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A study on health management practices and prevalence of gastrointestinal parasitic infections of goats in Tripura, India

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Abstract

A study has been undertaken in two districts of Tripura to illustrate the health management practices and also to analyze the prevalence of gastrointestinal parasitic infections in goats. Black Bengal goat was selected for this study because of its popularity and wide-scale acceptability. The information about this study was collected from two blocks such as Mandai and Jampuijala under the district of West and Sepahijala of Tripura respectively. Studies showed that more than 80% of the goat farmers, used to practice vaccination against Peste-Des-Petits Ruminants (PPR) and Goat Pox. In both the blocks, farmers were found to be aware of the importance of deworming, and 90% (Jampuijala block) and 86% (Mandai block) of goat farmers used to deworm their goats at regular intervals. Pre-weaning mortality was observed to be highest due to non-specific diarrhoea (33.33%) followed by pneumonia, parasitic worm infection, and other disease conditions like coccidiosis in both the study areas. Out of the total number of fecal sample examinations, 30-40% were found positive for Strongyles, in Jampuijala and Mandai block, respectively, and about 9-10% of fecal samples were found to be positive for Strongyloides, and likewise, about 38-40% were positive for Coccidia in both the blocks. Besides this, Moniezia, Trichuris, and Amphistome were found positive in 5-9% of the total fecal samples screened in both the Jampuijala and Mandai blocks of Tripura.

Keywords: Gastrointestinal parasite, goat rearing, health management practices, and prevalence

Introduction

Goats play a vital role in ensuring livelihood and food security to the millions of small, marginal farmers and landless laborers in our country. India has 148 million goats ranking 2nd after China in the world (20th Livestock Census, 2019) [1]. In India, the goat sector contributes 8.4 percent to the Indian livestock GDP and also generates about 4.2 percent of rural employment for small, marginal, and landless farmers. India ranked as the second largest goat meat-producing country in the world and ranked 1st and 5th in milk production and export of goat respectively. Traditional goat farming practices are considered to be the most sustainable livelihood for socio-economic progress in rural areas particularly for marginal and weaker sections of society. Goat meat has immense domestic demand, with no social, cultural, or religious restrictions. Goat rearing is a widespread animal husbandry practice in the entire NEH region including Tripura due to sufficient rainfall and availability of natural pastures, wild leaves, and grasses in abundance. Tripura has a total goat population of 3,60,204 (20th Livestock Census, 2019). The Black Bengal goat is popular for their best quality tenderness, and tasty meat and apart from that, possesses a tremendous ability to survive and often thrive on sparse vegetation. Goat rearing involves lower investment and is hence suited even to landless laborers and marginal farmers. Acharya *et al.* (1980) [2] found that goats spend more than 90% time browsing and hardly graze for 10% time on surface vegetation. Goats have been found to reclaim saline soils by consuming salt-laden leaves of a range of plants (Shankaranarayanan *et al.*, 1985) [12] and contribute fertility to soil by even distribution of essential manure. The vast majority of the poorer section of the rural population depends on goat rearing for subsistence and to meet the household's occasional needs for meat and milk. Goats can be handled and cared for by almost all family members. In the animal husbandry sector, goat is one of the most profitable enterprises but still some

constraints and stumble block the prospects of goat farming such as old and conventional approaches, faulty husbandry practices, scarcity of labor, non-availability of better breeds, inbreeding, mortality at the early stages of life, periodical de-worm, vaccination and timely veterinary intervention, practices of providing only grazing and browsing and not providing additional concentrate of fodder. Therefore, the farmers don't get optimum production and hence, dependability and reliability upon goat farming gradually reduces among the farming community. Sustainable development with the best possible productivity can be achieved through, incorporating scientific techniques, improving breed quality, facilitating out-breeding, and improving management practices. The foremost constraints on the way of development and progress of goat husbandry in the state of Tripura include nutritional deficiency diseases, high goat kid mortality rate, internal and external parasitic load, and infectious diseases. To address these issues like lack of interest among farmers, disease outbreaks, reduced reproductive performances of local breeds, depressed production, lack of proper market value, and early kid mortality, a comprehensive study was conducted in Tripura, and the fundamental reasons behind such disastrous outcome about goat farming include lack of awareness about balance diet, poor managerial practices in terms of breeding, and health care, non-practicing of periodical deworming of livestock. Therefore, it leads to pitiable performance, lack of vitality and growth. In the later part, it results in anemia and immunosuppression and brings out outbreaks of infectious diseases.

