

Prevalence of *Fasciola gigantica* infestation in cattle slaughtered at Minna metropolitan abattoir in North Central Nigeria

Esther Oyindamola OSINOWO^{1*}, John Yisa ADAMA², Moshood Abiola POPOOLA³, Adijat Yetunde SHORINMADE¹ and Qasim Olaitan AFOLABI¹

¹Department of Science and Laboratory Technology, Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan, Oyo-State, Nigeria.

²Department of Animal Production Technology, Federal University of Technology, Minna, Niger-State, Nigeria.

³Department of Animal Health and Production, Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan, Oyo-State, Nigeria.

*Corresponding author. Email: esther.osinowo87@gmail.com. Tel: +2348066591164, +2348089651671.

Copyright © 2017 Osinowo et al. This article remains permanently open access under the terms of the [Creative Commons Attribution License 4.0](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received 29th September, 2017; Accepted 2nd November, 2017

ABSTRACT: The study was conducted to provide a baseline data for the prevalence of *Fasciola gigantica* infestation in cattle slaughtered at Minna metropolitan abattoir in Chanchaga Local Government area of Niger State, Nigeria. The study was conducted for 90 days. Liver and gall bladder tissue samples were obtained from slaughtered cattle at abattoir. Ten cattle were sampled per week which translated to 120 animals. The liver and gall bladder tissue samples were processed at the State Veterinary Centre, Minna for worm recovery and identification. Liver was examined visually for the presence of *Fasciola* species by making length wise incision on the ventral aspect of the liver by cutting the bile duct and gall bladder open. Data were subjected to t-test statistics. Results showed that there were significant differences ($p < 0.05$) between the sex of *Fasciola gigantica* and the prevalence of *Fasciola gigantica* obtained in the organs. This study established the presence of *Fasciola gigantica* in cattle slaughtered in Minna Metropolis. It is recommended that grazing of cattle should be restricted to lesser snail infested areas particularly around rivers and streams.

Key words: Abattoir, *Fasciola gigantica*, infestation, prevalence.

INTRODUCTION

Fasciolosis is a parasitic disease of herbivorous mammals caused by trematodes of the genus *Fasciola* (Haseeb et al., 2002). It is an economically important parasite in cattle because it causes significant losses resulting in reductions in milk yield and loss of weight and decreased fertility in affected animals (Sariözkan and Yalçın, 2011). Abattoirs are used for the surveillance of diseases of both economic and public health significance. Fasciolosis, an emerging and re-emerging zoonosis, which affects both humans and animals (Mas-Coma et al., 2005). *Fasciola gigantica* is leaf-shaped and

tapers at both ends. The eggs of *Fasciola gigantica* can reach sizes of 0.2 mm in length (Dangprasert et al., 2001; Kumar, 1998). Adult flukes produce eggs that are passed in the host's faeces. In the wild, the eggs hatch into miracidia form into saclike sporocysts and multiply into rediae which then develop into cercariae. Free swimming cercariae are shed from snails, they then find aquatic plants, encyst and become metacercariae. In the transmission stage, the metacercariae are unknowingly ingested with aquatic plants by humans and grazing animals. In the mammal host, metacercariae encyst in

Table 1. Prevalence between sex of *Fasciola gigantica* obtained in organs.

Sex	Mean	Standard deviation	T	p-value
Female	27.00	0.70	15.59	0.041*
Male	13.50	0.50		

*- significant at $p < 0.05$.

Table 2. Prevalence of *Fasciola gigantica* in liver and gall bladder of cattle.

Organs	Mean	Standard deviation	T	p-value
Liver	20.12	0.42	6.17	0.030*
Gall bladder	12.10	0.18		

*- significant at $p < 0.05$.

the duodenum. Immature flukes then penetrate the liver and become mature in the biliary track (Cheesbrough, 2005; Read, 1973).

Fasciolosis is endemic in many countries of the world and it has food safety implications as it is a food-borne infection of public health importance in many parts of the world. It is estimated that more than 180 million people are at risk of infection, which make this disease to be a serious public health concern (WHO, 2007). About 2.4 million people are estimated to be infected in countries such as Andean Highlands of Bolivia, Ecuador and Peru, also the Nile Delta of Egypt and northern Iran (Haseeb et al., 2002).

