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The Impact of Fasciolosis on Food Security in Nigeria: A Review

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Abstract

A review was conducted to highlight the direct and indirect impact of bovine fasciolosis on food security in Nigeria. The direct impact on livestock productivity include; host mortality and partial or total condemnation of organs. Indirect losses in sheep include; reduced production and quality of wool reduced lambing percentages, poor growth rate of lambs and increased costs for replacement stock. In cattle, losses include; reduced production and quality of milk in dairy cattle, lower growth rates and lower feed conversion rates in fattening cattle and expenditures for anthelmintics. The economic contribution of animal production in ensuring food security in Nigeria cannot be overemphasized. Livestock production constitutes an important component of Nigeria agricultural development; animal protein, raw materials for agro allied based industries. It was therefore concluded that the potential for increasing livestock production can only be fully realized if the animals are adequately protected against adverse effects of diseases. Profitability of animal product demand efficient husbandry of animals, as diseases remain a profit limitation factor in many tropical countries. For sufficient livestock production to be fully realized to meet the ever growing population Nigeria, integrated approach to fasciolosis control is required to increase the present level of livestock production.

Keywords: *Anthelmintics, Bovine, Fasciolosis, husbandry, Livestock, Nigeria, Food security*

1. Introduction

Fasciolosis is an important parasitic disease of farm animals, which imposes direct and indirect economic impact on livestock particularly cattle and sheep [1], [2], [3], [4], [5]. These ruminants serve as the definitive host to this parasitic helminth trematode of the family, Fasciolidae, commonly known as liver flukes [6].

There are various species of these but the economically important ones are *Fasciola hepatica* in the temperate region and *Fasciola gigantica* in the tropics [7], [8]. Thus, these two fasciolid species often overlap in many African and Asian countries and sometimes in the same country, although in such cases the ecological requirements of the flukes and their snail intermediate host are distinct [9], [10].

The life cycle of these trematodes involves snail as an intermediate host [11], [12]. *Fasciola gigantica* (*Distomum giganticum*), the tropical liver fluke is a parasite of the liver and bile ducts of ruminants in Africa and Asia [13]. It is of great veterinary importance causing the disease in cattle, accounting for considerable economic losses [14]. The global production losses in animal productivity, liver condemnation and reduced carcass value due to fascilosis were estimated exceed US$3 billion/year to rural agricultural communities and commercial producers [15], [16],[17], with over 300 million cattle and 250 million sheep infected worldwide [18], [19],[4]. In developed countries, the incidence of *F. hepatica* can reach up to 77% [15]. For example losses due to fasciolosis in the united kingdom and Ireland alone are greater than £70.67 million a year [3]; a Swiss study estimated the economic loss due to bovine fasciolosis, largely attributable to sub-clinical infection, as £37.2 million in cattle alone [20].

In tropical countries, fasciolosis is considered as the single most important helminth infection of cattle, with reported prevalence of 30- 90% [21], [19]. [22] reported up to 0.26 million USD annual losses attributable to fasciolosis- associated liver condemnations in cattle slaughtered in Kenya. A study conducted by [1] reported up to 100% liver condemnation rates in some slaughter slabs in Iringa region in Tanzania due to liver flukes in cattle. The direct economic loss due to liver condemnation in Hawasa abattoir Southern Ethiopia is 106,400 Ethiopian Birr (8,312.5 USD) per annum [23], [24].

Apart from its global veterinary and economic importance, fasciolosis has recently been shown to be a re-emerging and widespread zoonosis affecting many

