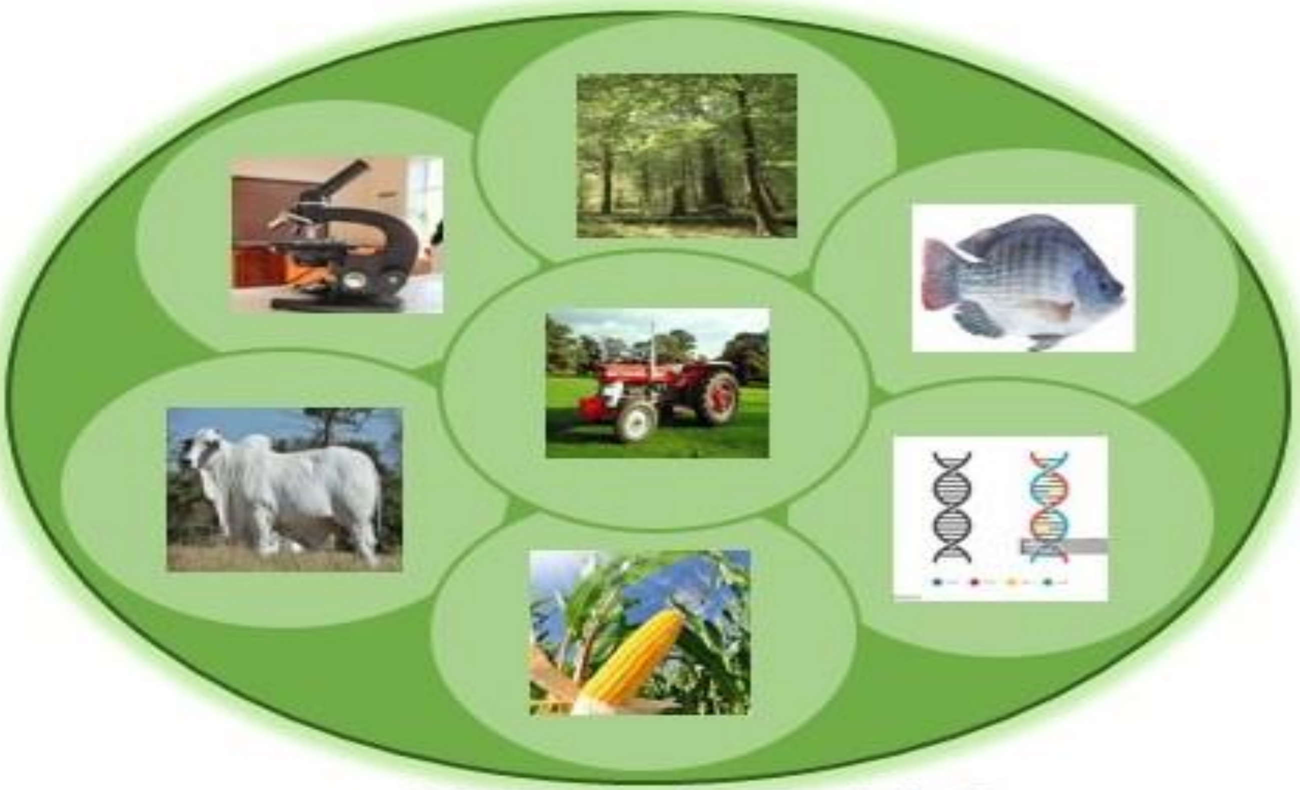
(KEJAANS)

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES

January, 2026, Vol. 2, issue 1



KEJAANS

CONTACT:
The Editor-in-Chief,
Kebbi Journal of Agriculture and Natural Sciences,
Faculty of Agriculture,
Abdullahi Fodio University of Science and Technology
Aliero,
PMB 1144, Birnin kebbi, Nigeria.
Email: kejaanseditor@ksusta.edu.ng,

ISSN: 3122-0584

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)

