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Seasonal Prevalence of *Fasciola gigantica* Infection Among the Sexes in Nigerian Cattle

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Abstract: This study examined the seasonal prevalence of fasciolosis between the sexes in Nigerian cattle. The possible role and effect of sex on prevalence of the disease is also discussed. One thousand cattle were examined for infection using the fecal and bile examination for *Fasciola* eggs and Agar gel precipitation test. Total 750 75%), 448 (44.8%) and 450 (45%) positive were detected by each of the three methods respectively. The first peak of infection was detected in February and the second from September to October. Prevalence was higher (52.3%) during the rainy seasons. The annual prevalence was higher in females (63.7%) than in males (36.3%). Prevalence was also higher in females from December to September and peaked (8.1%) in February. Peak prevalence for males occurred in September and October (6.6%), overall prevalence was found to be higher in the females and statistically significant during the dry season.

Key words: Fasciolosis, sex, dry season, rainy season, faeces, bile, serum

INTRODUCTION

Fasciolosis caused by *Fasciola gigantica* is one of the most important hepatic diseases causing economic losses in ruminants. Apart from its great veterinary importance throughout the world, fasciolosis is also a known zoonosis affecting a number of human populations (Esteban *et al*., 2003; Mas-Coma and Bargues, 1997).

The prevalence of fasciolosis in many parts of Africa has been determined mainly at slaughter (Phiri *et al*., 2005b). Estimation of economic loss because of fasciolosis at national or regional level is limited by lack of accurate estimation of the prevalence of disease.

Several reports exist on how variable climatic factors and patterns determine major period and level of fasciolosis transmission in the divergent agro-ecologic zones in the world (Bhatia *et al*., 1989; Malone *et al*., 1985; Morel and Mahatto, 1987). Apart from climatic factors, other factors including the sex of the animals have been suggested as a variable that could influence the prevalence of fasciolosis in cattle.

Reports from Zambia (Phiri *et al*., 2005a) and Sierra Leone (Asanji and Williams, 1984), suggest that difference in susceptibility between sexes may exist in cattle grazing together in the communal pastures. Although, there are several reports in Nigeria on the prevalence, regional incidence and seasonal variation of bovine fasciolosis (Babalola and Schillhorn Van Veen, 1976; Schillhorn Van Veen *et al*., 1980), there are little evidence of studies directed at investigating the effect of sex on seasonal variation of the prevalence of fasciolosis in Nigerian cattle.

This study was therefore aimed at determining the effect of sex on the seasonality of *F.gigantica* in Nigerian cattle.

MATERIALS AND METHODS

Samples of faeces, bile and serum were collected from one thousand cattle slaughtered at the Municipal Abattoir in Ibadan Nigeria during the dry and rainy seasons. These samples were obtained from each animal and the sex of each animal was recorded.

Samples of the faeces and bile were subjected to microscopic examination to identify *Fasciola gigantica* eggs. Faecal samples were examined using the standard sedimentation method. A few drops of 5% methylene blue was added to highlight the trematode eggs.

Examination of bile for *Fasciola gigantica* eggs was carried out using a modification of the method. Equal volume of bile and water mixed together was passed through a tea strainer and the filtrate centrifuged at 2000 rpm. Sediment was mixed with reagent grade ethyl acetate of about one third the volume of water before final centrifuging to remove fats and other pigments that may interfere with microscopic study.

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Agar gel precipitation test was carried out as described by using only undiluted serum for the test. Whole worm antigen was prepared by homogenizing 0.1g of adult *Fasciola* in 5 mL physiological saline. The emulsion was centrifuged at 5000 rpm for 30 min at 4°C. The supernatant was used as antigen and the test carried out using 1% agar rose solution.

RESULTS

Seasonal variation in helminth incidence: Out of the 1000 cattle examined for the evidence of *F. gigantica* infection, 750 (75%) were positive with fecal egg examination method, while bile examination and AGPT detected 448 (44.8%) and 450 (45%) as positive, respectively.

The prevalence of *F. gigantica* infection showed 2 main peaks, one in February and the other from September to October, there was also a slight increase in the incidence of infection at around May (Fig. 1).

The number of cattle that were infected during the dry season (December to March) and rainy season (June to October) were 158 (21.8%) and 379 (52.3%), respectively (Table 1).

