

Prevalence of Paramphistomosis in and around Santiniketan, Birbhum, West Bengal

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Abstract: Paramphistomiasis causes enteritis and anaemia in ruminants and results in substantial production and economic losses. Pathological symptoms are produced by immature flukes. They start to gather in the intestine and cause disease. Immature paramphistomes are responsible for serious disease to their host, like profuse foetid diarrhoea, anorexia, polydipsia, drop in plasma protein concentration and anaemia, which weaken the host. Diseases caused by the young flukes often results in high mortality, even upto 80-90% in ruminants. Flukes accumulate and attack the duodenal mucosa to induce acute enteritis. Liver tissues get damaged extensively leads to swelling, haemorrhage, discolouration, necrosis, bile duct hyperplasia and fibrosis. Mature paramphistomes are also responsible for rumenitis, irregular rumination, unthriftiness, lower nutrition conversion and loss of body condition resulting in considerable economic loss.

Keywords: *Paramphistomum, livestock, paramphistomosis, ruminants*

Introduction: Livestock, an adjacent to agriculture, plays an important role in the future growth and development of Indian Economy. India has the largest livestock population which constitutes nearly 7% towards its national income where the cattle and buffaloes generate 54% of the energy for agricultural operations. Any effort to intensify livestock production has been seriously affected by various factors, of which the most serious losses are due to gastrointestinal helminths. Goats are integral part of the livestock production system in crop – livestock mixed economy of the developing countries like India, but the benefits obtained from goats today do not match with their actual potential. Parasitic diseases contribute to the constraints of goat production.

Rumen flukes, also known as Paramphistomes, are parasites that infect ruminants including cattle, goat, sheep and water buffaloes. Paramphistomes are responsible for “Paramphistomosis” i.e., gastrointestinal parasitic disease characterized by lower nutrition conversion, decreased milk production and acute parasitic gastroenteritis with high morbidity and mortality rates particularly in domesticated and wild ruminants, which causes prime economic losses to the livestock industry to several thousand crores of rupees annually (Horak,1971). It has been a neglected trematode infectious disease in ruminants; but has recently come out as a significant cause of productivity loss in wool, meat and milk production. Distribution of paramphistomosis is worldwide, but the high prevalence has been accounted in tropical and subtropical regions, particularly in Africa, Asia, Australia and Eastern Europe (Nasmark, 1937).

Paramphistomes require an aquatic snail as an intermediate host and the pre-parasitic stages of the lifecycle (miracidia and stages in the snail). Rumen flukes, also known as paramphistomes, are parasites that infect ruminants including cattle, goats, sheep, and water buffaloes. *Paramphistomum* is considered to be one of the most important species of paramphistomes and are parasitic in the alimentary canal of many ruminants around the world. Mature parasites are especially prevalent in the reticulum and rumen, while immature parasites in the small intestine mainly in the duodenum (Eduardo, 1982b). Several species are also found in fish, amphibians, reptiles, birds and mammals. Immature flukes live in the small intestine and adults are found in the rumen or reticulum of ruminants, they have complex life cycle which requires an intermediate host for completion (Sey 1981-1982).

Immature migrating parasites of some species have been reported to cause serious disease and even deaths of their hosts by burying themselves into the sub-mucosa of the duodenum and feeding on the epithelial cells of the Brunner's gland which results in anorexia, polydipsia, profuse foetid diarrhoea, drop in plasma protein concentration and anaemia, which weaken the host. Mature paramphistomes are also responsible for rumenitis, irregular rumination, unthriftiness, lower nutrition conversion and loss of body condition (Urquhart G.M. et al. 1996).

Material and Methods: The present study was carried out in and around Santiniketan, Birbhum, West Bengal. The rumen and reticulum of slaughtered goat were collected every month from abattoirs to determine the seasonal prevalence of parasite and were checked for the presence of adult flukes. The adult flukes were carefully picked up with the help of forceps from rumen and reticulum of infected goat (Figure 1) and after collection parasites were washed properly with PBS (pH 7.4). Parasites collected from each animal were counted carefully to determine the intensity of infections. All examined goats belonged to *Capra hircus*.