January, 2026; Volume 2, Issue 1

OFFICIAL JOURNAL OF THE

FACULTY OF AGRICULTURE

ABDULLAHI FODIO UNIVERSITY OF SCIENCE AND TECHNOLOGY, ALIERO

KEJAANS

ISSN: 3122-0584

About the Journal

This official scientific publication of the Faculty of Agriculture, Abdullahi Fodio University of Science and Technology Aliero, is a non-profit, open access, double-blind peer-reviewed Journal publishing four issues (January, April, July and October) per annum. The Journal is a platform open to collaborations with researchers, authors, institutions, research agencies and private companies related to Agriculture. The Mission of the Journal is to disseminate scientific knowledge through the publication of original research articles, research notes, book reviews, letters to the editor and reviews of Literature, representing a contribution to scientific and technological knowledge in respective areas covered by the Journal. The Kebbi Journal of Agriculture and Natural Sciences seeks to validate and disseminate new knowledge, making it public in order to strengthen the human capacity, constitute a link in the scientific community to the society and encouraging the expansion of University and academic researches.

Scope of Kebbi Journal of Agriculture and Natural Sciences (KEJAANS)

The Kebbi Journal of Agriculture and Natural Sciences has the sole aim of providing an intellectual platform and ideas for scholars, by promoting interdisciplinary studies related to agriculture and natural science through publishing the latest scientific research findings that are of direct policy implications and beneficial to the research community. Consequently, the journal covers all aspects of Crop Science, Animal Science, Agricultural Economics, Agricultural Extension and Rural Development, Food Science, Fisheries and Aquaculture, Biotechnology, Soil Science and Agricultural Engineering, Forestry and Environment, Wildlife, Agricultural Education, Agro-allied Industries as well as all Natural Science researches related to Agriculture.

KEBBI JOURNAL OF AGRICULTURE AND NATURAL SCIENCES (KEJAANS)
January, 2026: Volume 2, Issue 1: 36-42
p-ISSN: 3122-0584

EPIDEMIOLOGICAL ASSESSMENT OF RUMINANT FASCIOLOSIS AT KONTAGORA MUNICIPAL ABATTOIR

Mohammed Gambo[1]*, Muftau Misbau Alaba [2]

1 Department of Agricultural Education, Faculty of Vocational and Technical Education, Federal University of Education, (FUE), P.M.B 39, Kontagora Niger state
2 Department of Animal science, Faculty of Agriculture, Abdullahi Fodiyo University of Science and Technology (AFUSTA), P.M.B 1144, Aliero (AFUSTA), Kebbi State, Nigeria.

Correspondence Author: gambo343@mail.com, +2348139623467

ABSTRACT

Fasciolosis is a serious animal health problem in Kontagora, Niger State, where livestock farming is second only to crop production This study investigated the epidemiology of the disease among slaughtered ruminants at Kontagora municipal abattoir. A total of 384 samples (fecal, bile, and liver) collected from 384 ruminants spreading across cattle, sheep and goat were analyzed using the formal ether technique. The results revealed an overall prevalence of 9.9%, with ruminant species-specific rates of 14.1% in sheep, 9.4% in cattle, and 6.3% in goats. Breed and age significantly influenced infection rates: Sokoto Gudali cattle (23.1%), Yankasa sheep (15.8%), and West African Dwarf goats (17.9%) showed the highest susceptibility within their respective groups. Across all species, adult ruminants were more frequently (15.8) infected than younger ones (8.3). The study concludes that adequate inspection at the ante-mortem level and strategic grazing management in swampy areas are vital to control the disease.

