

Research Article

Prevalence of parasites and morph-metric measurements of *Fasciola hepatica* in the Buffaloes at Lalkurti slaughter house Rawalpindi, Pakistan

Abdul Mateen¹, Usman Ahmad^{1*} and Farhana Riaz Chaudary¹

1. Department of Biology, PMAS Arid Agriculture University, Rawalpindi, Pakistan

*Corresponding author's email: usmanahmad239@yahoo.com

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Abstract

To record the prevalence of parasites in the buffaloes at Lalkurti slaughter house, Rawalpindi was carried out at weekly intervals from October 2013 to March 2014. Postmortem examination of 90 slaughtered buffaloes was carried out and pancreatic ducts, lungs, esophagus and livers were checked for the presence of the parasites. The parasitic burden on esophagus, pancreatic duct, liver and total parasites were 11.11%, 4.44%, 4.44% and 20% respectively. Morphometric measurements were taken for the identification of *Fasciola hepatica*. The *Fasciola hepatica* had body length (32mm to 42mm), body width (9mm to 13mm), cone length (2mm to 4mm), cone width (2mm to 4mm), distance between anterior to ventral sucker (3mm to 5mm), distance between oral sucker to ventral sucker (2mm to 4mm), distance between ventral sucker to posterior (27mm to 39mm), Testis length (16mm to 22mm). The *Fasciola hepatica* collected from Rawalpindi of Pakistan who had a morphological similarity with Egypt and Iran. It was noticed that a higher chance to find out *Fasciola* was recorded in older and female buffaloes than in youngsters and males. These buffaloes brought from areas which was very close to water. This proved that water played a major role in the transference of fasciolosis infection.

Keywords: Buffaloes; Economic losses; Fasciolosis; Morph-metric measurements; Prevalence

Introduction

Sheep and goats play a vital role in the economy of Pakistan. They are the source of food and nutrition by providing meat, milk, wool, manure and skins [1]. Pakistan has wide varieties of sheep and goats which are contributing in the economics of rural areas as well as the nation. Parasitic diseases are major problem in the development of livestock production [2].

Fascioliasis caused by *Fasciola hepatica* responsible of heavy economic losses in

Pakistan [3]. It is a common liver parasite in domestic ruminants and is present in all over the world [4, 5]. Fascioliasis is also caused by *Fasciola gigantica*. Both species of the *Fasciola* are present in Asia and Africa [6]. Both species lived in the gall bladder and bile duct of infected animals which responsible of the death of the organisms [7]. It is responsible for the annual loss about more than 2000 million dollars in livestock in all over the world [8]. The World Health Organization (WHO) reported that 2.4

million populations are infected with *Fasciola* and 180 million are at risky stage [9].

Large ruminants suffered from the nematodes and trematodes in all over the world. The experiment had been conducted to monitor the parasitic burden in liver, pancreatic duct, esophagus, bile duct and lung in slaughtered buffaloes and to identify the *Fasciola hepatica* on the basis of its morph-metric measurements in Rawalpindi.

Materials and Methods

Study area

Rawalpindi is important city of the Pakistan. It is located in the Potohar region of the Pakistan. The latitude of Rawalpindi is 33.60 and altitude is 73.04. Rawalpindi is blessed

by natural flora and fauna. This city has importance in the economic point of view.

Site and data collection

The data was collected from slaughter house of Lalkurti, once in a week from the infected livers, pancreatic ducts, lungs and esophagus of the buffaloes. Moreover, pictures of the infected organs were taken.

Parasites collection

The parasites was collected in the falcon tubes and preserved in 70 percent ethanol. The labeled samples were transported to Parasitological lab of PMAS-AAUR. Furthermore, the information regarding to the infected organ and parasites was obtained by self-develop Performa as (Annexure I).

Annexure I. Prevalence of parasitic burden on buffaloes

Visit	Animal observed	Non-infected animals	Infected animals	Infected			Organ observed Liver / Bile duct/ Esophagus / Pancreatic Duct / Lungs Liv/B.D/E.P/P.D/L
				Condition of animal			
				Mild Mil.	Moderate Mod.	Chronic Chr.	
01	25	21	4	0	2	2	E.P
02	25	19	6	0	2	4	E.P
03	20	16	4	0	2	2	P.D
04	20	16	4	0	2	2	Liv

Where Mil. = Mild condition, Mod. = Moderate condition, Chr. = Chronic condition, Liv = Liver, B.D = Bile duct, E.P = Esophagus, P.D = Pancreatic duct, L = Lungs

Prevalence of parasites

Percentage prevalence of parasites had been calculated with the help of formula as given below

$$\text{Percentage prevalence} = \frac{\text{Number of animals infected} \times 100}{\text{Total animals observed}}$$

Washing of fluke

Fasciola hepatica was commonly found in the livers of buffaloes. After collection of flukes they were washed with distilled water to remove debris and contaminations.

Measurement techniques and data analysis

The adult worms were examined under dissecting microscope and dimensions of body were done by ocular micrometry. All the measurements were recorded in

millimeters (mm) which include all the body parts and their ratios.