Figure 1: Parasites collected from infected goat

Result and discussion: Prevalence and distribution of species causing paramphistomosis show a wide variation with respect to geographical regions and host preference.

In the present study, paramphistomosis in goat was found throughout the year with prevalence between 2 % and 26 %, and with a yearly average of 13 %. The highest prevalence of *Paramphistomum* spp. in goat was observed in the summer (Figure 2).

In experiments it was evidenced that cattle were infected mainly throughout the rainy and windy seasons, during summer, autumn and at the beginning of winter Rangel-Ruiz et al. (2003). Outbreaks generally occur in drier months Soulsby (1982). Galdhar & Roy (2005) had reported a decreased prevalence in summer and increased prevalence during postmonsoon season in Chattisgarh, India. In different province of Turkey the prevalence of paramphistomosis in sheep ranged from 0.5 % to 100 % (Coskun, 1988; Tinar et al., 1992; Guralp, 1981; Gıcık et al., 2003). The highest infection in sheep was reported to be in summer and lowest in winter in the North West temperate Himalayan region of India (Tariq et al. 2008).

The intensity and severity of infection in the present study reaches to its maximum in late spring and summer. The lowest prevalence is in winter (November to January) with a mean prevalence rate of 2 % and the highest mean prevalence is during summer (March to June) with a mean prevalence rate of 26 % followed by a decreased prevalence in monsoon (July to September) and autumn (October) with percent prevalence of 11 and 10 respectively in goat (Figure 3). The low prevalence of paramphistomosis in winter season is likely to be associated with the nonavailability of intermediate snail hosts.

The age and sex had no significant influence on the prevalence of paramphistomosis (Godara et al., 2014). In this experiment samples were collected from male goats only. Infection was prominent in animals below 1 year of age and had a high prevalence rate than the animals between 1–3 years and above 3 years of age (Patel et al., 2001; Tariq et al. 2008). In this study, infection was also noticeable in young goats compared to higher age groups. This higher rate of infection in lower age group animals may be attributed to low resistant due to low immunity and high susceptibility to infection. The adult animals gradually develop immunity upon reinfection with time and thus can avoid acute disease. While younger animals are prone to infection and develop acute disease (Horak 1971; Soulsby 1982).

In order to take control measures and determine the seasonal prevalence for paramphistomosis in the study area, further studies need to be done in other geographical regions to get a clear picture on the biology and behaviour of the parasites.

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as and when required. Samples were collected from the goats slaughtered for consumption only.