Keywords: Fasciolosis, Ruminants, Prevalence, Abattoir,

Introduction

The livestock sector in sub-Saharan Africa continues to be a fundamental component of rural economies and food security, particularly in the northern savannah regions of Nigeria, where ruminant production serves as a crucial source of protein and income. However, this sector is persistently challenged by *fasciolosis*, commonly referred to as "liver rot," a snail-borne trematode infection predominantly affecting cattle, sheep, and goats. This disease, caused by *Fasciola gigantica* and *Fasciola hepatica* (Rana et al., 2014; WHO, 2017), is transmitted through the consumption of metacercaria-infested forage or contaminated water sources (Arjona et al., 2014). While *F. hepatica* is the primary concern in temperate regions, the distribution of both species overlaps in numerous areas of Africa and Asia (Mas-Coma et al., 2005), where lymnaea snails along riverbanks act as intermediate hosts (Magaji et al., 2014). The clinical presentation of fasciolosis—ranging from acute and subacute to chronic—depends on the quantity and duration of metacercariae ingestion (Suhardono and Copeman, 2006). Acute fascioliasis often results in sudden death without evident clinical signs (Kelly, et al., 2009), whereas sub-acute forms involve liver migratory tracts and early fibrosis. Chronic fascioliasis, regarded as one of the most severe helminths' infections in ruminants, leads to weight loss, submandibular edema, anemia, and decreased milk production (Bhatia et al., 2014; Chen and Matt, 2017).

In Nigeria, fascioliasis is enzootic and economically significant, particularly in northern regions where fadama (low-lying floodplains) and stagnant water serves as essential grazing and watering points during the dry season (Biu et al., 2006). In Kontagora Local Government Area of Niger State, recent anthropogenic changes, such as expansion of small-scale irrigation and dam construction, have created favorable conditions for snail vectors, thereby facilitating the parasite's life cycle (Idris and Bologo, 2020). Against this backdrop, this study was designed to elucidate the prevalence of fasciolosis among ruminants slaughtered in the Kontagora municipal abattoir.

Material and Methods

Study Area

A detailed investigation into the prevalence and distribution of fasciolosis among ruminants slaughtered at Kontagora municipal abattoir reveals a significant disease burden that varies by species, breed, and age, the abattoir which is located near the old market of the town, 10 km southwest of the Tungan Ga-Allah village. The town is situated at a latitude of 10° 24' 25.7256" N and longitude 5° 28' 11.7012" E. The mean annual rainfall of the town is 1258 mm, an average relative humidity of 34%, and a temperature range between 27°C and 39°C (NBS, 2021). The estimated population of Kontagora was 151,236 inhabitants, with the majority (85%) of the populace in the area being farmers while the remaining15% were involved in other vocations such as white-collar jobs, business, craft, and arts (NBS, 2021).

Sample Collection and Procedure

The collection of fecal and bile samples as well as the examination of liver from three hundred and eighty four (384) slaughtered animals spreading across the three species (cattle, sheep and goat) within the location were conducted on a fortnightly basis over a total of thirteen (13) visits at the early morning period (7am-9am).

Fecal Samples Preparation and Analysis

Feces were quickly extracted from the rectum using sterilize gloves after each ruminant was euthanized, and they were then placed in a vacuum stool test tubes with clear labels. Samples were stored in a 10% formalin solution for subsequent examination brought to the lab for analysis (Cheesbrough, 2005).

The test tubes with clear labels that contained 10 ml of normal saline solution and 2 ml of 10% formalin was filled with two grams (2 g) of collected feces using an applicator stick. The suspension was corked and manually shaken until a thick, homogenous emulsion was created and then transferred into a clean, well-labeled centrifugal test tube using a tea strainer with 2 mm (micrometers) apertures and centrifuged at 1000 revolution per minute (rpm) for 5 min. The supernatant fluid was carefully decanted, leaving the sediment at the bottom of the test tube, and the sediment was rinsed with normal saline solution. This rinsing was repeated 3times until the clean and clear sediment was free from plugs and debris and settled at the bottom of the test tube. Following rinsing, 2 ml of ethyl alcohol was added and centrifuged at 1000 rpm for 5 min. The suspension was carefully drained, leaving the sediment at the bottom of the test tube (Cheesbrough, 2005).

