

Epidemiology of paramphistomosis in domestic ruminants in different districts of Punjab and other adjoining areas

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Abstract

An epidemiological study was carried out under the aegis of National Agricultural Technology Project from August 2000 to September 2003 and a total of 3,335 faecal samples of domestic ruminants (863 cattle, 1,622 buffaloes, 616 sheep and 234 goats) were examined for the presence of paramphistome eggs from different districts of Punjab and other areas of adjoining states. Out of these 133 ruminants (32 cattle, 88 buffaloes, 11 sheep and 02 goats) were found to be positive with the prevalence rate of 3.99%. The incidence rate was highest in buffaloes (5.42%) followed by cattle (3.71%), sheep (1.79%) and goats (0.85%). Highest incidence was recorded during monsoon and post-monsoon (July to October) with the prevalence rate of 8.06% followed by 2.92% in summer (March to June) and 0.49% in winter (November to December).

Keywords: Epidemiology, paramphistomosis, prevalence, domestic ruminants, Punjab.

Introduction

The north Indian state of Punjab produces more than 10 percent of the total milk production in the country. The economic losses in livestock due to diseases differ from season to season (Singh *et al.*, 1983). Santra and Pachalag (1996) estimated the economic losses incidental to various livestock diseases, among which diarrhoea due to various etiological factors account for the maximum (59.42%) losses. Among these diseases, paramphistomosis is one of the most important diseases in domesticated animals causing heavy economic losses to livestock industry. The mortality rate due to immature paramphistomosis is very high and may go up to 80-90% in domestic ruminants. Incidence of amphistomosis in cattle, buffaloes, sheep and goats has been reported in different states of India (Chhabra *et al* 1972, Chhabra and Gill, 1975;Varma *et al.*, 1989 and Manna *et al.*, 1994).

The morbidity and mortality in cattle, buffalo, sheep and goats due to the immature flukes belonging to the family Paramphistomidae is of considerable importance. All the species of parasitic flukes are not pathogenic. Several clinical outbreaks of paramphistomes suggest that

Paramphistomum epiclitum, *P. cervi*, *Gastrothylax crumenifer*, *Gigantocotyle explanatum*, *Cotylophoron cotylophorum* and *Fischoederius elongatus* are the predominant species in domestic ruminants. The other recorded amphistome species are *Cotylophoron bareilliensis* and *C. indicum* in sheep, *C. bareilliensis* in goats and *P. dutti*, *Duttiela cephaloporus*, *Olveria bosi* and *O. indica* in buffaloes (Prasad and Varma, 1999).

The report highlights the current status of paramphistomosis in different agro-climatic zones of Punjab and its adjoining areas on the basis of epidemiological investigation carried out during 2000 to 2003.

Materials and Methods

Faecal samples of domestic ruminants were collected either per rectum or in faecal bags from different agro-climatic zones of Punjab and other districts of adjoining states including villages in districts Amritsar, Bathinda, Faridkot, Ferozepur, Hoshiarpur, Jammu (J&K), Jalandhar, Kapurthala, Karnal (Haryana), Ludhiana, Mansa, Moga, Muktsar, Palampur (Himachal Pradesh), Patiala, Ropar, and Sangrur (Fig. 1). The samples were examined in the laboratory by sedimentation and floatation techniques for the presence of paramphistome eggs and other parasitic eggs. A total of 3,335 samples were collected from August 2000 to September 2003 from buffaloes (1,622), cattle

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Fig. 1. Map showing prevalence (%) of paramphistomosis in different districts of Punjab

(863), sheep (616) and goats (234) examined during the period for the overall prevalence rate and seasonality of paramphistomosis. District-wise and season-wise incidence of amphistomosis was studied throughout the year dividing

into 3 seasons - summer (March to June), monsoon (July to October) and winter (November to February).

Results

Out of the faecal samples screened, a total 133 ruminants (32 cattle, 88 buffaloes, 11 sheep and 2 goats) were found to be positive for paramphistome eggs with an overall incidence of 3.99% (Table 1). The highest incidence was found in buffaloes (5.42%) followed by cattle (3.71%), sheep (1.79%) and goats (0.85%). District-wise incidence rate was recorded to be highest in Ropar (19.35%) followed by Patiala (16.7%), Jalandhar (9.02%), Ferozepur (7.7%), Amritsar (5.84%), Ludhiana (4.5%), Moga (3.3%), Karnal (1.82%), Mansa (1.68%), Hoshiarpur (1.65%), Kapurthala (1.09%), and Muktsar (0.61%) (Fig. 1 and Table 2).