Thus, the aim of this study is to provide baseline epidemiological data by estimating the prevalence rate of fasciolosis in cattle population in the study area.

MATERIALS AND METHODS

Study area

The study was conducted at Minna metropolitan abattoir, located in Chanchaga Local Government Area of Niger State with a distance of 8.41km, lies between 9.54056 latitude and 6.55363 longitude on a bearing of 185° S (Google Earth Map). Minna is the capital of Niger State of Nigeria and is geographically located in the Southern Guinea savannah zone, with a land mass of 283km² and lies between longitude 6° 29' E and latitude 9° 31' N (Student handbook, 2016).

Data collection, animal selection and sampling

The study was conducted for 90 days. Ten slaughtered cattle were randomly selected at the abattoirs on the morning of visitation which was done twice a week to give a total of 120 animals of different sexes. The breeds of the selected animals were sokoto gudali and white Fulani

between the ages of 2 to 4 years with a free-ranged management. Liver and gall bladder tissues were excised from the carcasses of these animals. The excised tissue samples were aseptically collected and placed into sterile polythene bags, which were labeled appropriately. Samples were then taken to State Veterinary Centre, Minna, for recovery and identification of worms as described by (Ulayi et al., 2007).

Worm recovery, identification and counting

Each gall bladder was cut opened and washed with distilled water, liver tissue infected with flukes was cut opened and worms were removed and put into a petri dish. The worms were counted and collected into individual containers (Ulayi et al., 2007). The gall bladder contents were examined for the presence of *Fasciola gigantica* eggs using sedimentation technique as described by (Urquhart et al., 2003).

Data analysis

Data were subjected to descriptive statistics such as frequency and percentage and t-test statistics using SPSS (Version 22).

RESULTS

In Table 1, the results show that there was significant difference ($p < 0.05$) in the sexes of *Fasciola gigantica* obtained from the organs of the sampled cattle. Female *Fasciola gigantica* was more prevalent than the male with means of 27 ± 0.70 and 13.50 ± 0.50 respectively. Table 2 shows that *Fasciola gigantica* was found to be more prevalent in liver than in gall bladder with means of 20.12 ± 0.42 and 12.10 ± 0.18 respectively. There was a

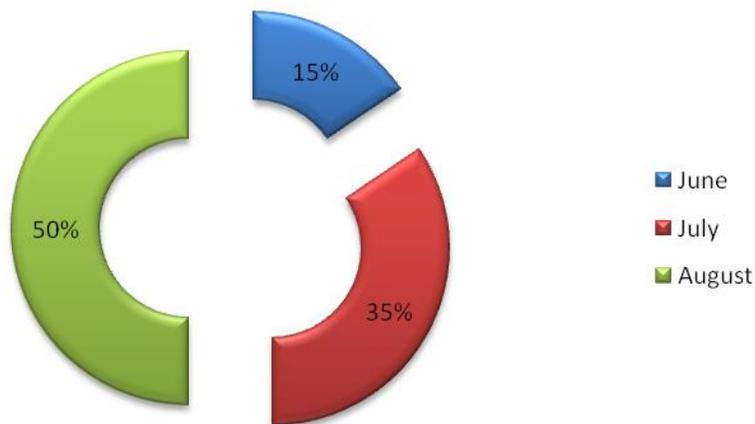


Figure 1. Prevalence of *Fasciola gigantica* obtained during the study period.