Samples examination and parasite identification

A few drops (1-2) of the sediments, Lugol’s iodine, and normal saline solution were collected using Pasteur pipettes, placed on a grease-free glass slide, covered with a cover slip, and examined under a low-power microscope at a magnification of ×40 before being switched to a high-power microscope at a magnification of ×100. If a Fasciola egg was observed with the necessary morphology of an ellipsoidal and operculated structure, the sample was deemed positive (FAO, 2003). The morphological traits of the Fasciola parasite eggs were identified using the Veterinary Parasite Identification Chart (FAO, 2003)

Data Analysis

The obtained data (384) were subjected to descriptive statistical analysis using IBM SPSS Version 28.0, the Statistical Package for Social Science. Epidemiological rates for ruminant species under study were determined using chi-square analysis.

RESULTS

Overall Prevalence across Species

The overall prevalence of fasciolosis was found to be 9.9% (38/384). When categorized by species, sheep recorded the highest infection rate at 14.1% (18/128), followed by cattle at 9.4% (12/128), while goats showed the lowest prevalence at 6.3% (8/128). Statistical analysis revealed a significant difference in infection rates between the three species ($p < 0.05$).

Table 1: Overall Prevalence of Fasciolosis by Species

Species	Number examined	Positive	Prevalence (%)	χ2	df	p-value
Cattle	128	12	9.4%			
Sheep	128	18	14.1%	**5.14**	**2**	**0.046***
Goat	128	8	6.3%			
Total	384	38	9.9%			

Influence of Breed and Age

As presented in Table 2, breed of cattle significantly influenced the prevalence of infection. The Sokoto Gudali breed exhibited a notably higher prevalence of 23.1% compared to White Fulani (8.3%), while no infections were recorded in Red Bororo samples. Regarding age, adult cattle (above 2 years) showed a higher prevalence (15.8%) than young (8.3%).

Table 2. Prevalence of Fasciolosis in Cattle

Variable	Category	Number Examined	Positive	Prevalence (%)	χ2	p-value
Breed	White Fulani	109	9	8.3%	**4.21**	**0.039***
	Sokoto Gudali	13	3	23.1%		
Age	Young	109	9	8.3%	**3.89**	**0.048***
	Adult	19	3	15.8%		

Prevalence of Fasciolosis in Sheep

The data for sheep (Table 3) indicates that Yankasa breed was more susceptible to infection, with a prevalence of 15.8%, compared to Uda breed (9.1%). In terms of age distribution, adult sheep recorded a prevalence of 16.7%, whereas young ones showed a slightly lower rate of 13.6%.

Table 3: Prevalence in Sheep by Breed and Age

Variable	Category	Examined	Positive	Negative	Prevalence (%)
Breed	Yankasa	95	15	80	15.8%
	Uda	33	3	30	9.1%
Age	Young (1–2 yrs)	110	15	95	13.6%
	Adult (>2 yrs)	18	3	15	16.7%

Prevalence of Fasciolosis in Goat

Among the goat examined, West African Dwarf (WAD) breed showed a significantly higher infection rate (17.9%) than Sokoto Red (3.2%). No cases were detected in Sahel goat breed. Similar to other species, adult goats (18.2%) were more frequently infected than young ones (5.1%), as detailed in Table 4.

Table 4: Prevalence in Goats by Breed and Age

Variable	Category	Examined	Positive	Negative	Prevalence (%)
Breed	Sokoto Red	93	3	90	3.2%
	West African Dwarf	28	5	23	17.9%
	Sahel Goat	7	0	7	0.0%
Age	Young (1–2 yrs)	117	6	111	5.1%
	Adult (>2 yrs)	11	2	9	18.2%

Discussion

The overall prevalence of 9.9% in this study is consistent with findings in other parts of Northern Nigeria, where seasonal grazing in "fadama" (floodplains) is common. The presence of *Fasciola* eggs in these ruminants is directly linked to the availability of the intermediate snail host, *Lymnaea natalensis*, which thrives in the slow-moving waters and irrigation canals surrounding Kontagora.

The significantly higher prevalence in sheep (14.1%) compared to cattle and goats is attributed to their close-cropping grazing habit. Sheep graze much closer to the base of the herbage, where the infectious metacercariae (the fluke's larval stage) are most densely encysted on the vegetation. In contrast, goats are primarily browsers and tend to feed on shrubs and higher foliage, which minimizes their contact with the water-dependent parasite.