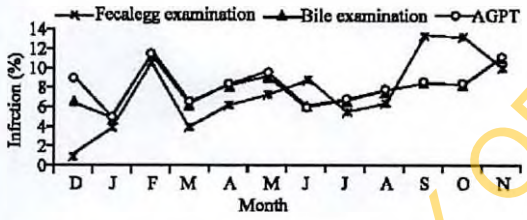

Fig. 1: Seasonal variation in fasciolosis using 3 methods of diagnosis

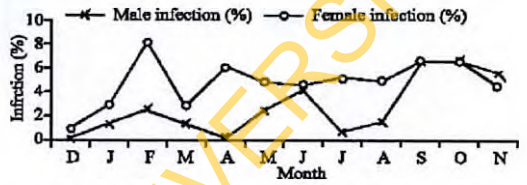

Fig. 2: Variation in male and female fasciolosis infection using fecal egg examination method

Table 1: The seasonal distribution in the Prevalence of *F. gigantica* infection using the Fecal egg examination Method

Season	Cattle No±S.E	(%)	Male No±S.E	(%)	Female No±S.E	(%)
Dry (December-March)	158±16.2	(21.8)	41±12.5	(2.9)	117±10	(75.1)
Rainy (June-October)	379± 3.9	(52.3)	156±13	(41.2)	223±3.5	(58.8)

S.E: Standard Error

Seasonal variation in male and female fascioliosis: The incidence of infection in males and females was about the same in June (4.1 and 4.6%, respectively) and same in both sexes in September and October (6.6%). The infection was higher in female from December to September and also in November (Fig. 2). The females had peak incidence of *F. gigantica* at February (8.1%), while that of the male was at September (6.6%) and October (6.6%). The annual prevalence of fasciolosis in female (63.7%) was significantly higher ($p<0.05$) than that for male (36.3%).

The overall seasonal trends showed that intensity of infection was higher during the rainy season (52.3%) than in the dry season (21%) and more females were infected during both dry and rainy season (Table 1), however, the difference in the prevalence of infection between males and female was only of statistical significance ($p<0.05$) during the dry season.

DISCUSSION

The detection of *F. gigantica* infection in Nigeria cattle by the three methods (Fecal egg examination, Bile examination and AGPT) used in our studies yielded similar result. However, the fecal egg examination method detected more positive cattle during the peak of the rainy season (September and October). This finding was also reported in Zambia (Phiri *et al.*, 2005a). The increase in the ability of this method to detect *fasciola* sp. egg may be connected to the change in the digestibility of the pasture which could in turn enhance egg recovery from animal feaces.

The results of all the methods showed that fasciolosis occurs throughout the year, agreeing with previous reports on the incidence of fasciolosis in Africa (Asanji, 1984; Phiri *et al.*, 2005a; Vassilev and Jooste, 1991). This observation in our situation may however, be related to the fact that cattle were transported to the abattoir from different parts of the country where there are some slight seasonal variations.

Our study also reports higher incidence of fasciolosis in the rainy than in the dry season, as the case with previous studies in Nigeria (Schillhorn Van Veen, 1980) and elsewhere in Africa (Asanji, 1984; Phiri *et al.*, 2005a). This is envisaged, since the rainy season generally presents a more favourable climate for the Life cycle of *F. gigantica* than the dry season, when the cercariae and the snail (intermediate host) have low survival rate.

The highest incidence of *F. gigantica* infection observed from June to October (with peak at September and October) coinciding with the rainy season that supports the survival of more viable metacercarial cyst for ingestion during grazing. The peaks in September and October are likely to be due to the ingestion of large quantity of larvae in June and July when the rains are

heavy, since it takes about three months for the ingested metacercariae to mature in the definitive host.

We also report that *F. gigantica* infection in female was significantly higher ($p<0.05$) than in male cattle throughout the year, corroborating the results of previous studies conducted in Zambia (Phiri *et al*., 2005b) and in Sierra Leone (Asanji, 1984), where the incidence of fascioliasis were generally higher in female than in males. Similar observations had been reported with respect to infection of other animals with *F. gigantica* (Dobson, 1966a; Dobson and Owen, 1978). This outcome has been attributed to the usual practice of having high female to male ratio (especially cow to oxen) and also the retention of female animals for breeding and milk production (Phiri *et al*., 2005b).

Although, on the contrary there some reports suggesting that male hosts are more susceptibility to some helminthic infection than the females (Mankau and Hamilton, 1972; Reddington *et al*., 1981; Solomon, 1969). Nevertheless, these conflicting observations and other studies (Frayha *et al*., 1971; Larry *et al*., 1981), all support the fact that the incidence of helminth species is influenced by the sex of the host. The disparity in susceptibility to helminth infection between the 2 sexes could be connected with the dlifferences in the host Intrinsic factors (genetics, physiology and immunology) and extrinsic factors (environment and management practices). However, the underlying mechanisms are poorly understood and needed clarification.

CONCLUSION

In conclusion, our study reports that *F.gigantica* infection is a common disease of cattle in Nigeria occurring throughout the year, with higher prevalence during the rainy season and more cases in the females. Animals especially the female that appears to be more susceptible than the male should be denied access to herbage and water contaminated with metacercariae.

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