases negatively affect the profitability and sustainability of livestock farming systems (Fazlullah, 2016). Gastrointestinal endoparasitism in ruminants is mainly caused by helminths and protozoa (Asif et al., 2008). Among protozoan parasites, *Eimeria spp.* (Phylum: Apicomplexa; Family: Eimeriidae) is responsible for bovine and ovine coccidiosis and is widely distributed in tropical and subtropical regions (Asif et al., 2008). Helminths, particularly nematodes of the order Strongylidae, are common in tropical climates and are major causes of parasitic gastroenteritis in cattle and sheep (Dagnachew et al., 2011). Other nematodes such as *Trichuris spp.*, *Bunostomum spp.*, and *Cooperies spp.* have also been reported in cattle (Khan et al., 2013). Trematodes such as *Fasciola hepatica* require intermediate hosts and are responsible for significant production losses in ruminants. Globally, the prevalence of gastrointestinal parasitism in cattle varies considerably. Reports indicate infection rates of 7.9% in Taiwan (Fazlullah, 2016), 50.5% in Colombia (Galan, 2005), 89.74% in Pakistan (Hassan et al., 2011), 11.56% in Sri Lanka (Gadahi et al., 2009), and 95.5% in Ghana (Gupta et al., 2006). Similar trends have been documented in cattle and buffalo populations in India (Jones and Raymond, 2001). These variations are largely influenced by climatic conditions, geographical location, farm management practices, and parasite control strategies. District Tando Allahyar, Sindh, possesses a substantial population of cattle, buffaloes, goats, and sheep, yet limited epidemiological data are available regarding gastrointestinal endoparasitism in this region. Considering the favorable warm climatic conditions and common practice of communal grazing in Sindh, livestock may be at considerable risk of parasitic infections. Therefore, the present study was undertaken to determine the prevalence and distribution of gastrointestinal endoparasites in large and small ruminants of District Tando Allahyar, Sindh, and to assess associated risk factors such as species and age.

## Materials and Methods

### Study Area

The present research investigation was conducted in District Tando Allahyar, Sindh, Pakistan. Tando Allahyar is located in the southern part of Sindh province and lies

approximately at 25°27'N latitude and 68°43'E longitude. The district is characterized by a predominantly agricultural landscape with extensive livestock farming. The climatic conditions of the area are generally hot and semi-arid. Summers are long, extremely hot, and dry, with temperatures often exceeding 40°C, whereas winters are short and mild. The average annual temperature ranges between 10°C in winter and 45°C in peak summer. Such warm climatic conditions are favorable for the development, survival, and transmission of gastrointestinal parasites in grazing animals.

### **Collection and Examination of Fecal Samples**

A cross-sectional study was conducted on 18 different livestock farms located in various localities of District Tando Allahyar. The farms included both small- and large-scale dairy and small ruminant production units. Approximately 5–10 grams of fresh fecal samples were collected randomly from about 35% of the animal population present on each farm. The samples were collected directly from the rectum or immediately after defecation using clean disposable gloves and placed in properly labeled polyethylene bags indicating species, age group, and farm identification number.

A total of 640 fecal samples were collected from cattle, buffaloes, goats, and sheep. After collection, the samples were transported in iceboxes to maintain freshness and prevent egg development or hatching. The samples were processed at the Veterinary Diagnosis and Research Laboratory (CVDL), Sindh, Tando Jam, for parasitological examination.

### **Parasitological Examination**

Qualitative examination of fecal samples was performed using standard parasitological techniques. Each sample was examined through direct smear microscopy as well as sedimentation and flotation techniques for the detection of helminth eggs and protozoan oocysts.

The sedimentation technique was primarily used for detecting heavier eggs such as *Fasciola spp.* and *Schistosoma bovis*, whereas the flotation technique was employed for identifying lighter eggs including *Eimeria spp.*, *Ascaris spp.*, *Strongyle spp.*, *Trichuris spp.*, and *Moniezia spp.*

Identification of endoparasites was carried out based on morphological characteristics of eggs and oocysts, including size, shape, color, shell thickness, and internal structures. Microscopic examination was performed under 10× and 40× magnifications using a compound light microscope.