Seasonal Prevalence

After pooling all the data seasonal epidemiological observations were made which revealed highest prevalence rate in buffaloes (10.94%) followed by cattle (8.36%) and goats (3.85%) in monsoon and post-monsoon. Highest incidence was observed during monsoon and post-monsoon (July to October) with the incidence rate of 8.06% followed by 2.92% in summer (March to June) and 0.49% in winter

Table 1. District-wise incidence of paramphistomosis in Punjab and other adjoining areas

| Area | Cattle | | | Buffalo | | | Sheep | | | Goat | | | Total | | |
|--------------|------------|-----------|-------------|-------------|-----------|-------------|------------|-----------|-------------|------------|----------|-------------|-------------|------------|-------------|
| | No. Exam | (+) Ve | % | No. Exam | (+) Ve | % | No. Exam | (+) Ve | % | No. Exam | (+) Ve | % | No. Exam | (+) Ve | % |
| Ludhiana | 388 | 9 | 2.32 | 843 | 55 | 6.52 | 270 | 6 | 2.2 | 77 | 1 | 1.3 | 1578 | 71 | 4.5 |
| Amritsar | 57 | 7 | 12.28 | 45 | 1 | 2.2 | 15 | 0 | 0 | 20 | 0 | 0 | 137 | 8 | 5.84 |
| Patiala | 63 | 11 | 17.46 | 39 | 6 | 15.38 | - | - | - | - | - | - | 102 | 17 | 16.7 |
| Bathinda | 72 | 0 | 0 | 61 | 0 | 0 | 21 | 0 | 0 | 16 | 0 | 0 | 170 | 0 | 0 |
| Moga | 26 | 0 | 0 | 150 | 6 | 4 | - | - | - | 4 | 0 | 0 | 180 | 6 | 3.3 |
| Muktsar | 11 | 0 | 0 | 35 | 0 | 0 | 50 | 0 | 0 | 68 | 1 | 1.47 | 164 | 1 | 0.61 |
| Kapurthala | - | - | - | 73 | 1 | 1.37 | 9 | 0 | 0 | 10 | 0 | 0 | 92 | 1 | 1.09 |
| Jalandhar | 54 | 4 | 7.41 | 79 | 8 | 10.13 | - | - | - | - | - | - | 133 | 12 | 9.02 |
| Sangrur | 32 | 0 | 0 | 45 | 0 | 0 | 25 | 0 | 0 | 18 | 0 | 0 | 120 | 0 | 0 |
| Mansa | 9 | 0 | 0 | 73 | 2 | 2.73 | 31 | 0 | 0 | 6 | 0 | 0 | 119 | 2 | 1.68 |
| Ropar | - | - | - | 31 | 6 | 19.35 | - | - | - | - | - | - | 31 | 6 | 19.35 |
| Hoshiarpur | 67 | 0 | 0 | 113 | 3 | 2.65 | - | - | - | 2 | 0 | 0 | 182 | 3 | 1.65 |
| Ferozpur | 4 | 1 | 25.0 | 1 | 0 | 0 | 6 | 0 | 0 | 2 | 0 | 0 | 13 | 1 | 7.7 |
| Faridkot | 1 | 0 | 0 | 3 | 0 | 0 | - | - | - | - | - | - | 4 | 0 | 0 |
| Karnal | 64 | 0 | 0 | 31 | 0 | 0 | 168 | 5 | 2.98 | 11 | 0 | 0 | 274 | 5 | 1.82 |
| Jammu | - | - | - | - | - | - | 7 | 0 | 0 | - | - | - | 7 | 0 | 0 |
| Palampur | 15 | 0 | 0 | - | - | - | 14 | 0 | 0 | - | - | - | 29 | 0 | 0 |
| Total | 863 | 32 | 3.71 | 1622 | 88 | 5.42 | 616 | 11 | 1.79 | 234 | 2 | 0.85 | 3335 | 133 | 3.99 |