Morph-metric characters

The linear morph-metric characters were body length (BL), body width (BW), cone length (CW), distance between anterior to ventral sucker (A-VS), distance between oral sucker to ventral sucker (OS-VS), distance between ventral sucker to posterior (VS-P) and testis length (TL).

Results and Discussion

The experiment was monitored to check the prevalence of parasites in large ruminants from Lalkurti, slaughter house. It was observed that fascioliasis in female buffaloes was higher as compared to male buffaloes. The reason was that male was brought to

slaughter at 2 to 3 years of age. After infection with this parasite, milk production decreased and they were brought to slaughter house. The fasciolosis was mostly recorded in the animals of the age of 5-6 years. The age was a major factor which really affects the prevalence of fasciolosis due to *Fasciola hepatica*.

Neuyen *et al.* [10] had examined the prevalence of natural *Fasciola* in cattle, found that age of animals less than 2 years was less affected as compared to the animals which having more than 2 years of age. Khan and Maqbool [11] had checked the prevalence of fasciolosis in cattle under different manegemental conditions in Punjab, noticed that higher infection rate was recorded in older animals as compared to youngsters.

A total of three species of Trematodes (*Fasciola gigantica*, *Fasciola hepatica* and *Paraphistomum*) were recovered from the samples collected from slaughter house, Lalkurti, Rawalpindi. As the main focus of this research was to find out the prevalence of fasciolosis due to *Fasciola hepatica* so the parasites collected were carefully examined. The liver, pancreatic duct, esophagus, bile duct and lungs of buffaloes were examined very carefully as shown in (Annexure I). The prevalence of parasites on esophagus, pancreatic duct, liver and total parasites were 11.11%, 4.44%, 4.44% and 20% respectively in buffaloes as shown in (Table 1). It was found that parasites were more in those buffaloes which were brought nearer to water areas. Kakar and Kakar Suleman Khel [12] had checked prevalence of trematodes in cow and buffaloes found that high infection rate found in those buffaloes which were closed to water areas.

Total numbers of fifteen samples were identified as *Fasciola hepatica* in the livers of buffaloes. All the morphological parameters like body length, width, cone length, cone width, anterior to ventral sucker, oral sucker to ventral sucker, ventral sucker

to posterior and testes lengths of these samples were measured carefully in millimeters with the help of ocular meter as shown in (Table 2).

The *Fasciola hepatica* was mostly found in livers of buffaloes and identification of *Fasciola hepatica* was made by morphometric measurements as shown in (Fig. 1). Periago *et al.* [13] were taken as reference standard for comparison purpose and results of morph-metric were similar to the bovines of Egypt and Iran as shown in (Table 3). The *Fasciola hepatica* found in buffaloes had body length (32mm to 42mm), body width (9mm to 13mm), cone length (2mm to 4mm), cone width (2mm to 4mm), distance between anterior to ventral sucker (3mm to 5mm), distance between oral sucker to ventral sucker (2mm to 4mm), distance between ventral sucker to posterior (27mm to 39mm), Testis length (16mm to 22mm). The high infection rate in buffaloes might be depending upon hygienic and feeding conditions.

Buffaloes are coming from different areas of Rawalpindi in the slaughter house Lalkurti. Those buffaloes coming from the low lying area of the Rawalpindi near to Nala Lali are more suspected for endo-parasites as compared to those buffaloes which are away from the NalaLali Rawalpindi. This evidence is also supported by Kakar and Kakar Suleman Khel [12] found more infection rate in those buffaloes which were closed to water areas.

It is found the fact that buffaloes which have age group between 16 years to 20 years are more suspected for disease which brought for slaughter house Lalkurti Rawalpindi and produced less quantity of milk. It is also found that buffaloes with older ages are more suspected to endo-parasites. These facts are supported by Fayyaz *et al.* [14] and cause the economic losses to the owners, in the form of less milk production and meat. It is also

responsible for more mortality among the livestock and damages to farmers.

These findings help the animal Livestock and Agriculture in the society to maintain the

good hygienic conditions for the buffaloes to enhance the quality and quantity of milk production as well as meat production for the welfare of mankind.

Table 1. Prevalence of various parasites in buffaloes (n=90)

Parasites	Number of infected buffaloes	Infection percentage in buffaloes (%)
Esophagus parasites	10	11.11
Pancreatic duct parasites	4	4.44
Liver parasites	4	4.44
Total	18	20

Table 2. Identification of *Fasciola hepatica* by morph-metric method and measurements are in millimeters (mm)

Samples	Parameters							
	Body Length	Body Weight	Cone Length	Cone Width	Anterior to Ventral Sucker	Oral Sucker to Ventral Sucker	Ventral Sucker to Posterior	Testis Length
	BL mm	BW mm	CL mm	CW mm	A-VS mm	OS-VS mm	VS-P mm	TL mm
1	36	11	3	3	5	4	31	19
2	32	10	3	4	4	3	28	16
3	34	10	3	3	4	3	30	18
4	33	11	2	3	4	3	29	17
5	38	11	2	3	4	3	34	20
6	41	12	2	4	4	3	37	21
7	42	11	3	4	3	2	39	20
8	41	13	4	3	3	2	38	20
9	40	11	4	3	4	3	36	19
10	38	12	3	2	4	3	34	18
11	42	10	3	4	5	3	37	22
12	36	9	2.5	3	4	3	34	19
13	35	10	3	3	4	3	31	18
14	32	9	3	3	4	3	28	17
15	35	10	3	3	4	3	31	19

