

Research Article

Prevalence of *Gastrothylax crumenifer* in the gastrointestinal of *Bubalus bubalis*

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Abstract

Among livestock, water buffalo (*Bubalus bubalis*) is very important because of its high milk yield to meet the protein requirement. However, gastrointestinal trematode parasite especially *Gastrothylax crumenifer* is a main cause for health hazards in buffalo of central Punjab. In this study prevalence and identification of *Gastrothylax crumenifer* was carried out by visiting local abattoirs. Total of 265 rumens and reticulums of buffaloes were examined for the presence of *Gastrothylax crumenifer*. 18.8% *Gastrothylax crumenifer* infection was recorded in central Punjab. The correlation between worm burden and area was found to be non-significant ($p > 0.05$) indicating the presence of trematode in all districts of study area. The correlation between worm burden and age was highly significant ($p < 0.05$). Furthermore, highest worm burden was noted in buffalo having 22 year age. It was concluded that the *Gastrothylax crumenifer* is prevalent in central Punjab. Several factors contribute in survival and development of *Gastrothylax crumenifer* in central Punjab including the availability of fresh water snails serving as intermediate host, existence of extensive water channel system and poor grazing management of animals being practices in these areas and their keepers being unaware from the parasites.

Key words: *Gastrothylax crumenifer*, Trematode, *Bubalus bubalis*, Prevalence.

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Introduction

Pakistan is primarily an agricultural based country and livestock plays a vital role in its economy by providing essential items of human diet in the form of milk, meat and eggs. At present, livestock is contributing about 55% of agricultural base and 11.6% to the GDP. The number of buffaloes in Pakistan is 29.9 million. It provides sources of income for 45 percent of countries labor force and 60% of rural population [1]. Foreign earnings of the livestock sector have reached 35 billion rupees annually. It also provides wool, hair, skin, blood, bones, and natural manure and is a principal source used for cultivation and rural transport. The role of livestock in rural economy can be understood by the fact that 30 to 35 million of the total rural population is related directly or indirectly to the livestock, having household holdings of 2 to 3 cattle / buffalo and 5 to 6 sheep and goats per family, deriving 30 to 40 per cent of income from it [2].

The livestock comprises of cattle, buffaloes, sheep, goats, camels, horses, asses and mules. During the last five years, the combined population of cattle, buffalo, sheep and goat increased from 113 million, 1998-99, to 125 million, 2002-03, depicting a total increase of 12 million or 24 lac heads per annum. The domestic animals generally looked upon as a prestigious possession of the family, as the number of animals kept

by farmers usually determines or show the wealth and status in the society. During the last two decades buffalo-based dairy and meat industry is growing in the near and far eastern regions [1]. World buffalo population has reached to 130 million [3]. From all domestic animals, Asian buffalo holds the greatest promise and potential for production [4]. The Food and Agriculture Organization has rightly termed buffalo as an important asset [5].

There are a large number of parasites which infect the domesticated animals. The gastrointestinal tracts (GIT) of buffalo can support a wide variety of parasites mainly the helminthes which cause clinical and sub clinical parasitism. These parasites adversely affect the health status of animals and cause enormous economic losses to the livestock industry by lowering both the quality and quantity of milk and meat. In Pakistan parasitic infestation is quite prevalent and cost about 26.5 million rupees annually to the livestock industry [6, 7]. One of the most important and frequently distributed specie of the paramphistome is the *Gastrothylax crumenifer* which lives in the rumen of the host. This is an obligate digenetic parasite the *Gyraulus convexiusculus crumenifer* which causes anemia [8, 9].

Table 1: Correlation between age and average worm burden

Age of buffalo (Years)	Sex	Average worm burden	Infected individuals	Coefficient of age	Correlation
16	Female	158.8			
17	Female	231.5			
18	Female	244.6			
19	Female	450.3	18.80%	9.594	r = 0.431
20	Female	501.5			*highly significant (p<0.05)
21	Female	523.4			
22	Female	681.5			

Gastrothylax crumenifer along with other trematodes produce the “crowding effect” which decreases the size and weight of these parasites and also affect the health of the host [10].

Gastrointestinal parasites in calves lead to reduced growth and constantly hampering the development of livestock industry in Pakistan. Although no exact figure of economic losses is available but it is fact that millions of rupees are being lost due to reduced milk yield, rejection of meat and edible offal’s, depreciation of hides, delayed age of maturity and death particularly in calves and high production cost due to the use of drugs [6, 11]. Therefore, it is important to control parasites of the gastrointestinal tract through better management as in developed countries, and knowledge on prevalence of these parasites is very necessary.

However in Pakistan a very little work has been done on these parasites. Basic village farmers do not have much knowledge regarding these endoparasites and as a consequence Pakistan faces a lot of economic loss every year.

The hypothesis of this study is “*Gastrothylax crumenifer* is prevalent in the rumen and reticulum of buffalo in central Punjab”. The objective of present

study was to find out the prevalence of *Gastrothylax crumenifer* collected from gastrointestinal tracts of naturally infected buffalos of central Punjab.