By taking into consideration the above facts, a study has been carried out in the field condition in two districts of Tripura to elucidate the health management practices and also to analyze the parasitic load of goats to find out a possible way out to tackle the menace of production loss and also to suggest the possible remedy for the improvement of socio-economic status of goat farmers in the state.

Materials and Methods

Study Area: The data about the health management practices and detailed analysis of gastrointestinal parasitic load in goats were carried out in two blocks such as Mandai and Jampuijala under the district of West and Sepahijala of state Tripura respectively. Mandai block lies approximately between latitude 23.8603° N and longitude 91.4797° E. Height from sea level is 69 meters. The climate of Mandai is generally hot and humid depending upon the elevation. Rainfall varies from 4500 mm to 841 mm. The average annual precipitation is 2388 mm. The average maximum temperature is 28.2 °C in May-June and the average minimum is 17.9 °C in December-January. Jampuijala area in Sepahijala District lies approximately between latitude 23.7149° N and longitude 91.4483° E with a height from sea level is 41 meters and with average annual rainfall in the district is about 2000 mm and relative humidity of 95% during the rainy season and the temperature varies between a maximum of 35.23° and a minimum of 7.43 °C.

Collection of Information: Black Bengal goats possess the unique characteristics of high prolificacy, short kidding intervals, early slaughter weight, delicious lean meat, and super fine skin quality. Therefore, it is the most popular and widely accepted breed in the North East Region of India including Tripura (Saha *et al.*, 2024) ^[10]. Hence, in the

present study, the Black Bengal breed of goats was taken as a breed of choice to evaluate the health management practices and prevalence of gastrointestinal parasitic infections. So, an impact would be assessed in terms of the health status of goat farming, its economic importance, and futuristic approaches towards sustainable development through goat husbandry. The information regarding the present study was collected by participatory approach, investigation, and rapid rural appraisal technique (Schonuth *et al.*, 1995) ^[11] from 100 goat owners in respective villages in repeated interactions from April 2023 to September 2023.

Health Monitoring: Most of the goat owners in the study area practiced vaccinations, deworming, and other managerial practices to prevent contagious & infectious diseases including cleaning, disinfection, and sanitary measures. The information regarding the advice taken during the illness of animals, mortality up to weaning vaccination, treatment of ectoparasites, deworming schedule, colostrum feeding, castration practice, etc. was recorded from the farmers through the questionnaire method.

Gastrointestinal helminth infections & incidence of diseases: The experimental animal's fresh fecal samples were collected per recta. Suitable containers like screw-capped wide-mouthed glass bottles were used for the collection of fecal samples and transported to the laboratory for further analysis. These were made airtight as much as possible to prevent the rate of development and hatching of eggs. Ten to fifteen gms of fecal samples were collected each time and were kept in refrigerator before the further analysis. The analysis of the fecal samples was carried out at the Department of Veterinary Parasitology, R K Nagar, Agartala, Tripura. Each vial was marked with a distinctive identification number and a register sheet was used to keep the record for every goat. Both the direct smear and floatation methods were performed to identify the positive samples. The McMaster counting technique was also carried out to determine the parasitic egg load. All the samples were subjected to routine coproscopy (e.g., direct smear, flotation, and sedimentation) to detect the eggs/oocysts of helminths and protozoan parasites. During the study, both healthy and sick animal feces were examined. The parasitic eggs were identified by using low power microscope according to the keys and morphological characteristics.

Statistical analysis: The data were collected, compiled, analyzed, tabulated, and also categorized for further clarity, realization, and interpretation. In the present study, the following methods were used for the analysis of data i.e. frequency, percentage, mean, standard deviation, and standard error. The frequencies and percentages, figures, and tables were generated by using the data analysis package of Microsoft Excel (Microsoft Corporation, 2018) with the level of significance at 5% level ($p < 0.05$) used to interpret the results.

Results and Discussion

The results of the study obtained are presented and discussed hereafter in statistical analysis. The present study was carried out in the Mandai block of West and the Jampuijala block of the Sepahijala district of Tripura. The study revealed that about 86% and 84% of farmers used to

