

PARASITIC LOAD OF CATTLE FAECAL MATTER FROM SELECTED FARMS IN Kpong AND ITS HEALTH IMPLICATIONS

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Abstract

Cattle, one of the domesticated animals which are a potential source of parasitic contamination of land and water resources was studied to established the parasitic load as a measure of quantifying biological quality of land and water sources to determine the level of parasite load of the environment. A total of 180 faecal samples were collected from three farms in Kpong in the Lower Manya Krobo Municipality for the study. The samples were collected between 9 - 10 am when the animals released from kraal to be grazed and the faecal matter were collected as soon as it was dropped on the ground. The samples were collected with wide mouth plastic containers (about 500 ml) with lid. Samples were transported to the Water Research Institute Parasitology Laboratory for analysis. 10 g sample each was placed in a test tube and 10 ml of PBS was added to it. It was then processed and a drop was placed on a microscope slide and Lugol's iodine was added and observed under X 40 objective lens of the microscope. A total of 111 (61.67 %) out of the 180 faecal samples were found to contain the following parasites whilst 95 (85.59 %) had *Ascaris* sp., eight (7.20 %) had *Strongyloides* sp., one (0.90 %) had *Trichuris erichiun* and one (0.90 %) sample had *Paragonimus* sp. Five (4.50 %) samples had mix infections of *Ascaris* sp and *Strongyloides* sp. and 1 (0.90 %) sample had a mixture of *Ascaris* sp and *T. berichium*. Infestation with *Ascaris* sp was found to be significantly higher ($p > 0.001$) than all the other parasites indicating that the animals are not often given worm expellants as expected and this can lead to zoonotic transmission of the parasite, as the cattle are reared on the same compound with the humans. This can affect the health of children as they played in the dung contaminated soils in their compound, thereby leading to absenteeism from school due to loss of blood from worm infestation leading to anaemia. The worm infestation can also lead to malnutrition and stunted growth in the children.

Introduction

Cattle, one of the most prominent domesticated livestock in developing countries, represent a valuable asset in both traditional and modern agriculture. In addition, they also provide meat, milk, skin and draught power for farming (Tewe, 1997). In some traditional settings, they also play an essential role in the socioeconomic system, representing family wealth or they can

be regarded as a survival kit by nomadic people (Fabiya, 1973). In Ghana, the livestock sector contributes 1.2 - 1.6 % of the gross domestic product (GDP) while cattle production solely contributes 50 % of the total meat requirement (Ghana Statistical Service, 2015). Although meat is one of the most important livestock products, there could be losses due to various diseases, including helminth infections. Since

most of these animals are often reared at the residences of humans, there is a possibility of zoonotic transmission of the parasites to humans, especially children (Elkins, et al., 1986). The infections can lead to iron deficiency anaemia and malnutrition in children, especially in the tropical and subtropical regions of Africa, Asia and Latin America. In heavy infections, several worms may ball up and cause intestinal obstruction (Blumenthal & Schultz, 1975; de Silva, Guyatt & Bundy, 1997; Villamizar et al., 1996). This may be accompanied by such complications as intussusceptions, volvulus, haemorrhagic infarctions and perforation of the intestine. Invasion of the biliary duct, hepatic abscesses, acute pancreatitis, acute appendicitis, peritonitis and obstruction of the upper respiratory tract have also been reported (Andrade-Junio et al., 1992; Asrat & Rogers, 1985; Pawlowski & Arfaa, 1985; de Silva, Guyatt & Bundy, 1997; Guyatt & Bundy, 1997; Villamizar et al., 1996; Xianmin et al., 1999). Allergic reactions, such as asthma, eosinophilia and urticaria have been reported in laboratory workers who have had previous exposure to materials from *Ascaris* worms (Arfaa, 1984; Tripathy et al., 1971). About 600 million - 740 million people suffer from hookworm infection globally, while threadworm infection has been found in as many as 50 million - 100 million people worldwide (Siddiqui and Berk, 2001; Hotez, 2011).

This study looked at subsistence cattle farming, presence of parasites in the cattle and the possible effect on the health of the farmers and their families.

Experimental

Three cattle farms, located upstream the water treatment plant at Kpong, were selected for the study. This was to study the cycle of transmission of other parasites on the potable water treatment and distribution. Again, the treated

water is supplied to Accra, the capital city, so any contamination can have public health implications. Fresh samples of cattle faecal matter were collected in the morning, as soon as they were released from kraals for grazing, using disposable wooden spatulas and were kept in wide-mouth plastic containers with lids and transported within the day to the CSIR Water Research Institute Parasitology Laboratory for analysis.