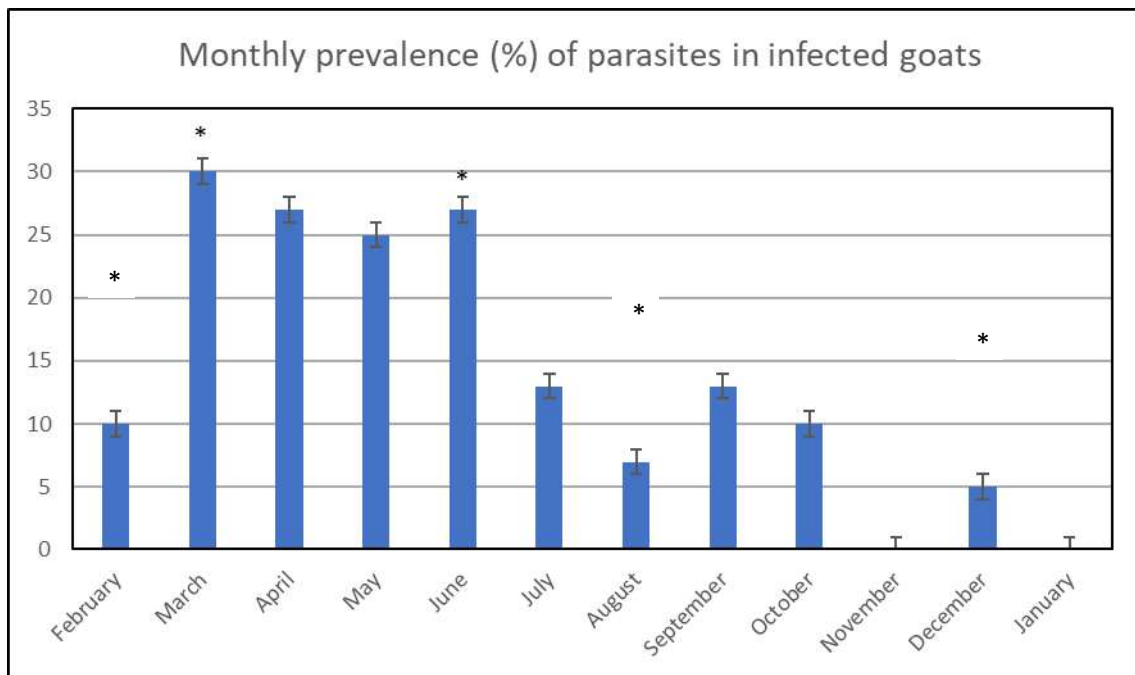


Figure 2: Monthly prevalence of *Paramphistomum* spp. according to gut examination in goat (asterisks indicate significant difference, $p < 0.05$)

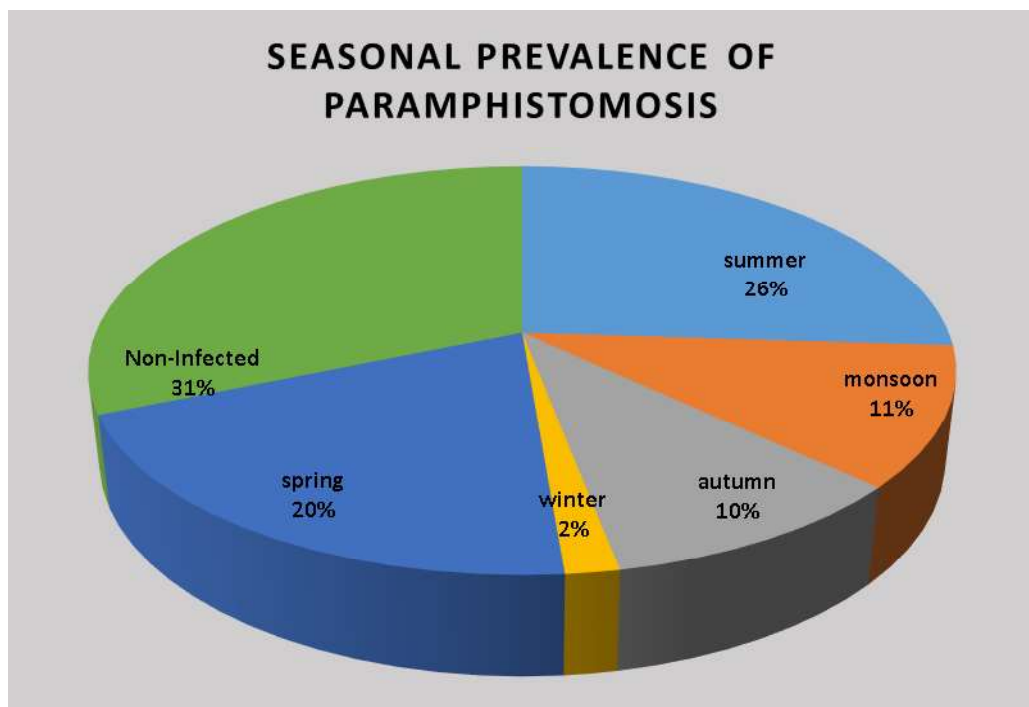


Figure 3: Seasonal prevalence of *Paramphistomum* spp. according to gut examination in goat

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