The high prevalence in Sokoto Gudali cattle (23.1%) and West African Dwarf goats (17.9%) suggests a possible genetic predisposition or, more likely, a difference in management systems. These breeds are often kept in sedentary or semi-intensive systems in swampy areas, whereas breeds like the Red Bororo or Sahel goats are often moved across larger, drier terrains by nomadic pastoralists, thereby escaping the snail-infested zones.

Across all species, adult animals consistently showed higher infection rates than young ones. This is explained by the cumulative nature of fasciolosis. Because flukes can live for several years in the bile ducts and the animals are repeatedly exposed to the same "fadama" grazing lands every dry season, the "parasitic load" increases as the animal grows older (Biu *et al*., 2006).

The prevalence of 9.9% confirms that fasciolosis is a significant veterinary issue in Kontagora. The higher infection rate in sheep may be due to their closer grazing style to the ground where metacercariae are encysted. The increased prevalence in older animals suggests a cumulative exposure risk over multiple grazing seasons in the "fadama" regions (Biu *et al*., 2006).

Conclusion

The findings of this study confirm that ruminant fasciolosis remains an endemic threat to livestock productivity in Kontagora area. The study successfully identified that sheep are most vulnerable species, likely due to their close-grazing habits. Furthermore, the significant association between infection and adult animals suggests a chronic accumulation of parasites over time, highlighting the failure of current deworming practices to break the transmission cycle.

Recommendations

Based on the epidemiological data gathered, the following actions are recommended:

1. **Strategic Anthelmintic Campaigns:** The Niger State Ministry of Agriculture should implement a "Strategic Deworming Schedule" specifically at the onset and peak of the dry season (October and February) when animals are most concentrated in the fadama areas.
2. **Abattoir Surveillance & Compensation:** Strengthen meat inspection at the Kontagora Municipal Abattoir. A system should be explored where data on liver condemnations is shared back with local livestock officers to trace "hotspots" of infection in specific grazing zones.
3. **Snail Population Management:** Pilot small-scale biological or environmental control of snails in irrigation canals, such as clearing excess vegetation where snails breed.
4. **Grazing Rotation:** Farmers should be educated to avoid grazing their animals—especially sheep and high-risk breeds like the Sokoto Gudali—in swampy areas during the early morning hours when metacercariae are most abundant on the grass.
5. **Water Safety:** Where possible, provide livestock with water from boreholes or protected wells rather than allowing direct access to snail-infested stagnant ponds.
6. **Quarantine for New Stock:** Newly purchased animals (especially from neighboring markets) should be dewormed before being introduced to the local herd to prevent the introduction of new fluke strains.
7. **Snail Survey:** A follow-up malacological survey is recommended in the Kontagora floodplains to identify the specific snail density and their seasonal infection rates with *Fasciola* cercariae.
8. **Economic Impact Study:** Further research is needed to quantify the exact financial loss incurred by farmers in Niger State due to liver condemnations and subclinical weight loss.

Acknowledgments

I wish to convey my profound appreciation to the management and staff of the Federal University of Education Kontagora, Niger State, for their provision of an academic environment and institutional support essential for the execution of this research.

I extend special gratitude to the veterinary officers and personnel at the Kontagora Municipal Abattoir for their cooperation during the thirteen fortnightly visits and for granting access to the livestock samples (fecal, bile, and liver) that constituted the foundation of this epidemiological assessment.

I am also deeply indebted to the laboratory technicians who assisted with the formal ether technique and the microscopic identification of Fasciola eggs. Lastly, I express my gratitude to my colleagues and family for their unwavering encouragement throughout the duration of this study.

References

Abebe, R., & Jobre, Y. (1996). Review of *Fasciolosis* in Ethiopia. *Journal of Veterinary Science*, 2(1), 12-18.

Arjona, J. S., Rangel-Ruiz, L. J., Hernandez-Vera, J., & De la Cruz-Leyva, M. C. (2014). *Fasciolosis*: An update on its epidemiology and control. *Veterinary Parasitology*, 204(1-2), 2–13.

