

Epidemiological Study on Helminth Infestations in Buffaloes (*Bubalus bubalis*) in Andhra Pradesh

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ABSTRACT

Gastrointestinal (GI) parasitic infestations pose a significant threat to livestock, leading to production losses, poor health, and even death, resulting in substantial economic losses for farmers. This study aimed to detect helminth parasitic infestations in buffaloes in Andhra Pradesh, India, and to examine, how these infestations vary by age, gender, and season. A total of 331 GI tracts from buffaloes processed at the Local Municipality Slaughterhouse in Vijayawada were examined over a period of one-year. Out of these, 228 tracts (68.9%) were found positive for various helminth parasites. The most prevalent parasite was *Amphistomes* (18.12%), followed by *Schistosoma spindale* (12.08%), *Setaria* spp. (15.4%), *Cysticercus tenuicollis* (5.43%), *Monezia* spp. (5.13%), *Cooperia* spp. (3.32%), *Trichuris* spp. (3.04%), *Haemonchus* spp. (2.11%), *Gigantocotyle* (1.20%), *Bunostomum* spp. (1.2%), *Fasciola* (0.90%), and *Stilesia* spp. (0.9%). The study also found that younger buffaloes (1 to 2.5 years old) had a higher infestation rate (73.11%) compared to older buffaloes, who had a prevalence rate of 61.34%. Female buffaloes had a significantly higher infestation rate of 96.96% compared to males (58.38%). Seasonal variations were observed, with 23.24% infestation in summer, 44.73% during the rainy, and 32.01% in winter season. This investigation showed that gastrointestinal (GI) parasitic infestations are widespread and occur at a relatively high rate in buffaloes of Andhra Pradesh causing severe economic loss to the farmers by reducing the overall productivity.

Keywords: Andhra Pradesh, Buffalo, Gastrointestinal parasites, Slaughter house, Vijayawada.

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INTRODUCTION

India is an agricultural nation, with the livestock sector playing a crucial role in its economy. The livestock sector contributes approximately 5.36% to the total GDP and 26.62% to the agricultural GDP (Anonymous, 2009). Over the past decade, this sector has seen rapid expansion. To achieve the national goal of providing nutritious and healthy food to our vast population, it is essential to optimize the utilization of livestock resources.

Among those livestock species, buffaloes are one of the most significant domestic animals in Andhra Pradesh, producing meat, milk with a high fat content, manure, and draught power. There are several elements that influence buffalo production performance. Parasites are among the most prominent factors generating significant economic losses to communities as a result of mortality in infected animals, poor weight gain, and condemnation of affected parts during meat inspection in slaughter-houses (Raza *et al.*, 2007). Helminth parasitism, particularly gastrointestinal (GI) parasitism, is a severe health concern for draught and dairy buffaloes (Shan and Chaudhry, 1995). Buffaloes are more susceptible to acquire infections with snail-borne helminths due to their proclivity for wallowing in rivers, ponds, or swamps. Some buffalo helminths can be transmitted directly or indirectly to people, causing severe clinical illnesses such as schistosomiasis, hydatidosis, echinococcosis, and fascioliasis in a number of countries (Tum *et al.*, 2007)

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Epidemiological surveys of gastrointestinal parasites help in controlling infestations and reducing economic losses by enabling better control measures. Studies on these parasites in buffaloes from different parts of India have been reported regularly (Muraleedharan 2005; Yadav *et al.*, 2008; Patel *et al.*, 2015; Nath *et al.*, 2016). A number of factors influence GI parasite prevalence, including age, gender, host breed, management practices, and environmental changes (Zvinorova *et al.*, 2016). To tackle this issue and reduce economic impact, it is important to collect data on

the occurrence of these parasites in buffaloes. This study was conducted to determine the prevalence of gastrointestinal parasites in buffaloes across various regions of Andhra Pradesh, aiming to develop effective treatment and prevention strategies.

MATERIALS AND METHODS

Study Area and Sample Collection

The study was aimed to determine the prevalence of various helminth parasites in buffaloes transported to the Municipal Corporation abattoir in Vijayawada during July 2023 to June 2024. It covered all three seasons, viz., winter, summer, and monsoon. Slaughtered buffaloes (n=331) were examined for helminth infestations in the rumen, reticulum, liver, bile duct, intestine, and other organs. A total of 331 samples were collected in small, sterilized polythene bags, which were numbered, sealed with elastic bands, and immediately sent to the laboratory for further analysis.

