

Original Article

Prevalence of *Gigantocotyle explanatum* in buffaloes slaughtered at Sihala Abattoir, Rawalpindi

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(Article history: Received: February 17, 2015; Revised: May 30, 2015)

Abstract

Gigantocotyle explanatum is a very common digenean trematode parasite affecting the domesticated animals usually present in the liver, bile duct and gallbladder. A study was designed to find out the prevalence of *G. explanatum* at Sihala Slaughter House, Rawalpindi. Three hundred livers of buffaloes were examined and sixty three livers were found infected by *G. explanatum*. The prevalence of *G. explanatum* was 21.24%. These results showed significant range of damage in buffaloes by this parasite, which in turn causes heavy economic loss in dairy industry. So, it is required to take immediate steps for reduction of infectious rate.

Key words: *G. explanatum*, trematode, buffalo, bile duct, liver, gall bladder, prevalence

To cite this article: MUHAMMAD, A., SHAH, S.I., IQBAL, M.N., ALI, S., IRFAN, M., AHMAD, A. AND QAYYUM, M., 2015. Prevalence of *Gigantocotyle explanatum* in buffaloes slaughtered at Sihala Abattoir, Rawalpindi. *Punjab Univ. J. Zool.*, **30**(1): 11-14.

INTRODUCTION

Livestock are an essential part of existing systems and offer opportunities for high value production. It is a major source of income in irrigated, arid, semiarid, and rain-fed areas of Pakistan. In Pakistan, livestock sector contributes 11.6% to national gross domestic product (GDP) and 55% to agriculture GDP (Economic survey of Pakistan, 2012). Buffalo is a major component of livestock sector, important for their milk, draft meat, dung as a fertilizer and fuel when it is dried etc. The contribution of buffalo is 12.1% to the world's total milk production, 38.0% in Asia, 55.0% in India, 16.4% in China, 50.8% in Egypt, 65.2% in Nepal and 66.6% in Pakistan (Sohail *et al.*, 2009).

Livestock diseases are common and widespread, and an important factor contributing to low productivity. Better management of livestock production including feeding systems, breeding program, production of fodders and

forages and health control is required to improve livestock productivity (Khan, 2003). Gastrointestinal trematode parasites are accountable for health hazards in buffalo of central Punjab (Iqbal *et al.*, 2013). A variety of parasites particularly helminthes harbor the gastrointestinal tract (GIT) of animals affecting the health status of animals and cause enormous economic losses to the livestock industry (Rafiullah *et al.*, 2011).

The *Gigantocotyle explanatum*, a digenetic trematode parasite infects the liver and bile duct of swamp buffaloes (*Bubalus bubalis*) (Iqbal *et al.*, 2014). *G. explanatum* is included in phylum platyhelminthes, class trematoda and subclass digenea contains adult endoparasites of molluscus; at least two different life cycles in two or more hosts; have oral sucker and acetabulum (Miller and Harly, 2010). The fresh water snails predominantly *Gyrulus convexiusculus* serve as the intermediate host for *G. explanatum* (Patzelt 1993). Parasite present in the bile ducts of buffaloes form plugs

on the luminal surface by their acetabulum (Malik 2010). Secondary infections caused by parasites are responsible for decrease in milk production, reduced product quality and quantity and increase mortality rate (Soulsby, 1982). *G. explanatum* showed no evidence of seasonal modulation in reproduction, with individual worms displaying the ability to produce relatively large numbers of eggs in all months. The locations occupied by the adult worms and the ecology of the mollusk can intermediate hosts are important to study the implications of the contrasting reproductive strategies in the rumen and bile duct inhabiting species (Hana *et al.*, 1988).

The heavy losses due to parasitic disease cause great damage to livestock field. The epidemiological information from this study is helpful in the development of rational control measure against *G. explanatum* in water buffalos. The objective of the present study was to determine the prevalence of *G. explanatum* in the livers/bile duct of buffaloes slaughtered at Sihala Slaughter House, Rawalpindi (SSHR).

MATERIALS AND METHODS

The present study was based on slaughter house examination of liver of buffalos brought for slaughtering from different regions of Punjab and KPK. This study was initiated in August 2011 and last up to January, 2012 at Sihala Slaughter House, Rawalpindi (SSHR). During this period 300 livers of buffaloes were screened to check the presence of *G. explanatum*. The questionnaire was developed to seek out information via age, sex, weight and origin of animals. The prevalence of parasite was determined by examining the liver of slaughter animals. The samples were preserved

in 70 percent alcohol at SSHR after collecting from bile ducts and transported to parasitology laboratory of PMAS Arid Agriculture University, Rawalpindi for further analysis.

For staining the parasite was removed from alcohol and placed in borax carmine solution followed by dehydration for three to four hours. Parasites then again washed with distilled water and pass through 30, 50, and 70 percent and with absolute alcohol for 15-30 minutes depending on size and thickness of the specimen. After dehydrations, the specimen was cleared in xylene and then permanent slide was prepared following the standard procedures and these were identified as described by Souls by (1982). The data obtained in this study was subjected to t-test to compare the mean difference in variables, which were studied during the research and checked significance difference between the variables by using version 16.0 statistical software (SPSS, Chicago, IL).