Where BL= Body length, BW = Body width, CL = Cone length, CW = Cone width, A-VS = Distance between anterior to ventral sucker, OS-VS = Distance between oral sucker to ventral sucker, VS-P = Distance between ventral sucker to posterior, TL = Testis length

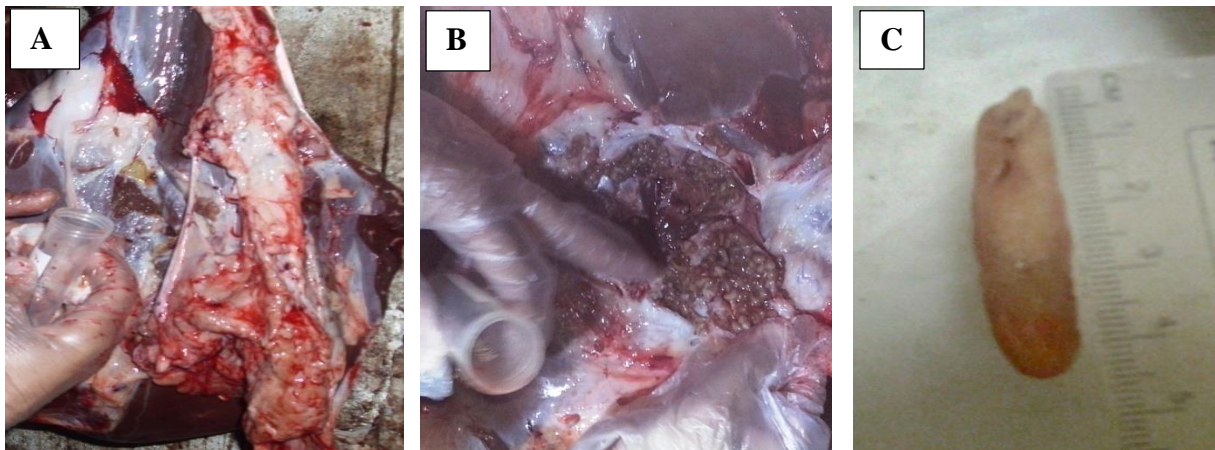


Figure 1. Collection of endo-parasites in the liver (a), (b) and identification of *Fasciola hepatica* (c) by morph-metric method

Table 3. Comparative morph-metric data of liver flukes hosted in cattle and buffalo from Potohar (Pakistan) and bovines from Iran and Egypt with average and extreme value measurements are in millimeters (mm)

Parameter	Observed Values (Average) min-max mm	Pariago (2008) (Average) min-max mm	
		Egypt	Iran
Body Length BL	(37) 32-42	(22.095) 15.48-28.71	(20.745) 11.47-30.02
Body Weight BW	(11) 9-13	(11.24) 8.21-14.27	(7.985) 4.59-11.38
Cone Length CL	(3) 2-4	(2.17) 1.36-2.98	(2.555) 1.63-3.48
Cone Weight CW	(3) 2-4	(3.02) 2.05-3.99	(3.135) 2.14-4.13
Anterior to Ventral Sucker A-VS	(4) 3-5	(2.765) 2.01-3.52	(2.36) 1.70-3.02
Oral Sucker to Ventral Sucker OS-VS	(3) 2-4	(2.03) 1.44-2.62	(1.755) 1.16-2.35
Ventral Sucker to Posterior VS-P	(33) 27-39	(18.74) 12.4-25.08	(34.08) 26.39-54.49
Testis Length TL	(19) 16-22	(21.36) 16.25-25.59	(16.91) 10.06-30.10

Where BL= Body length, BW = Body width, CL = Cone length, CW = Cone width, A-VS = Distance between anterior to ventral sucker, OS-VS = Distance between oral sucker to ventral sucker, VS-P = Distance between ventral sucker to posterior, TL = Testis length

Conclusion

The present study reveals that presence of *Fasciola hepatica* in the buffaloes is cause of fasciolosis. This fasciolosis is very harmful infection to the buffaloes and responsible for economic loss to the farmers and common men in the point of view of animal livestock and agriculture. It is responsible for less production of milk and meat. This study also finds out the presence of *Fasciola hepatica* depend on the water which played a major role in the transference of fasciolosis infection to the buffaloes. In conclusion that fasciolosis was due to *Fasciola hepatica* and responsible of life threatening in Patohar region.

Authors' contributions

Conceived and designed the experiments: FR Chaudary, Performed the experiments: U Ahmad & A Mateen, Analyzed the data: S Mehmood, Contributed materials/ analysis/ tools: FR Chaudary, Wrote the paper: U Ahmad & A Mateen

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