

Comparative Susceptibility of Buffaloes and Cattle to *Fasciola* Spp. Infection in Bahawalpur, Pakistan

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ملخص البحث

داء المتورقات هو أحد المشاكل البيطرية الكبرى في العالم و التي تقلل الإنتاج الحيواني. جُمعت في الدراسة الحالية، 3600 عينة روث (1800 من كل من الجواميس و الأبقار) على أساس عشوائي من مناطق مختلفة من بهاولبور في الفترة بين فبراير و أكتوبر من عام 2013. سُجّلت الحالة الجسدية للحيوان وتاريخ طرد الديدان أثناء جمع العينات من الحيوانات. بلغ مدى الإنتشار الكلي لداء المتورقات في الجواميس و الأبقار 15.8% و 14.2% على الترتيب. زيادة على ذلك، وُجد أن ضعف الحالة الجسدية في كلا من الجواميس و الأبقار (43.9% و 48.8% على الترتيب) و عدم طرد الديدان (25.9% و 24.6% على الترتيب) في صالح قابلية الحيوان للعدوى. مُثلت المتورقة العملاقة نمط العدوى الأكبر في كلا من الجواميس و الأبقار (11% و 10.1% على الترتيب) مقارنة بالمتورقة الكبديّة (الجواميس 3.6% و الأبقار 2.9%).

Summary

Fasciolosis is one of the major veterinary problems in the world that reduces the animal production. In the present study, a total of 3600 faecal samples (1800 from each of buffaloes and cattle) was collected on a random basis from different areas of Bahawalpur between February and October, 2013. During sampling the animals body condition and their deworming history were recorded. An overall prevalence of fasciolosis in buffaloes and cattle amounted to 15.8% and 14.2%, respectively. Furthermore, in both buffaloes and cattle it was found that poor body conditions (43.9% and 48.8%, respectively) and no deworming (25.9% and 24.6%, respectively) favoured animal susceptibility to infection. *Fasciola gigantica* was the major infection in both buffaloes and cattle (11% and 10.1%, respectively) as compared to that of *Fasciola hepatica* (buffaloes 3.61% and cattle 2.9%).

Introduction

There is a large number of zoonotic parasitic infections of which fasciolosis is one of the most important diseases (Schwabe, 1984), which involve snails as an intermediate host (Kandel, 1954; Fingerut *et al.*, 2003). It is caused by *Fasciola* spp. i.e., *Fasciola gigantica* and *Fasciola hepatica* (Phiri *et al.*, 2005). *Fasciola hepatica* is found throughout the world while *F. gigantica* is reported from Africa and Asia (Mascoma *et al.*, 2005).

The most important risk factors that favour fasciolosis are age, body condition and deworming history (Bitew *et al.*, 2010). Sometimes both species of *Fasciola* can infect ruminants like sheep and goats (Kedir *et al.*, 2012), which is termed as

mixed infection. The buffaloes are found to be more predominant reservoir of infection than cattle and sheep (Eslami *et al.*, 2009). Diagnosis of fasciolosis is an important step towards its control.

The present study aimed at evaluating the prevalence of fasciolosis and impact of body condition and deworming on disease prevalence in Bahawalpur region of southern Punjab, Pakistan. Furthermore, the infection type based on *Fasciola* species was also reported.

Materials and Methods

A total of 3600 faecal samples (1800 from each of buffaloes and cattle) was collected on a random basis from different areas of Bahawalpur, Pakistan between February and October 2013. Each sample was

properly labelled indicating date, place, deworming history and body condition.

Direct Smear method

Small quantity of faeces was mixed with normal saline solution in a small beaker and a drop of it was taken on slide, fully covered with a cover slip and examined under the microscope for *Fasciola* eggs detection (Thienpont *et al.*, 1979).

Simple sedimentation test

About 1-2 g of faecal sample was mixed with 15 ml of tap water and strained from a fine strainer (40 mesh per inch). The filtrate was then placed in 15 ml centrifuge tube and centrifuged at 1500 rpm for 5 min. The supernatant was then discarded and two drops of sediment were taken on glass slide, covered with cover slip and examined under microscope (Chatterjee, 1980).

Identification of *Fasciola* spp. eggs

Eggs of *F. hepatica* and *F. gigantica* were morphologically identified as described by Soulsby (1982).

Statistical analysis

SPSS 16.0 computer based statistical software was used for data analysis. The significant difference was tested using Chi-square (χ^2) with P value of 0.05 was considered significant.

Result

Prevalence of fasciolosis in buffaloes

With regard to body condition, it was noted that buffaloes with poor body condition were highly infected (43.9±0.032), followed by buffaloes with moderate body condition (15.8±0.015) while the lowest prevalence was found in buffaloes with good body condition (8.3±0.029) (Table 1).