RESULTS AND DISCUSSIONS

In SSHR out of three hundred livers of slaughtered buffaloes, sixty three livers were infected with *G. explanatum* and it was also found that out of these infected livers twenty eight livers have numerous populations of parasites and were damaged completely or partially, while in remaining thirty five livers the basic structure of liver was normal (Table I). The percentage prevalence of infected and non-infected livers by *G. explanatum* was determined by using t- test (Fig. 1). The results showed that 78.76 per cent livers were without infection of *G. explanatum* while 21.24 percent of livers were infected (Fig. 2).

Table I: Analysis of livers observed periodically at SSHR

Data collection per week	Total Liver Examined per week	No. of non-infected (NI) livers	No. of infected livers	Percentage of NI livers	Percentage of infected livers
1 st Month	33	23	10	69.70	30.30
2 nd Month	31	24	07	77.41	22.59
3 rd Month	42	34	08	80.95	19.05
4 th Month	53	40	13	75.47	24.53
5 th Month	52	41	11	78.85	21.15
6 th Month	47	38	09	80.85	19.15
7 th Month	42	37	05	88.09	11.91
Total	300	237	63	78.76+2.13A*	21.24+2.13B*

* Capital alphabets are showing the significance difference in infected and NI livers.

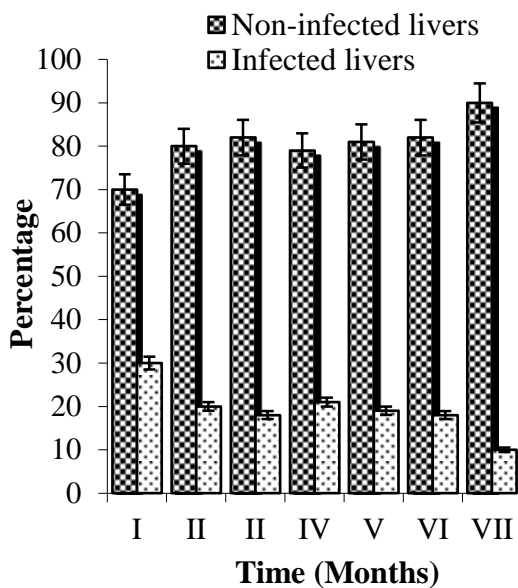


Figure 1: Percentage of Livers examined for *G. explanatum* at SSHR

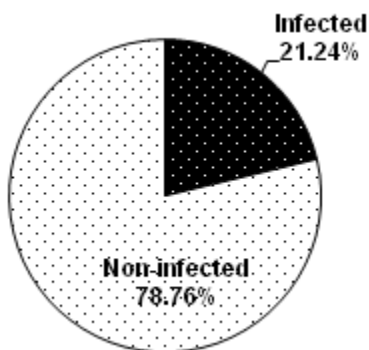


Figure 2: Prevalence of *G. explanatum* at SSHR

Iqbal et al. (2014) found that 50 buffaloes out of 200 buffaloes were diseased with digenetic trematode *G. explanatum*, showing 25 percent prevalence of this parasite. Our results are in accordance with Ahmedullah et al as demonstrated 31.25% prevalence of *G. explanatum* in buffaloes in Bangladesh, which indicated relatively higher prevalence (Ahmedullah et al., 2007). Malik (2010) examined the prevalence of *G. explanatum* in different regions of world and in developing countries *G. explanatum* infection considered as an important regional threat to animal production.

The geographical distribution of trematods species is mainly determined by the distribution patterns of the snail intermediate

hosts. The difference in prevalence rate of *G. explanatum* in different countries is due to the suitability of season/environment to mullusc intermediate host as the infection is reported in Korea, Taiwan (Rhee et al., 1986), Iraq (Altaif et al., 1978) and Iran (Sey and Eslami., 1981). The prevalence of *G. explanatum* in Vietnam was observed 12.5 percent (Ngugen et al., 1997) against our findings. The environmental conditions for intermediate host (snail) are more favorable in our region as compared to Vietnam, which has hot and dry weather.

The prevalence and implications of the contrasting reproductive strategies in the bile-duct inhabiting species such as *G. explanatum* were studied with reference to the locations occupied by the adult worms and availability of the mollusk intermediate hosts (Hanna et al., 1988). A variety of factors like age, sex and breed of the host, grazing habits, level of education and economic status of farmers, standard of management and anthelmintic used can influence the prevalence of helminthes (Pal and Qayyum, 1992).

Conclusion

G. explanatum is severely damaging the bile duct and liver of animal, thus resulting liver damage reduces the growth and milk production of buffaloes more than as generally anticipated. So, followings are suggestion to reduce the damage by this species.

- Production of power anthelmintics drugs against *G. explanatum* by working on its genetic makeup.
- Decrease access of intermediate host to the farm animal as well as with *G. explanatum*.

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