

*Review Article*

## **MOST PREVALENT ENDOPARASITIC INFESTATION IN DOMESTIC RUMINANTS AND THEIR MANAGEMENT IN FIELD CONDITION IN INDIAN SCENARIO: A REVIEW**

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**Abstract:** Most of the Indian breeds of domestic ruminants are well adapted to the harsh environment, low nutrition, tropical disease. Animal welfare and productivity are affected by endoparasite infestation. Parasites cause economic losses through decreased production, cost of prophylaxis and treatment, and death of infected animals. The proper management of internal parasites is extremely important for successful livestock farming especially in the grazing conditions.

**Keywords:** Infestation, Parasites, Ruminants.

### **Introduction**

India is paradise of many parasites due to its hot and humid climatic condition. Though most of the Indian breeds are well adapted to the harsh environment, low nutrition, tropical disease. Animal welfare and productivity are affected by endoparasite infestation [1]. The ailment is widely prevalent in India and affects livestock population irrespective of age, sex, breed and season [2], [3]. Animals affected with endoparasites (worms) develop clinical symptoms such as diarrhea, inappetite, potbelly and detection of worms in dung [4], [5].

As with all grazing livestock, the profitability of pasture-based small ruminant production is intimately tied with controlling infection from gastrointestinal nematodes (GIN). These parasites cause economic losses through decreased production, cost of prophylaxis and treatment, and death of infected animals [6]. The problem is however much more severe in tropical countries due to favorable environmental conditions for helminth transmission [7].

### **Prevalence of gastrointestinal nematode infection in domestic ruminants**

Many authors have explored various aspects of helminthes infestation in small ruminants at different localities of Tamil Nadu and other states of India with a range of 25 - 92%. No report is available on prevalence of gastrointestinal helminthes in south coastal region of

Tamil Nadu viz., Cuddalore and Nagapattinam districts where goat farming is the primordial occupation of the small farmers. Hence, the present study was undertaken to analyze the helminthes infestation in small ruminants with appropriate design and effective control measures. The study showed that the sheep of Ladakh are infected with four species of nematodes viz; *Trichuris ovis*, *Haemonchus contortus*, *Dictyocaulus filaria* and *Chabertia ovina* of which *T. ovis* was the most dominant followed by *H. contortus*, *D. filaria* and *C. ovina*, respectively. The study also indicated higher prevalence in Kargil which is comparatively lowland as compared to Leh (highaltitudes) which is in consent with reports from many parts of world [8], [9]. These low lands are characterized by a comparatively hot humid environmental situation which is favorable for the survival of the infective larval stage of most of the parasites. Study showed an association between the prevalence and the agro-ecology of the study area and it was observed that the infection was higher in Kargil (comparative lowland), (57.35%) as compared to Leh (42.64%). It also disclosed that regardless the season, age, sex, and locality; the animals are infected with a variety of nematode parasites of which *T. ovis* was the most abundant. However, no significant association was observed in prevalence of parasite and body condition of the host. The higher prevalence in wet season than dry is in consent with many reports around the world [10], [11]. This could be due to the existence of a direct relationship between prevalence with the rainfall, humidity and temperature. The presence of sufficient rainfall and moisture during the wet season favored the survival of infective larvae in the pasture and higher probability of uptake of the infective larvae leading to higher prevalence rate. In Rajasthan prevalence of trematode parasites have been observed in southern part of state [12]. However, the prevalence of amphistomes in buffaloes in association with age, sex and seasons has not been studied in Rajasthan. The amphistomes were collected from infected parts of rumen of Buffalo (*Bubalus bubalis*) at local zoo abattoir and various slaughtered houses in Udaipur from July 2012 - June 2013. In southern Rajasthan humid ecosystem is predominant and has number of perennial freshwater bodies. Seasonal occurrence and variable prevalence rate (39.34–92.4 %) of these parasitic infections have been reported from different states of India as Andhra Pradesh [13], Chhattisgarh [14], Haryana [15], Jammu and Kashmir [16], Karnataka [17], Maharashtra [18], Meghalaya [19], Punjab [20], Sikkim [21] and Uttar Pradesh [22]. From the state of Rajasthan such studies or reports are too scanty especially in tribal region of southern Rajasthan. However, few reports are available from arid region of western Rajasthan [23]. Intestinal parasitosis is more prevalent in tribal individuals of

Rajasthan, responsible for chronic morbidity in the form of nutritional and iron-deficiency anemia. Gastrointestinal parasitism directly or indirectly affects the economic losses in number of ways such as lowered fertility, reduced work capacity, reduction in food intake, lower weight gain and milk production, treatment cost and mortality in heavily parasitized animals. Therefore, several workers conducted epidemiological studies on gastrointestinal parasitic infections in different species of domestic animals inhabiting different ecological conditions and geographical provinces. In southern Rajasthan humid ecosystem is predominant and has number of perennial freshwater bodies. The highest prevalence rate was found in rainy season (84.21 %) followed by winter (73.9 %) and summer (52.8 %). The possible causes for variation in prevalence of parasitic infections are also discussed.