human populations with between 2.4 and 17 million people currently infected, and a further 91.1 million living at risk of infection [25], [19]. There is insufficient literature on the economic impact of the disease in Nigeria. This paper therefore reviews the economic impact of fasciolosis in Nigeria. The direct and indirect impact of Fascilosis on food security in Nigeria is also highlighted. Recent data evidences on economic losses due to fasciolosis in cattle indicate a reduction in production efficiency by 5% and over 10% in mild and severe infection respectively [26]. The first incidence of fasciolosis in Nigeria was reported by Burke (1939) [27] after reported cases of over 3000 mortalities in goats of the disease in the then Borno province, North-Eastern Nigeria [14], [28]. In the South Western States of Nigeria, a gross total liver loss of 8.292 kg was observed with about 75% loss of value in 29.952 kg of partially condemned livers in a single abattoir over a three-year period [14]. Estimating that each of the 36 states and the Federal Capital Territory will record similar losses in at least one abattoir per state, this will translate to huge loss of resources (£3,830,550.66) for the country. Most Fulani herdsmen graze their herds along the river banks from the north across the southern part of the states in Nigeria (Figure 1.1) during the prolonged dry season when the upland pasture is poor in quantity and quality [29].

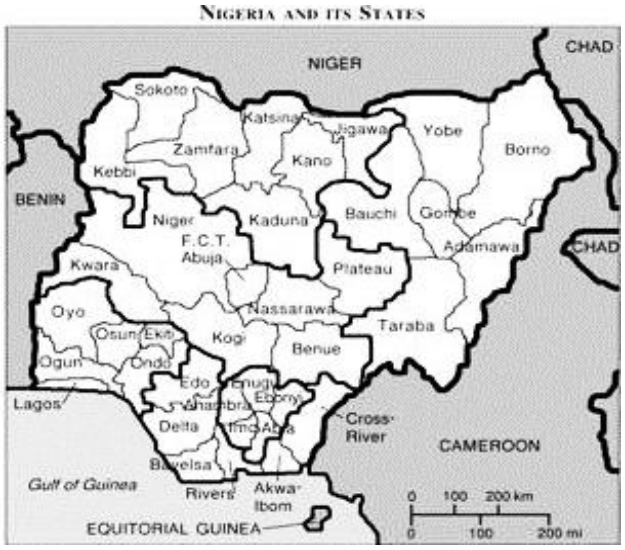

Figure 1.1: Map of Nigeria showing the 36 states and Federal Capital Territory Abuja
Adopted from [30]. http://file.scirp.org/Html/4-9401351_6993.htm

These animals are therefore exposed to high risks of Fasciola infection on the available posture during their movement [29].

1) Direct impact: Direct losses due to fasciolosis are host mortality and liver condemnations [31], [32].
2) Indirect impact: Indirect losses in sheep include; reduced production and quality of wool reduced lambing percentages, poor growth rate of lambs and increased costs for replacement stock [33], [34]. In cattle, losses include; reduced production and quality of milk in dairy cattle, lower growth rates and lower feed conversion rates in fattening cattle and expenditures for anthelmintic treatment [15], [35].

2. Control and prevention

A number of control measures against ruminant fasciolosis are available and can either be used independently or as a combination of two or more of them [36]. These methods involve reduction in the number of intermediate snail hosts by chemical or biological means, strategic application of anthelmintics, reduction in the number of snails by drainage, fencing and other management practices and reduction in the risk of infection by planned grazing management [33],[37].

2.1 Snail control: A great number of chemicals have been used as molluscicides in the past, but at present Niclosamide (Bayluscide or mollotor) and copper sulfate are used in different part of African Countries [33],[38].

2.2 Chemotherapy: Effective control of most trematode infections is based on strategically applied chemotherapy [39], [40]. These include Rafoxanide, Nitroxynil, Brotanide, Closantel and Albendazole. Diamphentide kills all immature flukes even a day old once and the Triclbendazole (TCBZ) is highly effective against all infective stages of the fluke. It is one of the drugs used worldwide for the control of fasciolosis [41], [42].

2.3 Environmental sanitation and manipulation: Draining swamps, building sewage systems and providing clean water supplies are used to control water-borne /including snail borne/ helminthes but it is very expensive compared to chemotherapy [43], [33].

Conclusions

It can therefore be concluded that the potential for increasing livestock production can only be fully realized if the animals are adequately protected against the adverse effects of periodic diseases such as fasciolosis and stress. Profitability of animal product therefore demand efficient husbandry of animals, as diseases remain profit limitation factor in many tropical countries. For optimal livestock production to be realized so as to meet the growing population of Nigeria therefore, integrated approach to fasciolosis control is required.

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