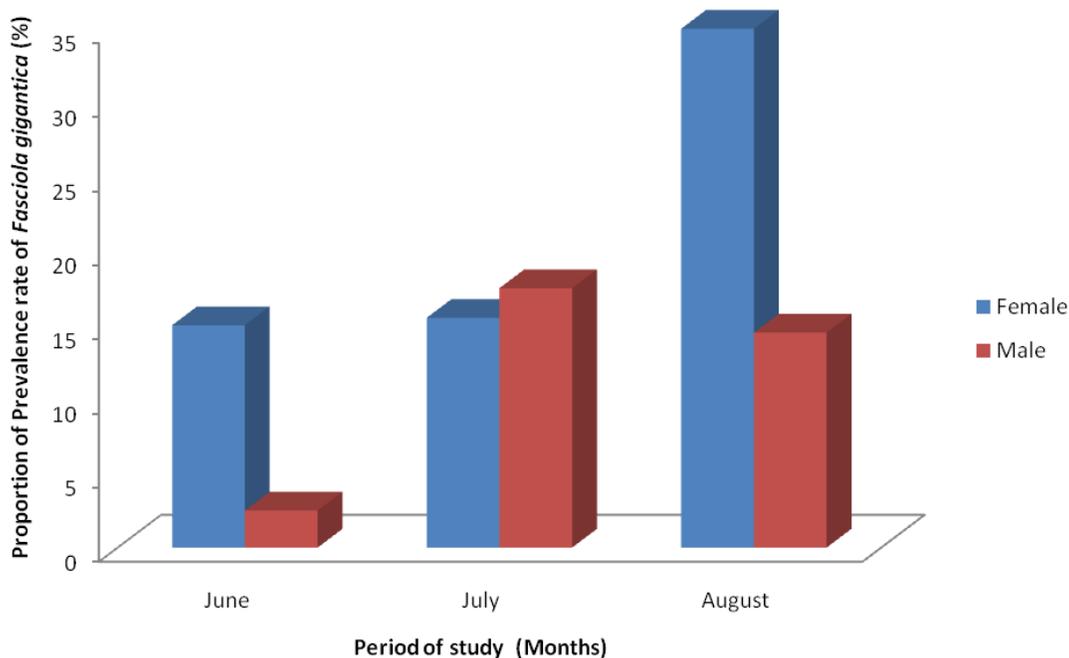


Figure 2. Prevalence of sex of *Fasciola gigantica* obtained during the study period.

higher frequency of occurrence of *Fasciola gigantica* during the month of August, followed by July and the least was obtained in June (Figure 1). The prevalence of sex of *Fasciola gigantica* with respect to the period of occurrence during the period of study is presented in Figure 2. Results revealed that female *Fasciola gigantica* were most prevalent in the month of August, followed by in July and the least was obtained in June. Also male *Fasciola gigantica* were mostly obtained in July, followed by August while the least was obtained in June.

DISCUSSION

The difference obtained in the sex of *Fasciola gigantica* recorded during the study period disagreed with the findings of Ulayi et al. (2005) who reported that prevalence rates in female and male animals in Zaria were 38.5 and 50.0% respectively. The difference obtained in prevalence of *Fasciola gigantica* in the organs where it was more prevalent in the liver than gall bladder and could be due to its migration within the liver

parenchyma which causes haemorrhage and destruction to the liver cells due to the parasitic size and enzymes released to liver cells by the parasites which occur in adult stages of development.

The prevalence rates obtained from the study is an indication that fasciolosis is prevalent within the study area. This result agrees with earlier reports (Egbe-Nwiyi and Ohaudrai, 1996), in which prevalence rates of 41.3% was reported in rainy season while that of 32.7% was reported during the post rainy season period in Borno state of Nigeria. This result also agreed with earlier findings (Eguale et al., 2009; Schillhorn et al., 1983) that rainfall period favours fluke development and provides an optimum habitat for the intermediate hosts. High prevalence rate obtained could be due to the fact that snails which serve as the intermediate hosts abound in rainy season in the Guinea savannah regions of Nigeria as reported by Schillhorn et al. (1980). The high prevalence rates obtained could also be due to abundant grazing reserves, rivers and streams within the study area that could have established favorable environmental conditions for the development of the snail intermediate hosts.

Conclusions

The prevalence rate of *Fasciola gigantica* was established within Minna metropolis and its environs indicating fasciolosis to be endemic. It also indicated that this condition could be of public health importance to vegetarians as improper cooked vegetables could become sources of infection to humans.