#### **Prevention and control measures**

The various control strategies applied, on the host and off the host with or without chemicals will be useful for sustainable production of farm animals as per agro-climatic conditions.

**Housing management:** Animal shed must be well ventilated and lighted to maintain required humidity and air circulation [24]. Always keep the manure by making heap so that eggs, larvae, cyst, or other stages of parasites are killed due to heat generated during composting. The bedding material should be allowed to decompose. Facilities of proper drainage in the animal shed.

**Nutritional management:** Vitamin A, D and B complexes are essential in developing the immunity against parasites. Minerals like zinc, iron, cobalt, sodium, potassium, phosphorus, etc. are very essential for proper functioning of immunological phenomenon going inside the animal's body to develop functional immunity against the parasites [25] including the use of tree and shrub leaves to reduce intake for ground-based and contaminated feeds; plants with possible direct or indirect anthelmintic effect and cut-and-carry methods, especially during times of heavy rain or heavy pasture contamination.

**Pasture management:** Regular burning of old or grazed pasture should always be practiced to obtain parasites free pasture land. In India, the winter season seems most appropriate when transmission of parasites is less as compared to rainy and summer season. Overstocking of animals in a small piece of land increases the concentration of parasites. So, allow optimum number of animals to graze in a given piece of land. It is estimated that parasite infections increase with the square of the animal load, per surface unit. Therefore, for a given piece of land, parasitic infestations become quadruples when animal density is doubled.

**Pasture rotation and rest:** The main objective of pasture rotation is not to put the animals back into the same field until the risk of infection has diminished. A rest of 3–6 months is required for an infected pasture to return to a low level of infectivity. The larvae of most parasites move to the tops of plants when intensity of light is low at sunrise, sunset and in overcast sky. Therefore, grazing should be avoided during these conditions. As the density of parasite is generally at a maximum in the rainy season and at a minimum in the summer/winter.

**Grazing by age group:** As susceptibility of animals against parasites varies with age, it is reasonable to graze different age group animals in different fields.

**Multispecies grazing:** Sheep and goats are generally not affected by the same internal parasites [26] similar is the condition with cattle and horses. Consequently, pastures grazed by large ruminant and horses are safer for sheep or and goats and conversely. Sheep or goat can be co-grazed with bovine and/or horses. Pastures can be alternated between sheep and cattle and/or horses. This can help to break the parasite's life cycles.

**Zero grazing:** Zero grazing means keeping the animal in captivity to reduce the parasitic load. During confinement the animal should be fed off the ground in feeders and watering containers should be kept free from faecal matter.

**Alternative forages:** The pasture plants containing condensed tannins have anthelmintic properties [27]. Research has shown that animals grazing tannin rich forages have lower faecal egg counts than animals grazing traditional grass pastures.

**Controlled breeding or Genetics of animals:** Genetics is probably the best long term weapon against internal parasites in animals. Some animal breeds are more resistant and resilient to internal parasites. On the basis of faecal egg output a parasite resistant or susceptible breed can be identified.

**Biological control:** The biological control with nematophagous fungi are well documented all over the world. The fungus *Duddingtonia flagrans* is relatively easy to culture and can be released in the environment against the targeted parasites in a controlled fashion [28]. The natural plough, 'earthworm' can ingest worm eggs and larvae during its normal feeding process thus destroying the egg in the gut or carrying them below the soil surface. Dung beetles ingest manure, thus killing eggs and larvae of various parasites.

### **Anti-parasitic drugs management strategies**

Anti-parasitic drugs are still an important part of parasite control in the grazing livestock. As per Indian climatic conditions the grazing animals must be dosed at least twice in year at the onset (May end) and offset of monsoon (September end).

### **Reduce use of anti-parasitic drugs**

Injudicious use of anthelmintics leads to faster rate of development of drug resistance [29] than when used judiciously. Drug use should be minimized to 2 or 3 times per year or on the basis of epidemiology of parasitic infection. Frequent dosing of same anthelmintics must be avoided.

### **Conclusions**

Parasites causes economic losses through decreased production, cost of prophylaxis and treatment and death of infected animals. The proper management of internal parasites is extremely important for successful livestock farming especially in the grazing conditions. None of the single control measures will give long term solution.

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