Materials and Methods

The present study was conducted on Nili-Ravi buffaloes (*Bubalus bubalis*) came for slaughtering from different districts of central Punjab including Chiniot, Sargodha, Mandi Bahuddin, Gujrat, Pindi Bhattian and Hafizabad. These districts have well developed water channel system supporting development and survival of different freshwater snails serving as intermediate host for wide variety digenetic trematode parasites.

A total of 265 rumen and reticulum parts of gastrointestinal tracts of buffalo were examined for presence of *Gastrothylax crumenifer*. *Gastrothylax crumenifer* was recovered from the reticulum and rumen of the infected buffalo by visiting the local abattoirs located in Rawalpindi and Islamabad. The specimen was preserved in 70% alcohol and transported to Parasitology laboratory, Department of Zoology, PMAS, AAUR for further processing and identification.

Table 2: Frequency of *Paramphistomum cervi* and correlation of worm burden with reference to district

Sr. No	Districts	Frequency of <i>P. cervi</i>	Average Colony	Average worm burden	Correlation b/w area and worm burden
1	GRT	18.75%	7.32	501.33	
2	SHK	13.92%	6.50	472.72	r = 0.102
3	CH	28.57%	7.61	538.25	*non- significant
4	PB	27.90%	9.50	649.66	(P > 0.05)
5	MBD	13.72%	8.63	630.42	

Notes: Whereas; *GRT (Gujrat), SHK (Sheikhpura), CH (Chiniot), PB (PindiBhattian), MBD (MandiBahauddin)

Staining was done on the collected parasites with borax carmine and was followed by dehydration in 30 percent, 50 percent, 70 percent, 90 percent and absolute ethanol. After dehydration these specimen

was cleared in xylene and permanent slides were prepared. The trematodes collected were processed for histological studies by using eosin and hematoxylin staining protocols. The stained

specimens were subjected to morphometrical studies and measurements were taken with the help of Filaroccular micrometer as described [12]. The data was first subjected to normality test (Kolmogorov-Smirnov) to check the normality of the data and then for further analysis ANOVA was carried out by using SPSS version 16.0.

Results and Discussion

The results of present study revealed that 50 (18.8%) buffalos were infected with *Gastrothylax crumenifer* out of 265. This indicated that *Gastrothylax crumenifer* is common trematode parasite infecting the buffalos in central Punjab. This finding is consistent with that of Sanabria and Romero [13], who had reported this parasite affecting water buffaloes in Italy in spite of big environmental difference.

The trematode infection is prevalent in central Punjab by having little variation in average worm burden. However there was non-significant ($p > 0.05$) correlation between worm burden and area. The highest worm burden 649.66 was reported in Pindi Bhattian; while, the lowest worm burden was observed in buffalo of Sheikhpura district (Table 1). The existence of well-established water canal system, green lands and adequate rainfall might contribute the distribution parasite in all the districts of study area. Similar study revealed comparable worm burden pattern in north eastern Nigeria [9].

The correlation between age and worm burden was highly significant at ($p < 0.05$). The worm burden increases with increase in age. The highest worm burden was observed in the buffalo of 22 years and lowest in the buffalo of 16. The coefficient of age is 9.594 and its calculated p is $0.0008 < 0.05$ which shows high significance.

Change in one unit of age increased 9.594 worm burdens on an average. The worm burden was increased with age due to more exposure to the environment, increased grazing time and reproductive activities of parasites.

The prevalence is higher in younger as compare with adult buffaloes ($p < 0.05$), however, the prevalence varied with different species of helminthes in age groups [14]. Generally with the increase in age, the infection level decreased. The lower age groups of animals found to be more infected because of the high susceptibility and low resistance in young animals. Age is an important factor for onset of the infection because immunity plays a great role in establishment of parasites in host. The low level of parasitism

reported in adult animals is due to development of significant immunity [15].

The worm burden showed high significance with worm colony and it was observed that worm burden increases corresponding to increase in the number of colony (Table 2). All of the collected parasites were from the female buffalo as compared to male buffalo. This is due to fact that male buffalo were either slaughtered in early stages of their lives or might be reared for reproductive purposes. It is to be mentioned that the females buffalo brought for slaughtering might have passed their reproductive age.

Conclusion

Gastrothylax crumenifer is an important helminth and one of the major obstacle for livestock development in Pakistan causing remarkable direct and indirect losses at different parts of the country. The high level of *Gastrothylax crumenifer* in buffalos in the present study represent high rate of infection and immense economic losses to the country. It is, therefore, recommended that farmers who rear buffalos should improve provision of feeds to their animals so that the animal can have good body condition that confers some level of resistance against *Gastrothylax crumenifer*. Besides, they should regularly treat their animals with appropriate anthelmintics and awareness should be created on the prevention and control of *Gastrothylax crumenifer*.

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