Fig. 1. Lower Manya Krobo Municipality: Kpong
Source: Thematic Mapping Division-CSIR-INSTI

In all, 180 cattle faecal samples of from cattle aged one month to five years (which was the age range of the cattle on the farms) were collected over a period of six months. In each test tube was placed 10 g each of faecal sample and 15 ml PBS (Phosphate-buffered saline solution) was added and homogenized on a vortex mixer. The mixture was observed under the compound microscope for the presence or otherwise of the parasites.

Statistical analysis

Data were subjected to descriptive statistical analysis and the percentages of the various parasites present were determined. Prevalence of helminthes in relation to various parasites was analyzed using Chi-square statistical test.

Results

TABLE 1

Prevalence of intestinal helminthes obtained from cow dung from farms at Kpong, Ghana

<i>Species of Helminth</i>	<i>No. of samples examined</i>	<i>No. positive</i>	<i>Prevalence (%)</i>
<i>Ascaris lumbricoides</i>	180	95	85.59
<i>Strongyloides sp.</i>	180	8	7.20
<i>Paragonimus sp.</i>	180	1	0.90
<i>Trichiuris sp.</i>	180	1	0.90
<i>Ascaris sp. & Strongyloides sp.</i>	180	5	4.50
<i>Ascaris sp. and Trichiuris sp.</i>	180	1	0.90

Discussion

There are a number of factors which facilitate the spread of infections in the Third World countries, as well as increase the risk of importing parasitic infections into developed countries (Felissa, 2003; Atehmengo & Nnagbo, 2014). These factors commonly include climate change, mass migration, poor sanitation, poverty, inadequate medical care, immunodeficiency and the presence of hosts in some ecosystems (reservoirs of parasites).

The animals were kept under semi-intensive system, here they were given shelter (in the form of a kraal under a tree) and are allowed to graze during the day. This shelter was part of the farmer's compound, thus the animals and the humans shared certain things in common which could allow the spread of parasites. When the cattle were released in the morning for grazing they dropped their faecal matter on the compound and this is not cleaned but allowed to dry out thus any parasite in it can be spread through direct contact, contamination of food and water. The results showed 95 out of the 180 cattle faecal matter studied had *Ascaris lumbricoides* present in them and these may find its way to humans especially children who play on the compound. The parasites were mostly found in adult animals (70 %) than the young ones showing a trend that the adults (cattle)

spread the worms. Protozoa parasites were found in large numbers in the calves (85 % of the positive cases observed) and their (Protozoa parasites) numbers went down as they grow into adults and have their immune systems well formed. Also, because the young feed on milk there is minimal worm infestation than adults (Höglund, et al 2001). The improved immune systems favoured suppression of infestation of Protozoa parasites and not the metazoans (Olson *et al* 2000, Olson *et al*, 2004). Therefore, *Ascaris*, *Strongyloides* and other large parasites are more in the adult animals.

If these large worms find their way into children, they will compete with them (children) for the food undergoing digestion, thus causing malnutrition in the children. Again at the point of attachment in the intestines they cause lacerations which could lead to blood loss, thereby causing anaemia. All these together affect the children's health (anaemia, malnutrition and stunted growth) leading absenteeism from school and therefore, affecting their academic performance.

Comparing the infections of *Ascaris* and *Strongyloides*, it is significant ($p < 0.005$). *Ascaris sp* and *Paragonimus sp* is also significant ($p < 0.005$). *Ascaris* and *Trichiuris trichiura* is also significant ($p < 0.005$) but the others are not significant.

Conclusion and Recommendation

The prominent worms found in the cattle faecal matter were *Ascaris* and *Strongyloides* followed by *Paragonimus* and *Trichuris* spp. These parasites have the tendency of affecting the humans on the farms (Andrade-junior et al 1992) especially children and this can lead to anaemia and malnutrition which can affect their growth and development (Blumenthal & Schultz, 1975). Cases of heavy worm infection can lead to mortality in children (de Silva, et al, 1997). It is recommended that Veterinary and Extension officers are to be encouraged to visit the farms periodically to deworm the animals and attend to other needs of the animals.

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