All laboratory procedures were carried out following standard veterinary parasitology protocols to ensure accuracy and reliability of results

## Results

### Overall Prevalence of Gastrointestinal Helminths

Out of the total 640 fecal samples examined from large and small ruminants in District Tando Allahyar, 472 animals were found positive for one or more gastrointestinal helminths, while 168 were negative. This corresponds to an overall prevalence of 73.75%, indicating a high burden of parasitic infection in the study population.

The observed prevalence was statistically significant when compared against the expected equal distribution of infection ( $\chi^2 = 146.80$ ,  $p < 0.001$ ), confirming that gastrointestinal helminthiasis is highly prevalent in the investigated ruminant population.

**Table 1: Overall Prevalence of Gastrointestinal Helminths**

No. of Animals	Positive	Negative	Percentage (%)
640	472	168	73.75%

### Species-wise Prevalence of Endo parasitic Infestation

Species-wise analysis revealed variation in infection rates among the examined animals. Goats exhibited the highest prevalence (81.48%), followed by buffaloes (74.73%), cattle (71.78%), and sheep (64.44%).

Out of 365 cattle examined, 262 were positive, giving a prevalence of 71.78%. Among 95 buffaloes, 71 were infected (74.73%). In goats, 110 out of 135 animals were positive (81.48%), representing the highest infection rate among all species. Sheep showed comparatively lower prevalence, with 29 out of 45 animals infected (64.44%).

Chi-square analysis demonstrated a statistically significant association between host species and prevalence of infection ( $\chi^2 = 8.64$ ,  $p = 0.034$ ), indicating that susceptibility to gastrointestinal helminths significantly varies among ruminant species.

The higher prevalence in goats may be attributed to their extensive grazing and browsing habits, which increase exposure to infective stages present on contaminated pasture. The comparatively lower prevalence in sheep could be associated with managemental differences or smaller sample size. The major helminths identified included *Eimeria spp.*, *Ascaris spp.*, *Strongyle spp.*, *Fasciola spp.*, *Trichuris spp.*, *Moniezia spp.*, and *Schistosoma bovis*, with *Eimeria spp.* being the most predominant parasite across species.

**Table 2: Species-wise Prevalence of Endo parasitic Infestation**

Species	Total Samples	Positive	Negative	Prevalence (%)
Cattle	365	262	103	71.78
Buffalo	95	71	24	74.73
Goat	135	110	25	81.48
Sheep	45	29	16	64.44

**Age-wise distribution in large ruminants showed a clear increasing trend of infection with advancing age.**

In cattle, animals less than 1 year old showed a prevalence of 55.00% (66/120). The prevalence increased to 77.03% (104/135) in the 1–3 years age group and further increased to 83.63% (92/110) in animals older than 3 years. Similarly, in buffaloes, animals under 1 year of age showed 62.50% prevalence (20/32). The prevalence increased to 80.64% (25/31) in the 1–3 years group and reached 84.37% (27/32) in animals older than 3 years. Statistical analysis revealed a significant association between age and prevalence in large ruminants ( $\chi^2 = 12.18$ ,  $p = 0.006$ ). The increasing prevalence with age may be attributed to prolonged exposure to contaminated grazing fields and cumulative parasitic burden over time.

**Table 3: Effect of Age on Prevalence in Large Ruminants**

Species	Age Group	Total	Positive	Prevalence (%)
Cattle	<1 year	120	66	55.00
Cattle	1–3 years	135	104	77.03
Cattle	>3 years	110	92	83.63
Buffalo	<1 year	32	20	62.50
Buffalo	1–3 years	31	25	80.64
Buffalo	>3 years	32	27	84.37

#### **Effect of Age on Prevalence in Small Ruminants**

In small ruminants, age also significantly influenced the prevalence of gastrointestinal helminths. Among goats, animals younger than 6 months showed 62.50% prevalence (20/32). The infection rate increased to 80.95% (34/42) in the 6 months–2 years age group and was highest in animals older than 2 years, with 86.88% prevalence (53/61).

In sheep, lambs younger than 6 months showed the lowest prevalence of 50.00% (7/14). The highest prevalence was observed in the 6 months–2 years group (75.00%; 9/12), while sheep older than 2 years showed 68.42% prevalence (13/19). Chi-square test indicated a statistically significant relationship between age and infection in small ruminants ( $\chi^2 = 9.27$ ,  $p = 0.026$ ). The higher prevalence in adult goats suggests cumulative exposure and grazing intensity, whereas the slightly reduced prevalence in older sheep compared to intermediate age groups may reflect acquired partial immunity.

