# COMPARATIVE SENSITIVITY OF FAECAL AND BILE SAMPLES IN THE DIAGNOSIS OF LIVER FLUKE INFECTION IN SHEEP AND GOATS IN ZARIA, NIGERIA

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## ABSTRACT
Liver fluke disease (also known as liver rot) is an economically important disease of ruminant's worldwide, causing significant morbidity and grave economic loss. In a study to determine the degree of sensitivity of bile sample and faecal sample to the detection of liver flukes (*Fasciola gigantica* and *Dicrocoelium hospes)* infection in sheep and goats slaughtered in Zaria. A total of 200 samples each of gall bladders and faeces were collected from 174 goats and 26 sheep. The contents of the gall bladder and faecal samples were analyzed using sedimentation technique to isolate the eggs of these parasites and possibly the adult stages. The percentage sensitivity for bile and faecal samples were found to be approximately 90% and 63.2% respectively as more of the parasites were isolated from bile than faeces. It was then concluded that compared to examination of faeces, bile analysis is a more reliable method for the diagnoses of liver fluke infection in small ruminants around the study area.
**Key words:** Liver fluke, sensitivity, faeces and bile.

## INTRODUCTION
In Nigeria, small ruminants provide about 36.5% of total protein intake (NISER/CBN, 1991) which still falls short of the minimum animal protein requirement of 50 gram recommended by FAO/WHO (1993). However, Lamorde (1996) reported that when properly harnessed, these farm animals can meet the protein requirement of the nation because of their high reproductive efficiency. Liver fluke disease (also known as liver rot) is an economically important disease hindering optimum production of ruminants worldwide; causing significant morbidity, mortality, liver damage and weight loss (Mage, 1989; Ogunrinade *et al,* 1981). The disease in small ruminants is caused by Trematodes from the genera; *Fasciola, Fascioloides* and *Dicrocoelium* (Troncy, 1989). In Nigeria, total annual losses due to fasciolosis in ruminant were estimated to be about 5 million naira which was equivalent to U.S $ 8.39 million (Mobolaji, 2001). In the tropics where climatic condition favours the development of these parasites and their intermediate hosts, *Fasciola* and *Dicrocoelium* are the common agents incriminated in the occurrence of liver fluke disease in cattle, sheep and goats and often isolated from the faeces and gall bladder (bile) of these animals. Clinically, outbreaks of acute cases result in weakness, pallor of mucus membrane, palpable enlarged liver, abdominal pain, ascites and may be complicated by concurrent infection such as *Clostridium novyi* (causing black disease). The chronic form of the disease is the most common form and is manifested as anaemia, ascites, hypoalbuminaemia and submandibular oedema (Urquhart *et al,* 1996). Accurate and reliable diagnosis of important parasitic infection such as liver fluke is prerequisite for the design of proper control and eradication programme. It is therefore pertinent to ascertain the degree of sensitivity of the common samples used in the diagnosis of liver fluke infection within our locality, hence the essence of this study.

## MATERIALS AND METHODS
**Study Area:** The study was conducted in sheep and goat market containing slaughter slab known as Yan Awaki. It is located along new Kano road, about one kilometer out of Zaria where, basically only sheep and goats are being slaughtered. Zaria is located on the geographic coordinates of 11°4′00″ North and 7°42′00″ (Maplandia, 2009).
**Sampling:** Using the random sampling technique, a total of 400 samples (200 feacal samples and 200 gall bladders) were collected at slaughter from 200 animals. Of the total animals sampled, 174 were goats while 26 were sheep. Samples were collected over a period of two months (July - August). After slaughter and evisceration, the gall bladder was

severed from the liver into a polythene bag, while a reasonable amount of feaces from the rectum of the same animal was collected into another polythene bag. Both polythene bags were then knotted together and labeled appropriately. The samples were then placed in cold packs and transported to the Helminthology laboratory, Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria for analysis on the same day of collection but on few occasions where this was not possible, the samples were preserved at 4°c in a refrigerator for maximum of 2days before analysis.

