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Prevalence of endo-and ecto-parasites of sheep in and around Krishna district, Andhra Pradesh

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Abstract

The present study reports the prevalence of ecto- and endo-parasites of sheep in and around Krishna district, Andhra Pradesh. A total of 625 sheep samples (faeces, blood, and external parasites) collected and examined from April 2022 to September 2022. Examination of faecal samples revealed the presence of different gastrointestinal (GI) parasites in 441 sheep. The overall prevalence was 70.6%. The endoparasites were *strongyles*, (52.2%), *Amphistomes*, (12.6%), *Trichostrongyles* (11.7%) and *Strongyloides* (9.1%) in helminths and *coccidia* (3.8%) in protozoa. *Trichostrongyles* were the most prevalent, followed by *Paramphistomes*. Overall, the prevalence was highest in yearlings (73.7%), followed by adults (71.4%) and lambs (68.5%). The prevalence was more in male (75.9%) than female (70.1%) sheep. On examination of blood smears, no sheep were found to be positive for haemoparasites. 110 (17.6%) sheep were found to be infested with ticks and identified as *Rhipicephalus microplus* and *R. Haemophysaloides* based on morphological characters after processing.

Keywords: Sheep, endoparasites, ectoparasites, infection percentage, Coccidia, Strongyle, amphistomes

1. Introduction

Sheep is considered as museum of parasites. The 20th Livestock Census was conducted in 2019 and revealed that there are 74.26 million sheep in India, an increase of 14.1% over the previous count (Statistics, B. A. H. 2019) [18]. For many farmers in the country, especially the marginal farmers, raising sheep has been a significant source of revenue. Sheep are generally raised for their meat, which meets the protein needs of humans, as well as for their wool, milk, and manure. Parasitism is a major constraint to the economy and growth of sheep industry. Sheep are susceptible to a number of diseases, particularly parasite infections, which lower the productivity of the animals in terms of wool loss, decreased wool quality, decreased weight gain, and mortality in severe infections. Small ruminant productivity is severely threatened and limited by helminthiasis, particularly parasite gastroenteritis, because of the associated morbidity, mortality, cost of treatment, and necessary control measures. (Nwosu *et al*, 2007) [9]. *Haemonchosis*, *Ostertagiasis*, *Strongyloidosis*, *Oesophostomiasis*, *Bunostomiasis*, and *Trichostrongylosis* are common gastrointestinal parasite in sheep. *Haemonchus contortus* is the most significant nematode. According to McLeod, R. S. (2004) [7], losses caused by gastroenteric roundworms in ruminants in India are estimated to be more than 103 million dollars (USD) yearly. The rational design of efficient preventative and control methods against the deadly parasitic diseases requires a thorough understanding of the epidemiology of parasitic diseases.

2. Materials and Methods

The aim of this study is to assess the prevalence and risk factors of endo- and ecto- parasites of sheep in and around Krishna District, Andhra Pradesh, India. Sheep maintained by the farmers in open grazing system were included for the study.

A total of 625 Nellore sheep samples (faeces, blood, and external parasites) were collected by simple random sampling irrespective of their age, sex and health status from various villages in Krishna district, Andhra Pradesh from April 2022 to September 2022. The animal estimated age and gender were recorded. Age categorisation was done as lamb (upto 1 year), yearling (1-2 year) and adult (>2 years). Fresh faecal samples were collected from the rectum of sheep using gloved finger. Blood samples for haematological examination were collected in EDTA vacutainers from jugular vein and peripheral ear vein and smear were made.

Faecal samples were processed and examined by floatation and sedimentation techniques for qualitative investigation of parasitic eggs. Blood smear were examined after Giemsa's staining

for haemoparasites. Collected ecto-parasites were processed and identified based on morphological features (Soulsby, 2002)^[17].

In order to see the magnitude of variation in the prevalence of endoparasites among sheep of various groups, the data were analyzed statistically using Chi square test.

3. Results and Discussion

Various studies have been conducted on prevalence of gastrointestinal parasites in sheep and goats in this country and abroad (Singh *et al* 2010, Sutar *et al* 2010, om *et al* 2010, Pant *et al* 2010)^[16, 19, 10, 11]. This variation in prevalence of parasitic infestation depends upon difference in agroclimatic condition and availability of susceptible host. Examination of faecal samples of 625 sheep revealed the presence of different gastrointestinal (GI) parasites in 441 sheep.

The overall prevalence was 70.6%. Single infection was more frequent (74.3%) than mixed infection (25.7%) and eggs of nematodes particularly strongyles were the common parasites in all infected sheep. No cestode segment or egg was identified. The ova identified include *Strongyles*, (52.2%), *amphistomes*, (12.6%), *Trichuris* (11.7%) and *Strongyloides* (9.1%) in helminths and coccidia (3.8%) in protozoa. *Trichostrongyles* were the most prevalent among the parasites detected, followed by *Paramphistomes*. Eggs of strongyles were found to be common in mixed infections.

The results of age wise analysis (Table 1) indicate that the overall prevalence was highest in yearlings (73.7%), followed by adults (71.4%) and lambs (68.5%). The aforementioned results were consistent with a study on the prevalence of gastrointestinal helminths in sheep and goats in the middle agroclimatic zone of Jammu province, which revealed higher infection in young animals (73.22%) compared to adults (61.25%) (Khajuria *et al*, 2013)^[6]. Additionally, in the Prakasam district of Andhra Pradesh, the overall infection percentage was higher in animals under one year of age (57.40%), followed by above 2 years (50.72%) and followed by 1-2 years of age (36.84%) (Chiranjeevi *et al*, 2021)^[4].