Recommendations

This present infestation rate can be reduced within Minna metropolis and its environs if strategic deworming program for livestock farmers is being practiced. Also, preventive control measures on the intermediate hosts particularly in riverine areas should be practiced. It is also recommended that future studies be carried out to map out areas heavily infested with snail intermediate hosts within the study area so as to have improved livestock production.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCES

- Adedokun, O. A., Ayinmode, A. B., & Fagbemi, B. O. (2008). Seasonal prevalence of *Fasciola gigantica* infection among the sexes in Nigerian cattle. *Veterinary Research*, 2(1), 12–14.
- Biu A. A., Ahmed, M. I., & Mshelia, S. S. (2006). Economic assessment of losses due to parasitic diseases common at the Maiduguri abattoir, Nigeria. *African Scientist*, 7(3), 143–45.
- Egbey-Nwiyi, J. N., & Ohaudrai, S. U. R. (1996). Observation on prevalence, haematological and pathological changes in cattle, sheep and goats naturally infected with *Fasciola gigantica* in acid zone of Borno state Nigeria. *Pakistan veterinary Journal*, 16(4), 172-175.
- Eguale, T., Tilahun, G., Debella, A., Feleke, A., & Makonnen, E. (2009). In vitro and in vivo anthelmintic activity of crude extracts of *Coriandrum sativum* against *Haemonchus contortus*. *Journal of Ethnopharmacology*, 110, 428-433.
- Marques, S. M. T., & Scroferneker, M. L. (2003). Fasciola hepatica infection in cattle and buffaloes in the State of Rio Grande do Sul, Brazil. *Parasitologia Latinoamericana*, 58(3-4), 169-172.
- Mason, C. (2004). Fasciolosis associated with metabolic disease in a dairy herd, and its effects on health and productivity. *Cattle Practice*, 12(1), 7-13.
- Ngwu, G.I., Ohaegbula, A. B. O., & Okafor, F. C. (2004). Prevalence of *Fasciola gigantica*, *Cysticercus boris* and some other disease conditions of cattle slaughtered in Nsukka urban abattoir. *Animal Research International*, 1(1), 7-11.
- Oladele-Bukola, M., & Odetokun, I. A. (2014). Prevalence of Bovine Fasciolosis at the Ibadan Municipal Abattoir, Nigeria. *African Journal of Food, Agriculture, Nutrition and Development*, 14(4), 9055-9070.
- Sariözkan, S., & Yalçın, C. (2011). Estimating the total cost of bovine fasciolosis in Turkey. *A Tropical Medical Parasitology*, 105, 439-444.
- Schillhorn Van Veen, T. W., (1983). Animal fasciolosis and schistosomiasis in Egypt and Sudan. *Helminthological Abstracts*, 52(8), 421-438.
- Schillhorn Van Veen, T. W., Folaranmi, D. O. B., Usman, S., & Ishaya, T. (1980). Incidence of liver fluke infections (*Fasciola gigantica* and *Dicrocoelium hospes*) in ruminants in Northern Nigeria. *Tropical Animal Health and Production*, 12, 97-104.
- Students Handbook (2016). Federal University of Technology Minna, *Student Handbook Manual*. p. 2.
- Ulayi, B. M., Umaru-Sule, B., & Adamu, S. (2005). Prevalence of *Dicrocoelium hospes* and *Fasciola gigantica* infections in cattle at slaughter in Zaria, Nigeria. *Journal of Animal and Veterinary Advances*, 6(9), 1112-1115.
- Urquhart, G. M., Armour, J., Duncan, J. L., Dunn, A. M., & Jennings, S. F. W., (2003). A textbook of veterinary Parasitology, 2nd Edition. Pp. 276-278.
- Usip, L. P. E., Ibanga, E. S., Edoho, H. J., Amadi, E. C., & Utah, E. (2014). Prevalence of Fascioliasis and the economic loss of condemned liver due to *Fasciola* infection in Cattle slaughtered at three abattoirs in Eket Urban, Akwa Ibom State of Nigeria. *Global Advanced Research Journal of Food Science and Technology*, 3(2), 54-75.
- Walker, S. M., Makundi, A. E., & Namuba, F. V., (2008). The distribution of *Fasciola hepatica* and *Fasciola gigantica* within Southern Tanzania-constraints associated with the intermediate host, *Parasitology*, 135(4), 495-503.
- WHO (2007). Report of the WHO Informal Meeting on use of triclabendazole in fascioliasis control. Tech. Rep. WHO/CDS/NTD/PCT/2007.1.