Processing of Collected Organs

Each organ was cut open, and the contents were placed in a beaker. The contents were diluted with water and mixed well. The mixture was then poured into a tray, and adult worms were collected in a petri dish with saline. The worms were washed, preserved in 10% formalin, and prepared for examination. Trematodes and cestodes were stained, and nematodes were temporarily mounted. The species were identified by examining their internal structure (Soulsby, 2012).

Statistical Analysis

The prevalence percentages for different parasites and seasons were compared using the Duncan's method (one-way ANOVA) separately for parasites and seasons. The data were also compared between adult and young buffaloes, as well as between male and female buffaloes, using one-way ANOVA with a 5% significance level ($p < 0.05$). All statistical analyses were done using SPSS, Windows Version 22.0.

RESULTS AND DISCUSSION

Over the course of a year, 331 samples were collected from the Local Municipality Slaughterhouse in Vijayawada, which supplies meat to both government and private consumers. This slaughterhouse, located in the city, is important for the region's meat supply and processes buffaloes from nearby districts like Nellore, Prakasam, Guntur, Krishna, and Godavari, known for buffalo rearing. Permission was obtained from the authorities to collect samples systematically. These samples were taken throughout the year to consider seasonal changes affecting parasitic infestations, aiming to assess the presence and extent of helminth infestations in the buffaloes. Once the samples were collected, they were meticulously transported to the laboratory for detailed analysis. The primary focus of the screening was to identify the presence of GI helminth parasites, which are known to be a major health concern in livestock.

Out of the 331 samples, 228 tracts (68.9%) were found positive for various helminth parasites. This prevalence rate was higher than some previous reports such as 64.41% in Pakistan (Azam *et al.*, 2002), 51.45% in Coastal Zone of West Bengal (Jas *et al.*, 2020), 47% in Punjab (Asif *et al.*, 2007), 43.4% in southwestern Gujarat (Kumar *et al.*, 2016), and 36% in Junagadh (Maharana *et al.*, 2016). Akhtar and Mohammad (2005) reported a lower rate of 15.2% in Hyderabad, likely due to regional and seasonal differences. Conversely, Rehman *et al.* (2009) observed a much higher prevalence of 91.44%, likely because the buffaloes grazed near water bodies where parasites are more prevalent. Variations in GI helminth prevalence across regions may result from differences in agro-climatic conditions, management, and sample sizes.

The study further revealed significant differences in the prevalence of the condition based on age, gender, and season. The GI parasites identified in this study included *Paramphistomum* (18.12%), *Schistosoma spindale* (12.08%), *Gigantocotyle* (1.20%), *Fasciola* (0.90%), *Monezia* spp. (5.13%), *Cysticercus tenuicollis* (5.43%), *Stilesia* spp. (0.9%), *Setaria* spp. (15.4%), *Cooperia* spp. (3.32%), *Haemonchus* spp. (2.11%), *Trichuris* spp. (3.04%) and *Bunostomum* spp. (1.2%) (Fig. 1,2,3j