The Strongyle group was most prevalent in both sexes, followed by *Amphistomes*, *Trichuris*, *Strongyloides*, and coccidians, in that order (Table 2). However, male hosts (75.9%) of the parasite species had a higher prevalence than female hosts (70.1%). The findings of the current study are corroborated by Kanyari *et al.* (2017)^[5] who discovered that after puberty, females were more resistant to infection than males. Raza MA. *et al.* (2003)^[14] and Bhat *et al.* (2012)^[3] also found that rams were more susceptible to gastrointestinal parasites than ewes. The effect of sex on an animal's susceptibility to infections may also be due to genetic predisposition and variations in susceptibility caused by hormonal regulation. The immunosuppressive properties of testosterone are well-known (Barger, 1993)^[2], and this has frequently been cited as the main cause of male increased susceptibility to a wide range of infectious disorders (Roberts, 2001)^[15]. Age and gender of sheep did not influence the occurrence of parasites ($p > 0.05$). On examination of blood smears, no sheep were found to be positive for haemoparasites.

110 sheep (17.6%) out of 625 were found to have ectoparasite infestations, all of which were ticks. Following processing, *Rhipicephalus microplus* and *R. Haemophysaloides* ticks were recognised based on physical characteristics (Soulsby, 2002)^[17]. A study carried out by Balasubramanian *et al* (2019)^[1],

168 (86.15%) of the 195 domestic animals that were examined were positive for ectoparasitism. The tick species with the highest prevalence rate was *Rhipicephalus microplus* (52.71%), which was also the most common. *R. decoloratus* (15.77%), *Haemaphysalis bispinosa* (16.9%), *H. turturis* (11.42%), *R. sanguineus* (1.32%), *Amblyomma integrum* (1.15%), and *H. spinigera* (0.71%) were next in line. Based on morphological identification, the incidence of *Rhipicephalus haemaphysaloides* has been noted in several Indian states, including Kerala (Rajendran and Hafeez, 2003; Prakasan and Ramani, 2007; Nimisha *et al*, 2017)^[13, 12, 8].

Table 1: Prevalence of various gastrointestinal parasite spp. of sheep (n= 625) in relation to age

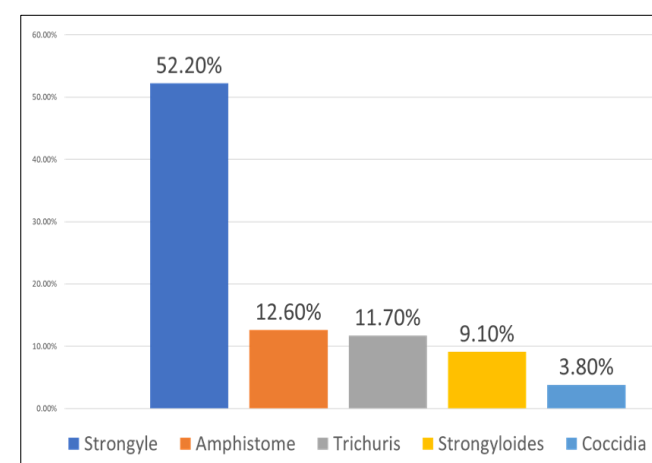
Name of Parasites	Age group of sheep		
	Lamb (n=257)	Yearling (n=99)	Adult (n=269)
<i>Strongyles</i>	137(53.3)	49(49.49)	140(52.04)
<i>Coccidia oocysts</i>	7(2.72)	8(8.08)	9(3.34)
<i>Strongyloides</i>	18(7.0)	9(9.09)	30(11.15)
<i>Trichuris</i>	28(10.8)	12(12.12)	33(12.26)
<i>Amphistomes</i>	25(9.72)	11(11.11)	40(14.86)

No significance ($\chi^2 = 1.101, P = 0.57$)

Table 2: Relationship between sex and gastrointestinal parasite spp

Name of Parasites	Male(n=54)		Female(n=571)	
	No. of Sheep Infected	Prevalence (%)	No. of Sheep Infected	Prevalence (%)
<i>Strongyles</i>	32	59.25	294	51.48
<i>Coccidia oocysts</i>	0	0	24	4.20
<i>Strongyloides</i>	8	14.81	49	8.58
<i>Trichuris</i>	5	9.25	68	11.90
<i>Amphistomes</i>	10	18.51	69	12.08

No significance ($\chi^2 = 0.819, P = 1$)



Species wise prevalence

4. Conclusions

According to the current study, the most common endoparasites found in sheep were strongyles, amphistomes, *Trichuris*, and *Strongyloides* in helminths, and coccidia in protozoa. *Trichostrongyles* were the most prevalent among the parasites detected, followed by *Paramphistomes*. Strongyle eggs were discovered to be prevalent in mixed infections. The management of gastrointestinal parasite infection in sheep may be improved, and farmers could be

made aware of how to use anthelmintics properly, by combining a strategic use of anthelmintics with conventional veterinary care and effective management.

5. Acknowledgments

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6. Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

7. References

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