Bhatia, B. B., Pathak, K. M. L., & Juyal, P. D. (2014). *Textbook of veterinary parasitology* (4th ed.). Kalyani Publishers.22

Biu, A. A., Ahmed, M. I., & Mshelia, S. S. (2006). Epidemiology of *Fasciola gigantica* in ruminants slaughtered in the Maiduguri Municipal Abattoir, Nigeria. *Journal of Applied Sciences*, *6*(5), 1114–1116. https://doi.org/10.3923/jas.2006.1114.1116

Centers for Disease Control and Prevention. (2024, May 10). *Fascioliasis (Fasciola Infection)*. https://www.cdc.gov/parasites/fasciola/index.html

Cheesbrough, M. (2005). *District laboratory practice in tropical countries* (2nd ed., Vol. 1). Cambridges University Press. https://doi.org/10.1017/CBO9780511581304

Chen, J., & Matt, D. (2017). Clinical impacts of chronic helminth infections on ruminant productivity. *Veterinary Parasitology Reports*, *12*(3), 45–52.

Food and Agriculture Organization of the United Nations (FAO). (2003). *Veterinary parasite identification chart*. FAO Animal Health Manuals.

Elelu, N., & Eisler, M. C. (2018). A review of *Fasciola gigantica* in Nigeria. *Veterinary Parasitology: Regional Studies and Reports*, 11, 37-50.

Isah, U., & Muhammad, T. S. (2019). Prevalence and economic importance of liver flukes in slaughtered ruminants: A case study of Northern Nigeria. *Journal of Helminthology*, 93(4), 412–418.

Kelly, D. W., Mas-Coma, S., & Bargues, M. D. (2009). The role of introduced species in the epidemiology of fasciolosis. *Journal of Helminthology*, 83(2), 125–130.

Keyyu, J. D., Monrad, J., Kyvsgaard, N. C., & Kassuku, A. A. (2005). Epidemiology of *Fasciola gigantica* and amphistomes in cattle on traditional, small-holder dairy and large-scale dairy farms in the southern highlands of Tanzania. *Tropical Animal Health and Production*, 37(4), 303-314.

Magaji, A.A., Ibrahim, K., Salihu, M.D., Saulawa, M.A., Mohammed, A.A., Musawa, A.I., (2014). Prevalence of fascioliasis in cattle slaughtered in Sokoto metropolitan abattoir, Sokoto, Nigeria. *Journal of Advance Epidemiology*, 3(4): 85-88.

National Bureau of Statistics (NBS). (2021). *Annual Abstract of Statistics for Niger State*. Abuja, Nigeria.

Onoja, S. O., & Mshelbwala, P. P. (2017). Post-mortem inspection of liver and bile in small ruminants: Implications for public health and economics. *International Journal of Veterinary Science*, 6(3), 145-149.

Rana, M. A. A., Roohi, and Khan, M. A. (2014). fascioliasis in cattle: A review. *Journal of Animal and Plant Sciences*, 24(3): pp. 668-675

Soulsby, E. J. L. (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals* (7th ed.). Lea & Febiger, Philadelphia.

Suhardono, and Copeman, D. B. (2006). The effect of temperature and humidity on longevity of metacercariae of *Fasciola gigantica*. *Tropical Animal Health and Production*, 38(5), 371–377. https://doi.org/10.1007/s11250-006-4310-9

Tembely, S., Lahlou-Kassi, A., & Rege, J. E. O. (1995). Small ruminant parasite management in sub-Saharan Africa. *International Livestock Research Institute (ILRI) Publications*.

World Health Organization (WHO). (2017). *Fascioliasis: Fact sheet on neglected tropical diseases*. WHO Press

Yatswako, S., & Alhaji, N. B. (2017). Survey of bovine fasciolosis burdens in trade cattle slaughtered at abattoirs in North-central Nigeria: The associated predisposing factors and economic implication. *Parasite Epidemiology and Control, 2,* 30–39. https://doi.org/10.1016/j.parepi.2017.02.001