**Table 4: Effect of Age on Prevalence in Small Ruminants**

Species	Age Group	Total	Positive	Prevalence (%)
Goat	<6 months	32	20	62.50
Goat	6 months–2 years	42	34	80.95
Goat	>2 years	61	53	86.88
Sheep	<6 months	14	7	50.00
Sheep	6 months–2 years	12	9	75.00
Sheep	>2 years	19	13	68.42

## Discussion

The present study revealed a high prevalence (73.75%) of gastrointestinal helminths among ruminants in District Tando Allahyar, Sindh. This high infection rate confirms that parasitism remains a major constraint to livestock productivity in southern Pakistan. Comparable prevalence rates have been reported in different regions of Pakistan and other tropical countries (Asif et al., 2008; Gahahi et al., 2009; Aliyu et al., 2020). Variations in prevalence across regions may be attributed to climatic conditions, management practices, and grazing systems. The significantly higher prevalence observed in goats (81.48%) agrees with findings of Kaleri et al., (2026a), Raza et al. (2014), Kaleri et al., (2026), Soomro et al., (2025) and Singh et al. (2017), who reported increased susceptibility in small ruminants due to extensive grazing habits. Goats are more exposed to contaminated pasture, increasing ingestion of infective larvae. Similarly, buffaloes and cattle showed substantial infection rates, likely due to shared water sources and communal grazing. Age-wise analysis demonstrated significantly higher infection rates in adult animals, supporting findings of Khan et al. (2017) and Bikila et al. (2013). Prolonged exposure and cumulative ingestion of infective stages may explain this trend. Younger animals may benefit from limited grazing exposure and partial maternal immunity. The predominance of *Eimeria spp.* aligns with global reports of coccidiosis as a common parasitic problem in warm climates (Kabir et al., (2021), Kumbhar et al., (2018), Urquhart et al., 1996; Sohail et al., 2017; Kaleri et al., 2025a). The detection of *Fasciola spp.* suggests the presence of suitable intermediate

hosts in irrigated areas, while *Schistosoma bovis* indicates potential water-borne transmission. Managemental factors such as poor housing, lack of strategic deworming, and indiscriminate use of anthelmintics may contribute to persistent infections and emerging drug resistance (Kaleri et al., 2025b; Khan et al., 2021; Rafi et al., 2021). Warm and humid climatic conditions of Sindh Favor survival of helminth eggs and larvae on pasture. Overall, integrated parasite control strategies including rotational grazing, faecal monitoring, targeted selective treatment, and farmer awareness programs are essential to reduce helminth burden and improve livestock productivity. In addition, seasonal variations may further influence parasite epidemiology, as increased rainfall enhances larval development and pasture contamination. Nutritional deficiencies in grazing animals may also compromise immune responses, increasing susceptibility to infection. Overstocking and uncontrolled grazing intensify pasture contamination, thereby facilitating rapid transmission cycles. The absence of routine faecal examination in smallholder farming systems prevents early detection and targeted intervention. Furthermore, improper rotation of anthelmintics can accelerate resistance development, posing a serious threat to sustainable parasite control. Socioeconomic constraints and limited veterinary extension services in rural Sindh further aggravate the situation. The interaction between host immunity, environmental factors, and parasite biology collectively determines infection dynamics in this region. Therefore, comprehensive epidemiological surveillance combined with evidence-based deworming strategies is necessary to reduce the long-term economic burden of gastrointestinal helminthiasis. Overall, integrated parasite control strategies including rotational grazing, faecal monitoring, targeted selective treatment, and farmer awareness programs are essential to reduce helminth burden and improve livestock productivity.

## Conclusion

These findings confirm that gastrointestinal helminth infections are widespread in District Tando Allahyar and are significantly influenced by both host species and age. The predominance of *Eimeria spp.* and other helminths such as *Fasciola spp.* and *Schistosoma bovis* highlights the need for targeted parasite control programs, including strategic deworming and improved grazing management practices.

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