

## Epidemiology of fasciolosis in buffaloes under different managerial conditions

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### ABSTRACT

Epidemiological studies were undertaken at slaughter houses, livestock farms, veterinary hospitals and on household buffaloes under the different climatic conditions existing in Punjab province. Infection rate was 25.59, 26.16, 13.7 and 10.5 per cent, respectively in slaughtered buffaloes, buffaloes at livestock farms, veterinary hospitals and in household buffaloes. Overall highest (24.0%) seasonal prevalence in all types of buffaloes was recorded during autumn, followed by spring (20.0%), winter (13.0%). While the lowest (9.0%) was recorded during summer. It was noticed that a higher infection rate was recorded in older buffaloes than in youngsters (below 2 years of age) where as sex showed no significant difference. Buffaloes of either sex are equally affected.

**Key words:** fasciolosis, epidemiology, managerial conditions

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### **Introduction**

Fasciolosis is a widespread parasitosis responsible for immense economic losses in buffaloes in terms of condemnation of livers, decreased milk and meat production, loss of weight and poor carcass quality. Fasciolosis is characterized by sudden death with bloodstained froth at the natural orifices in acute cases. Diarrhoea, jaundice and bottle jaw are predominant features in chronic cases. This disease entity causes losses in terms of morbidity and mortality in flukey areas. Surveys in some Asian countries have shown that amongst domestic animals, buffaloes suffer more frequently from fasciolosis (BALASINGAM, 1962; AL-BARWARI, 1977; SHEIKH et al., 1983).

In developed countries, the data on epidemiology of various helminthiasis are published in an efficient manner as an aid to combat infections more effectively. In contrast, in developing countries little published information exists and data on the epidemiological aspect of helminthic infections, particularly on fasciolosis. This the reason for this paper, which records the prevalence of fasciolosis in buffaloes in the Punjab (Pakistan) in relation to meteorological factors, host, age and physiological status and is an attempt to bridge the gap in knowledge of these aspects.

### **Materials and methods**

*Survey of fasciolosis in slaughter houses.* To record the prevalence of fasciolosis a survey of 6 slaughterhouses in Lahore, Gujranwala, Sheikhpura, Sargodah, Jhang and Faisalabad was carried out by visiting the abattoirs at weekly intervals each month during the period January to December 1996. Post-mortem examinations of slaughtered animals were carried out and livers were checked for the presence of the parasites. The date, the number of total and infected animals were recorded, as were the age and sex of infected animals.

*Fasciolosis in live animals.* Epidemiological and parasitological studies were performed at livestock farms, veterinary hospitals and on household buffaloes in the districts of Lahore, Gujranwala, Sheikhpura, Sargodah, Jahang and Faisalabad. During the studies the seasonal prevalence was recorded. For this purpose the year was divided into 4 seasons as follows:

winter (November-February), spring (March-April), summer (May-August), and autumn (September-October). The prevalence of fasciolosis in relation to temperature, humidity, age and sex was also defined.

*Parasitological techniques.* Flukes recovered from each of the infected livers during the survey in slaughterhouses were counted and morphologically identified as *Fasciola gigantica* (ROSS et al., 1966). Faecal samples were examined by direct smear, flotation and sedimentation techniques for the presence of fluke eggs (URQUHART et al., 1988). The counting of eggs was performed by McMaster egg counting technique (KELLY, 1974). Trematode eggs were identified on the basis of morphology (YAMAGUTI, 1975; SOULSBY, 1982).

*Meteorological data.* Day-to-day information on maximum and minimum temperature, humidity, rainfall and pan-evaporation was collected from the meteorological records of Lahore, Sargodha and Faisalabad. The monthly averages for each weather factor were calculated.

## Results

*Epidemiology of fasciolosis.* During the study year (January-December, 1996) 2704 at slaughterhouses, 1720 at livestock farms, 8721 at veterinary hospitals and 8783 household buffaloes were examined of which 692 (25.6%) were slaughtered, 450 (26.16%) at livestock farms, and 1201 (13.77%) household buffaloes were infected with *Fasciola gigantica*. Overall infection rate was 3226 (14.7%) (Table 1).

Table 1. Epidemiology of fasciolosis in buffaloes

Buffaloes	Number examined	Number affected	% age of infection
Slaughtered	2704	692	25.6
Livestock Farm	1720	450	26.16
House hold	8783	883	10.05
Veterinary hospitals	8721	1201	13.77
Overall	21928	3226	14.71

Table 2. Seasonal prevalence (%) of fasciolosis in buffaloes

	Seasonal prevalence of fasciolosis				
	Spring	Summer	Autumn	Winter	Overall
Slaughtered	134/460 29.13%	164/906 18.10%	207/438 47.26%	187/900 20.77%	692/2704 25.59%
Livestock farm	87/272 31.98	105/557 18.85	119/290 41.03	135/601 22.46	450/1720 26.16
House hold	215/1432 15.0	159/2855 5.56	225/1499 15.0	284/2997 9.47	883/8783 10.05
Veterinary hospital	289/1467 19.7	238/29.2 8.20	339/1444 23.47	335/29.8 11.5	
Overall	19.96%	9.22%	24.24%	12.71%	

Among the slaughtered buffaloes the highest overall prevalence was recorded during autumn (47.26%) followed by spring (29.1%) and winter (20.8%). The lowest prevalence (18.1%) was recorded during summer. At livestock farms, the highest overall prevalence (41.03%) was recorded during autumn, followed by spring (31.98%) and winter (22.5%), while the lowest prevalence was during summer (18.85%). At veterinary hospitals a peak of *Fasciola* infection was recorded during autumn with an infection rate of 23.47%, followed by 19.7% during spring and 11.5% during winter. The lowest prevalence (8.2%) was recorded during summer. In household buffaloes, two seasonal peaks were recorded, during spring and autumn, with an infection rate of 15 and 15%, respectively. The lowest rate (5.56%)