Table 1: Prevalence of fasciolosis in buffaloes and cattle

Factors		No. examined		No. of positive		Prevalence (%)±SE	
		buffaloes	cattle	buffaloes	cattle	buffaloes	cattle
Body condition	Poor	248	211	109	103	43.95±0.032	48.8±0.034
	Moderate	620	704	98	85	15.80±0.015	12±0.012
	Good	932	885	77	68	8.26±0.029	7.7±0.032
Deworming history	No	735	720	190	177	25.85±0.021	24.6±0.021
	Occasional	548	558	74	62	13.50±0.015	11.1±0.014
	Regular	517	522	20	17	3.86±0.008	3.3±0.008
Infection type	<i>F. gigantica</i>	1800	1800	198	182	11	10.1
	<i>F. hepatica</i>	1800	1800	65	52	3.61	2.9
	Mixed infection	1800	1800	21	22	1.16	1.2
Total		1800	1800	284	256	15.80%	14.20%

According to deworming history, it was evident that the prevalence was highest in undewormed (25.9±0.021), followed by occasionally dewormed (13.5±0.015) and lowest in regularly dewormed animals (3.9±0.008) (Table 1).

Prevalence of *F. gigantica* (11%) was significantly ($p<0.05$) higher than that of *F. hepatica* (3.7%) and mixed infection (1.2%) (Table 1).

Prevalence of fasciolosis in cattle

Regarding body condition, it was noted that cattle with poor body condition were highly infected (48.8±0.034%), followed by cattle with moderate body condition (12±0.012%) while the lowest infection was observed in cattle with good body condition (7.7±0.032%) (Table 1).

According to deworming history, it was evident that the prevalence was highest in undewormed (24.6±0.021%), followed by occasionally deworming (11.1±0.014%) and lowest in regularly dewormed animals (3.3±0.008%) (Table 1).

Prevalence of *F. gigantica* (10.1%) was significantly ($p<0.05$) higher than that of *F. hepatica* (2.9%) and mixed infection (1.2%). Insignificant ($p>0.05$) difference was found between *F. hepatica* and mixed infection (Table 1).

Comparative susceptibility of buffaloes and cattle to fasciolosis

An overall prevalence of fasciolosis in buffaloes was found to be 15.8% in Bahawalpur from February to October, 2013, while in cattle it was found to be 14.2%. Statistically, the difference between the two animals species was found to be insignificant ($P>0.05$) (Table 1).

Discussion

In this study, the comparative susceptibility of buffaloes and cattle to *Fasciola* spp. infection in Bahawalpur, Pakistan, was reported. There is no authentic work from Pakistan that shows the prevalence of fasciolosis in ruminants based on body condition. In both buffaloes and cattle, animals with poor body condition were more susceptible than animals with moderate and good body condition. Kedir *et al.* (2012) from Ethiopia, recorded prevalence rates of 4.42%, 1.6%, and 1% in animals with poor, medium and good body condition, respectively. Bitew *et al.* (2010) have showed that body condition is an important risk factor associated with fasciolosis, where high prevalence (73.7%) was recorded in sheep with poor body condition. This work coincides with our findings in buffaloes and cattle.

Based on deworming history, the undewormed buffaloes and cattle were found to be highly susceptible compared with those occasionally and regularly dewormed ones. To the best of our knowledge, there is no work from Pakistan on this aspect. In Ethiopia, Bitew *et al.* (2010) has also showed that deworming activity is important risk factors associated with fasciolosis. They recorded 57.7% infection of fasciolosis in undewormed sheep, while 47.7% and 30% infections were found in occasionally and regularly dewormed sheep, respectively. Their results support our findings for both animal species in the present study.

Khan *et al.* (2009) reported that infection of *F. gigantica* (22.40%) was higher than that of *F. hepatica* (3.06%) in both buffaloes and cattle of Punjab. These results are in strong favour of our findings, as we also recorded a prevalence of *F. gigantica* higher than that of *F. hepatica* in buffaloes and cattle. Kakar *et al.* (2011) recorded 24.6% prevalence in cattle with high prevalence rate of *F. hepatica* compared with that of *F. gigantica*, and minimum number of cattle was infected with mixed type of infection in Quetta.

This difference might be due to variable environmental conditions of these areas. In our results, buffaloes (15.8%) were found to be slightly more susceptible to infection than cattle (14.2%). Khan *et al.* (2009) reported, specieswise high prevalence of fasciolosis in buffaloes (30.50%) as compared to cattle (20.42%).

It is concluded that Bahawalpur region is one of the zones where *Fasciola* infestation has significant prevalence, with probably significant related economic loss.

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