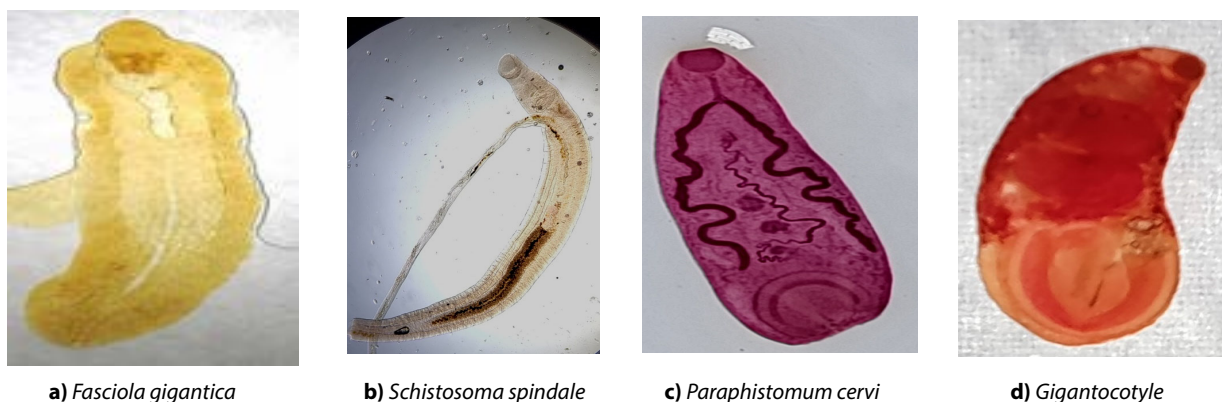


Fig. 1: Trematode parasites found in buffaloes of Vijayawada region of Andhra Pradesh



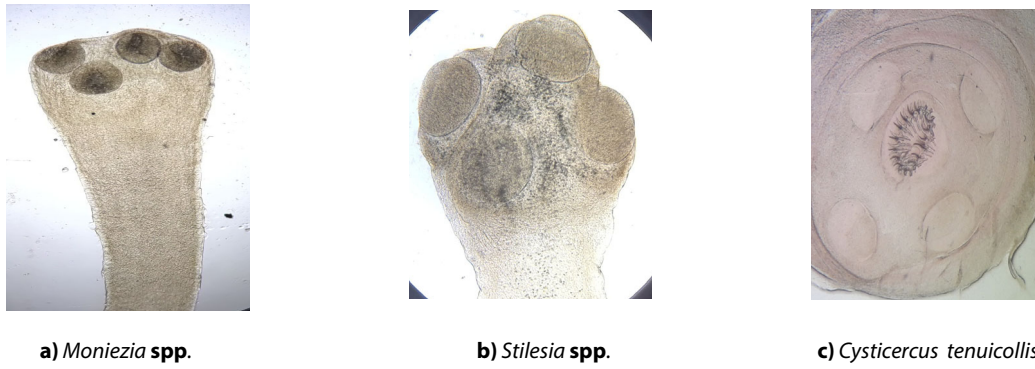
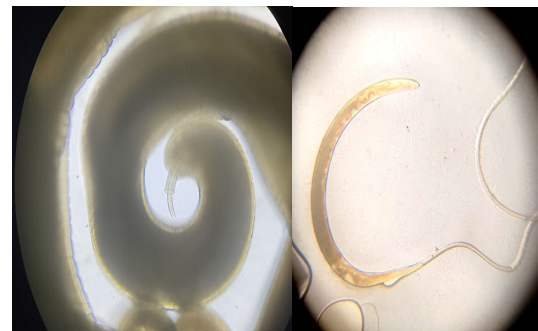
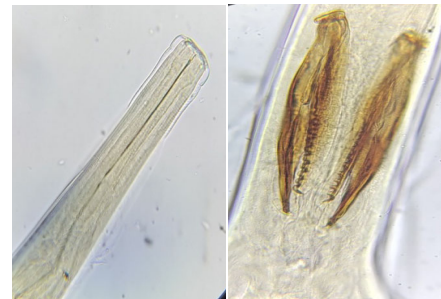
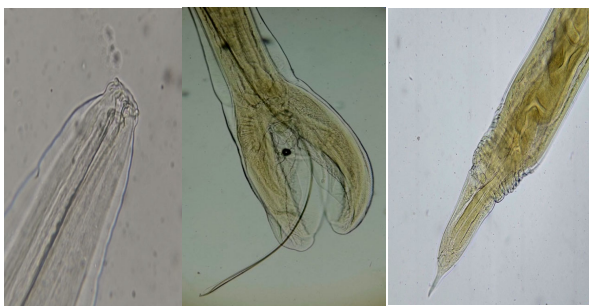
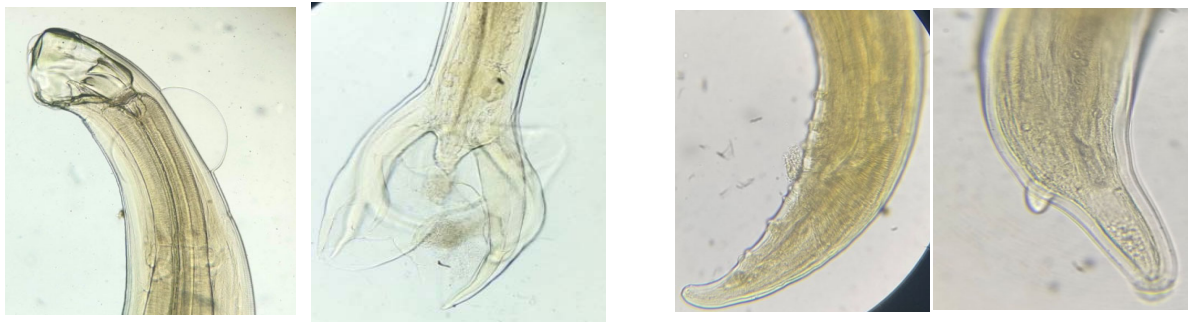