Table 3. Age wise prevalence (%) of fasciolosis in buffaloes

	Below 2 years	Above 2 years
Slaughtered	262/1317 19.89	435/1400 31.07
Livestock farm	284/1102 25.77	166/618 26.86
House hold	313/3863 8.10	570/4920 11.58
Veterinary hospital	453/5263 8.60	748/3458 21.63
Overall	11.36%	18.45%

Table 1. Specification of myomorphus mammals examined by renoculture and microscopic agglutination according to the trapping area with corresponding results

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was recorded during summer. Hence, the overall highest incidence of the year in buffaloes was recorded during autumn (24.24%), followed by spring (19.96%) and winter (12.7%), while the lowest (9.22%) prevalence was recorded during summer (Table 2).

The occurrence of fasciolosis was more frequently recorded in adult buffaloes (18.45%) than in youngsters less than 2 years of age (11.36%) (Table 3). Analysis of the disease pattern in male and female buffaloes revealed no significant difference (Table 4).

Table 4. Sex wise prevalence of fasciolosis in buffaloes

Sex	Slaughtered	Livestock farm	House hold	Veterinary hospital
Male	454/1717 26.44	317/1099 28.84	343/3888 8.93	717/5598 12.8
Female	238/987 24.1	133/626 21.22	540/4944 10.92	484/3123 15.49

It was also noticed that prevalence was higher in buffaloes at livestock farms (26.16%) followed by slaughterhouse buffaloes (25.59%) and at veterinary hospitals (13.77%), while the lowest (10.05%) prevalence was recorded in household buffaloes.

It was also reported that the highest prevalence was recorded at Gujranwala, followed by Lahore, Sargodha, Sheikhpura, and Jhang, with the lowest at Faisalabad.

*Prevalence in relation to meteorological factors.* The meteorological data of Lahore, Sargodha and Faisalabad districts for the period January to December 1996 were recorded.

A positive correlation of disease prevalence to minimum temperature, morning and evening humidity and rainfall has been recorded. Statistical analysis revealed a significant correlation ( $P < 0.01$ ) between disease prevalence and humidity. Correlation between disease prevalence and other meteorological factors was not significant.

## Discussion

The occurrence of fasciolosis in an area is influenced by a multifactorial system which comprises hosts, parasite and environmental effects. In the natural foci of fasciolosis, the *Fasciola* and their intermediate and final hosts form an association posing a potential epidemiological threat and it is important that the existence and localization of such an association should be recognized beforehand so that the situation can be brought under control.

In the present study, epidemiological data on fasciolosis were collected from buffaloes in slaughterhouses, at livestock farms, in households and at the veterinary hospitals of Lahore, Gujranwala, Sheikhpura, Sargodha, Jhang and Faisalabad districts of Punjab province. When the data on seasonal prevalence in all the four groups of buffaloes were analyzed it was observed that a higher prevalence of fasciolosis occurred during autumn, followed by spring and winter, while it was lowest during summer. These findings are consistent with those of GUPTA et al. (1986), MOREL and MAHAT (1987), CHAUDHRI et al. (1993), MAQBOOL et al. (1994), and GHIRMIRE and KARKI (1996).

In fact, SWARUP and PACHAURI (1987) and CHAUDHRI et al. (1993) reported that fasciolosis is definitely seasonal and is at most restricted to two seasons of the year, i.e. autumn and spring. *Fasciola cercariae* and *Lymnaea* snails have been found to survive better at 25-30 °C which explains, in part at least, the much higher prevalence in autumn compared to other seasons. OLLERENSHAW (1958) reported that the two most important factors influencing the prevalence of fasciolosis are temperature and moisture, for they affect the hatching of fluke ova, the viability of encysting cercariae and population of snails. He also emphasized that there are at least two seasonal periods in which temperature and moisture are favourable for the rapid propagation of the parasitic life cycle.

In the present study, rains beginning during June change environmental temperature and humidity thereby favouring the emergence of cercariae from snails. Due to this, metacercariae may show their existence in July after ingestion, which produces fasciolosis in animals. This assumption appears to be the reason for the high prevalence of fasciolosis during autumn.

Animals over two years old were significantly more frequently affected than those under 2 years. These findings accord with those of AAL et al.

(1999), SHRESTHA et al. (1992), and GHIRMIRE and KARKI (1996). Our recorded findings corroborate the opinion of the above mentioned workers. The higher incidence in older animals might be due to lowering of resistance due to environmental factors at partus. Animals of both sexes were almost equally affected in the present study, as was similarly recorded by AAL et al. (1999).

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**SAŽETAK**

Epizootiološka istraživanja fascioleze u bivola držanih pod različitim klimatskim uvjetima na području Punjaba provedena su na klaonicama, većim farmama, manjim seoskim gospodarstvima i na veterinarskim klinikama. Učestalost invazije u zaklanih bivola iznosila je 25,59%, u bivola s farmi 26,16%, veterinarskih klinika 13,7% te malih seoskih gospodarstava 10,5%. Najveća učestalost ustanovljena je u jesen (24,0%), zatim u proljeće (20,0%) te zimi (13,0%), dok je najmanji postotak invadiranih životinja (9,0%) utvrđen u ljetnom razdoblju. Istraživanjem je potvrđeno da su češće bile invadirane starije životinje. Nisu utvrđene razlike učestalosti po spolu.

**Ključne riječi:** fascioleza, epizootiologija, način uzgoja

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