take the help of veterinary professionals for the treatment of their livestock in the Jampuijala and Mandai areas respectively. The majority of the farmers i.e. 90% and 88% in Jampuijala block and Mandai block, respectively used to practice vaccination against Peste-Des-Petits Ruminants (PPR) and Goat Pox. Regular awareness programs and free vaccination have probably led to the acceptability and practice of vaccination in rural areas. The findings are in agreement with Deshpande *et al.* (2009) [7]. In both the blocks, farmers were found to be aware of the importance of deworming, and 90% (Jampuijala block) and 86% (Mandai block) of goat farmers used to deworm their goats at regular intervals. The awareness and practice of deworming in the majority of households might be attributed to awareness programs and free distribution of anthelmintics by the Animal Resources Development Department Government of Tripura. Respondents also revealed that they were aware of the importance of deworming and if needed also brought anthelmintics from local pharmacies. The findings here did not match with the findings of Deshpande *et al.* (2009) [7] who observed that only 22.04% of the farmers dewormed their goats further, he also did not specify proper deworming schedules. This study showed more than 80% of farmers followed proper cutting and management of naval cord. Further study revealed, that colostrum feeding to kids just after some time of birth was found to be a regular practice among the majority of the farmers in both study areas. This present study revealed that the farmers were aware of the importance of feeding colostrum to kids and the findings resemble that of Thombre *et al.* (2010) [13].

Pre-weaning kid mortality (0-3 months) during the study period in the Jampuijala area was observed to be highest due to non-specific diarrhoea with 33.33% out of the total pre-weaning kid mortalities and followed by pneumonia, parasitic worm infection, coccidiosis, general weakness toxemia & cold shock and other miscellaneous causes. On the other hand, in the Mandai area, pre-weaning kid mortality was highest due to non-specific diarrhoea at 35.21% of total mortalities, followed by pneumonia and parasitic worm load as these conditions were found to be the major reasons for kid mortality in early ages (Table-1).

Table 1: Disease-wise pre-weaning mortality of kids

Disease conditions associated with pre-weaning mortality of kids	Jampuijala Mortality (%)	Mandai Mortality (%)
Pneumonia	20.37	22.53
Coccidiosis	9.25	5.63
Worm load	11.11	12.67
Non-specific diarrhoea	33.33	35.21
General weakness	7.40	5.63
Cold shock	5.55	8.45
Toxaemia	7.40	1.40
Septicaemia	0.00	8.45
Miscellaneous	5.55	0.00

Lodh *et al.* (1993) [9] reported 49.28% death of Black Bengal kids within 0-30 days and the highest mortality was recorded due to pneumonia, followed by enteritis with 31.88% and 18.84% respectively. Likewise, Chowdhury *et al.* (2002) [6] also documented the kids' (0-3 months) mortality mainly due to pneumonia (42.39%) followed by diarrhoea (32.61%). Further studies by Donkin and Boyazoglu (2004) [8] observed that maximum kid mortality due to pneumonia (54%) followed by coccidiosis (53%),

cachexia (15%), puerperal infections (15%) & enteritis (9%). Bera *et al.* (2007) [4] reported that the causes of newly born goat mortality were due to enteritis (36.62%), PPR (26.72%), pneumonia (9.86%), HS (12.68%), and others (14.08%).

Table 2: Gastrointestinal helminth infections in two different study areas of Tripura.

Gastro intestinal Parasites	Jampuijala Parasite prevalence %	Mandai Parasite prevalence %
Strongyles	38.09	31.81
Strongyloides	9.52	9.09
Coccidia	38.09	40.9
Moniezia	9.52	4.54
Trichuris	4.76	4.54
Amphistome	0	9.09

Out of the total numbers of fecal sample examinations, 38.09% and 31.81% were found to be positive for Strongyles, in Jampuijala and Mandai block, respectively. Further study revealed, that out of the total fecal samples screened, 9.52% and 9.09% were found to be positive for Strongyloides, and likewise about 38-40% were positive for Coccidia in both the blocks. Besides that, 9.52%, 4.54% for Moniezia, 4.76% 4.54% for Trichuris, and 0% and 9.09% were found positive for Amphistome in Jampuijala and Mandai block, respectively (Table-2). Results of earlier studies by other researchers in Bangladesh demonstrated that the overall prevalence of GI parasitic infections was 61.82% in goats (Bhowmik *et al.*, 2020) [5] and comparable outcomes were also observed in the present study. During the study, it was observed that coccidia was found to be the most prevalent (39.53%) gastro-intestinal parasite and the present findings agree with the conclusions from Asif *et al.* (2008) [3] who documented about 57.5% of samples were positive for Coccidia in sheep and goats in and around Rawalpindi and Islamabad of Pakistan. Strongyle was the second most prevalent species whereas the prevalence percentage was relatively low in the case of other species i.e. Strongyloides, Moniezia, Trichuris, and Amphistome.

Conclusion

The study on the evaluation of health management practices and gastrointestinal parasitic infections of goats in Tripura generated a few insights to articulate a conceivable way out to tackle the menace of infectious disease, and poor breeding performance production loss and also to suggest the possible remedy for the improvement of socio-economic status of goats' farmers in the state.

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