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Table 2. Seasonal prevalence of paramphistomosis in ruminants in Punjab and other adjoining areas during August 2000 to September 2003

| Species | Summer (March to June) | | | Monsoon & Post-monsoon (July to October) | | | Winter (November to February) | | |
|---------|---------------------------|----------|------|---|----------|-------|----------------------------------|----------|------|
| | Examined | Positive | % | Examined | Positive | % | Examined | Positive | % |
| Cattle | 370 | 7 | 1.89 | 299 | 25 | 8.36 | 194 | 0 | 0 |
| Buffalo | 679 | 29 | 4.27 | 515 | 56 | 10.94 | 428 | 3 | 0.7 |
| Sheep | 279 | 6 | 2.15 | 239 | 5 | 2.1 | 98 | 0 | 0 |
| Goat | 112 | 0 | 0 | 26 | 1 | 3.85 | 96 | 1 | 1.04 |
| Total | 1440 | 42 | 2.92 | 1079 | 87 | 8.06 | 816 | 4 | 0.49 |

Table 3. Year-wise prevalence of paramphistomosis in Punjab and other adjoining areas

| Species | 2000 | | | 2001 | | | 2002 | | | 2003 | | | Total | | |
|---------|------|-----|-------|------|-----|------|------|-----|------|------|-----|------|-------|-----|------|
| | No. | +ve | % | No. | +ve | % | No. | +ve | % | No. | +ve | % | No. | +ve | % |
| Cattle | - | - | - | 115 | 3 | 2.61 | 479 | 22 | 4.59 | 269 | 7 | 2.6 | 863 | 32 | 3.71 |
| Buffalo | 47 | 8 | 17.02 | 324 | 24 | 7.41 | 709 | 50 | 7.05 | 542 | 6 | 1.11 | 1622 | 88 | 5.43 |
| Sheep | 133 | 5 | 3.76 | 110 | 0 | 0 | 61 | 1 | 1.64 | 312 | 5 | 1.6 | 616 | 11 | 1.79 |
| Goat | - | - | - | 4 | 0 | 0 | 91 | 1 | 1.1 | 139 | 1 | 0.72 | 234 | 2 | 0.85 |
| Total | 180 | 13 | 7.22 | 553 | 27 | 4.88 | 1340 | 74 | 5.52 | 1262 | 19 | 1.51 | 3335 | 133 | 3.99 |

(November to December) (Table 2). During monsoon and post-monsoon months, buffaloes showed highest prevalence as compared to cattle, goats and sheep. In case of sheep and goats the infection was highest in summer and monsoon.

Overall Prevalence

The year-wise incidence of paramphistomosis in the study area is shown in Table 3. Buffaloes showed the highest prevalence (5.43%) followed by cattle (3.71%), sheep (1.79%) and goats (0.85%) (Table-3).

Discussion

In the present study, the higher incidence of paramphistomosis mainly ruminal paramphistomes in buffaloes as compared with that in sheep and goats confirm earlier reports of Thapar (1956), Mishra *et al.* (1974), Varma *et al.* (1989) and Manna *et al.* (1994). The higher incidence of paramphistome infections in buffaloes signifies their importance as reservoir host and according to Dunn (1969) most of outbreaks in sheep and goats are acquired from bovines. The highest incidence of paramphistomosis recorded in monsoon and post-monsoon season can be correlated with abundance of snails intermediate hosts *viz.*, *Indoplanorbis*, *Gyraulus* and *Lymnaea* spp. The low

prevalence of flukes in winter is well documented (Chhabra and Gill, 1975). The lower incidence rate of this disease in animals is due to changing pattern in animal husbandry practices and change in the grazing pattern of the animals. It is pertinent to state that most of the farmers have switched over to stall feeding, thereby the overall prevalence of the disease is low in comparison to the earlier reports in Punjab and other states. The higher prevalence rate during monsoon and post-monsoon, however, relates to the early development of the metacercariae due to availability of the snail population from the months of March - April. During the survey, the clinical signs in buffaloes and sheep, such as acute parasitic gastroenteritis in young animals, profuse foetid diarrhoea, sub-mandibular oedema, poor appetite, marked weakness, death of young animals were recorded, which confirm to earlier reports (Panda and Misra, 1980, Gupta *et al.*, 1978, Saheb and Hafeez, 1995 and Chhabra *et al.*, 1972).

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