Fig. 2: Cestode parasites observed in buffaloes of Vijayawada region of Andhra Pradesh



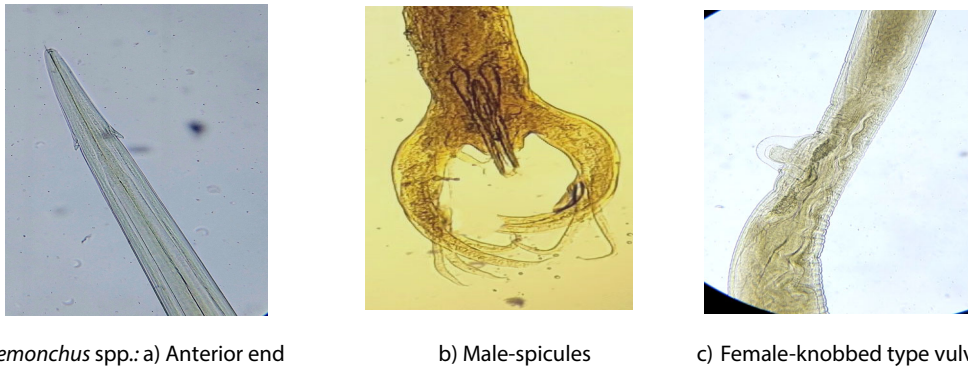


Fig. 3: Nematode parasites, found in buffaloes of Vijayawada region of Andhra Pradesh

NON-significantly higher prevalence of helminthes (67.90%) was observed in young animals aged 1 to 2.5 years as compared to 32.01% in animals older than 2.5 years. These findings were consistent with other studies across various regions by Asif *et al.* (2007), Mamun *et al.* (2011) and Patel *et al.* (2015). However, some studies, like those by Biswas *et al.* (2014) and Das *et al.* (2018), reported higher prevalence in adults, which could be due to differences in agro-climatic conditions, grazing areas, management practices, and the potential weakening of the immune system in older buffaloes.

Gender also affected prevalence rates significantly, with females having a positivity rate of 96.96% and males showing the rate of 58.38%. This higher prevalence in females may be due to the stresses of production and reproduction, as suggested by Raza *et al.* (2012). This finding also concurred with Jas *et al.* (2020), who reported a non-significantly ($p > 0.05$) higher prevalence in females compared to males. The variation in results could be due to differences in agro-climatic conditions, rearing practices, and the age and number of female buffaloes included in the study.

Season significantly influenced the occurrence of GI helminthes in buffaloes. The highest prevalence was seen during the rainy season (44.73%), followed by winter (32.01%), and the lowest in summer (23.24%). The lower summer prevalence may be due to high temperatures, low humidity, and drying of water bodies, which are not favorable for the survival of nematodes and snail hosts. The conditions of rainy season, including optimal temperatures, high rainfall, and humidity, are ideal for the survival of parasites and the breeding of snail hosts. Grazing on waterlogged pastures during the rainy season also contributes to the higher prevalence. Similar results have been reported by other researchers, including Singh *et al.* (2012) and Jas *et al.* (2020). In contrast, Azhar *et al.* (2002) found the highest prevalence in autumn and the lowest in summer.

CONCLUSION

This study identified a high prevalence of naturally occurring GI helminth parasites in buffaloes in Andhra Pradesh, with significant influences from gender, season, and age. This data is crucial for designing targeted treatment and control

strategies to minimize economic losses associated with GI helminth infections in this region.

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