**Processing of Samples:** In the laboratory, the gall bladder was split open using a scissors into a clean plastic container while about 5 g of the faecal sample was placed in another clean plastic container and mixed with water. The samples were then processed using sedimentation technique as described by (Soulsby, 1982).The fluke eggs were identified based on morphological characteristics and size of fluke eggs as described by Soulsby (1982).

**Statistical analysis:** The data collected were analysed using the Chi-square test to check the association between sensitivity of bile sample and faecal sample in the diagnosis of liver fluke disease. P-values of less than or equal to 0.05($P<0.05$) was considered significant.

## RESULTS

Overall, 200 bile and 200 faecal samples were examined from 200 animals (sheep and goats). Of the 174 samples from goats, 38(21.83%) bile samples and 24(13.80%) faecal samples were positive for *Fasciola* eggs, while of the 26 samples from sheep, only 7 (23.08%) bile samples and 2(7.69%) faecal samples were positive for *Fasciola* eggs (Table 1). However, of the 174 samples from goats, 18(10.34%) bile samples and 6(3.44%). faecal samples were positive for *Dicrocoelium* while of the 26 samples examined from sheep, only 1(3.85%) bile sample was positive for *Dicrocoelium* but no *Dicrocoelium* egg was isolated in faeces (Table 2). There was no incidence of mixed infection with *Fasciola* and *Dicrocelium* in any of the animals sampled. Test for association was conducted for *Fasciola gigantica* in the animals sampled and it was observed that more of the parasites were isolated in the bile than in faeces and the difference was found to be statistically insignificant ( P= 0.13) Table 1). For infection due to *Dicrocoelium hospes*, more of the parasites were also found in the bile compared to faeces and test for association also revealed a statistically insignificant difference (p= 0.39) (Table 2).

## DISCUSSION

The prevalence of liver fluke disease (31.5%) is generally moderate in small ruminants around Zaria, this may be due to the fact that sheep and goat in this area are mostly kept by women, raised on semi—intensive system of management and are usually indoors without being allowed to stray far to where there are ponds and stream which serve as favourable breeding sites of snails. In this study, more goats were encountered than sheep and this can be attributed to religious importance as sheep are usually kept for sales during periods of religious festivities. From the present study, it can be inferred that the average isolation of fluke eggs from the faeces is less sensitive compared to isolation from bile. This finding concurs with the previous report of Wolfensberger and Hertzberg (1995). More often than not, the flukes were also seen in bile once isolated in faeces but not always seen in faeces when present in the bile. There was no incidence of mixed infection of both *Fasciola* and *Dicrocoelium* in any of the samples examined but the prevalence of *Fasciola gigantica* was higher than that of *Dicrocoelium hospes* which is in agreement with the observation made by Nwosu and Srivasta (1993).

### Conclusion

It can be concluded that examination of the bile is clearly a more reliable method of diagnosing liver fluke infection than examination of faeces. Therefore this study stresses the use of bile sample for more effective diagnosis.

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Table 1: Variation in sensitivity of bile and faecal sample to*Fasciola gigantica* in sheep and goat.

| | Sample type | | | |
|---|---|---|---|---|
| | Faecal sample | | Bile sample | |
| Animal species | No. examined | No. positive (%) | No. examined | No. positive (%) |
| Goat | 174 | 24(13.80) | 174 | 38(21.84) |
| Sheep | 26 | 2 (7.69) | 26 | 6(23.07) |
| Total | 200 | 26(21.49) | 200 | 44(44.91) |

$\chi^2 = 0.13$, df= 1, $p < 0.05$

Table 2: Variation in sensitivity of bile and faecal sample to*Dicrocoelium hospes* in sheep and goat.

| | Sample type | | | |
|---|---|---|---|---|
| | Faecal sample | | Bile sample | |
| Animal species | No. examined | No. positive (%) | No. examined | No. positive (%) |
| Goat | 174 | 6(3.45) | 174 | 18(10.34) |
| Sheep | 26 | 0 (0.00) | 26 | 1(3.85) |
| Total | 200 | 6(3.45) | 200 | 19(14.19) |

$\chi^2 = 0.39$, df= 1, $p < 0.05$