ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 12, pp.8668-8672, December, 2019

DOI: https://doi.org/10.24941/ijcr.37389.12.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

STUDY ON THE GASTROINTESTINAL AND HAEMOPARASITES OF PIGS IN ZURU TOWNSHIP, KEBBI STATE, NIGERIA

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ARTICLE INFO

Article History:
Received 24th September, 2019
Received in revised form
18th October, 2019
Accepted 15th November, 2019
Published online 30th December, 2019

Key Words:
Gastrointestinal,
Haemoparasites,
Strongyles Eimeria spp,
Faecal concentration, Zuru.

ABSTRACT

This study was undertaken to determine the prevalence of gastrointestinal and haemoparasites of pigs in Zuru, Kebbi State. A total of thirty-three (33) and sixty-eight (68) faecal samples from local breeds of pigs under semi-intensive system of management were collected and processed for GIT helminths and protozoa respectively. Fifty (50) blood samples were collected for haemoparasites. Faecal concentration methods of simple floatation and centrifugal sedimentation methods were used to analyze the faecal samples while Wet mount, Buffy coat and Thin smear techniques were used for the blood samples. In overall, eight (8) samples out of thirty-three (33) were positive for strongyle eggs given a prevalence of 24.25%. Fifteen (15) of the samples (45.45%) were from the male animals, with an observed prevalence of 26.67% while eighteen 18 (54.54%) were from the female animals, having a percentage prevalence of 22.22%. From the 31 samples collected and processed from adult pigs, 8(25.8%) were found positive while from the only 2 samples collected and examined from the young pigs (piglets), none was observed to be positive for any form of the parasites. An overall prevalence rate of 17.65% for only one gastrointestinal protozoan parasite (*Eimeria*) was encountered. However, the prevalence rate of *Eimeria* was significantly higher in female pigs (18.92%) compared to the male pigs (16.13%) and prevalence was significantly higher in adult pigs (22.22%) while the young piglets showed no infection. Samples from the blood revealed no haemoparasites in all the samples processed. Based on the present findings, it was concluded that gastrointestinal helminthes, especially strongyle and *Eimeria* spp. infections occur in pigs in Zuru, Kebbi State. Although, there was no recorded prevalence of haemoparasites in the pigs examined, there could be several other factors that were responsible for the negative results obtained in the present study. It was therefore recommended that further studies should be repeated to ascertain the true picture of the conditions in all the sampled pigs.

***Citation: Mahmuda, A. and Usman, M.* 2019.** "Study on the gastrointestinal and haemoparasites of pigs in zuru township, kebbi state, Nigeria", *International Journal of Current Research*, 11, (12), 8668-8672.

INTRODUCTION

Parasitism is crucial in livestock production but often overlooked due to the fact that clinical signs are not obvious. Stunted growth and prolonged fertility are often associated with parasitism. This is a major setback to efficient, effective and result oriented livestock production (Akerejola *et al*., 1997; Paul *et al*., 2009; Geresu *et al*., 2015). Besides, pig farming is an important task which provides opportunity as an income generating activity for small-scale farmers, especially in developing countries (Akerejola, 1997; Geresu *et al*., 2015; Paulo and Nonga, 2015). Pigs are one of the most common livestock reared in Nigeria with a lot of potentials for economic development (Pam *et al*., 2013; Sowemimo *et al*., 2014).

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However, intestinal parasitism is a debilitating condition in piggery. In spite of this, gastrointestinal parasites are often neglected because of its in apparent clinical signs. Losses of production ranges from stunted growth, prolonged fertility to reduced productivity (Mutual *et al*, 2007; Jufare *et al*., 2015). Infection of pigs with GIT parasites is widely reported from all corners of the world and shown to be influenced by the type of pig management practiced (Joaching and Dulma, 2002). Pig infected with GIT parasites had poor feed conversion rate and delays in achievement of market weight. Some of the GIT parasites of pigs result in condemnation of organs or entire carcasses causing economic losses in pork industry (Abdu and Gashaw, 2010; Zewdneh, 2013). In addition, pigs infected with GIT parasites may act as source of zoonoses through contaminating the environment with infective stages of intestinal parasites present in their excreta (Abdu and Gashaw, 2010).

The prevalence of pig born GIT parasites may further be complicated when some of the parasite of pigs infects man and vice versa (Abdu and Gashaw, 2010). Pigs serve as sources of income, protein and also provide farm yard manure. While together with cattle, sheep and goats in sub-Saharan Africa may be infected with a wide variety of parasites most importantly vector-borne prokaryotic and eukaryotic haemoparasites such as the Rickettsiae: *Anaplasma* and the protozoan parasites: *Theileria*, *Babesia* and *Trypanosoma* (Bell-Sakyi *et al*., 2004; Okaiyeto *et al*., 2008). The tropical environment is for various reasons suitable for the development of these parasitic diseases (Payne, 1990). Haemoparasites have generally been shown to cause destruction of red blood cells resulting in anaemia, jaundice, anorexia, weight loss and infertility (Akande *et al*., 2010). Farmers may not appreciate the effects of these haemoparasites on their animals, perhaps due to the subclinical nature of presentation and chronic nature on the affected animals (Jatau *et al*., 2011). This study was undertaken to determine the prevalence of gastrointestinal and haemoparasites of Pigs in Zuru township.

MATERIALS AND METHODS

Study area

The study was conducted in Zuru Local Government Area, Kebbi State. Zuru lies within the tropical rain forest between Latitude: 11.42° N, Longitude: 5.23° E. The area is characterized with wet season ranging from May to October and a dry season extending from November to April. Certain areas are still dotted with rural settlement, trees and fruit trees and rearing of pig is common. The area has warm humid climate conditions, with maximum ambient temperature ranging between 26 – 28°C

Sample collection

Gastrointestinal parasites: The pigs were restrained and faecal samples were collected manually through the rectum using sterile disposable hand gloves, two fingers were inserted gently into the rectum to collect the faeces after which the faecal samples were labeled accordingly. The samples were then put in a container filled with ice packs and immediately transported to the Department of Parasitology and Entomology Laboratory, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto for analysis.

Haemoparasites: Blood samples were collected from 50 pigs of both sexes and different ages. About 2 mL of venous blood was obtained intravenously from each individual pig using sterile heparinized tubes. The reliable and safe method of venipuncture was used to collect the pig's blood. This involved cleaning the lateral side of the neck (jugular furrow) with 70% alcohol and inserting a 21G sterile needle and syringe for collection a few millilitres of blood, following manual restrain.

Finger (thumb) pressure was used to ensure haemostasis and the procedure was stopped with peroxide wiping over the injection site to remove and clean any remaining blood residue. The tubes containing the blood samples were transported to the Laboratory of the Department of Parasitology and Entomology, Usmanu Danfodiyo University, Sokoto, in a box containing ice packs. The samples were analyzed within nine (9) to ten (10) hours after collection.

Sample processing

Gastrointestinal parasites: Simple floatation (Urquhart *et al*., 1987) using saturated salt solution and sedimentation (Taylor *et al*., 2007) techniques were used on each sample for identification of any form of the parasites.

Haemoparasites: Three (3) different methods of Wet mount (WHO, 1991), Buffy Coat (Roberts and Janovy, 2005) and thin blood smears (Urquhart *et al*., 1987) were performed for all the samples collected.

RESULTS

A total of sixty-eight (68) fecal samples were examined with an overall prevalence of 12 (17.65%) for gastrointestinal protozoa. Thirty-one 31 (45.59%) samples were from the male pigs while thirty-seven37 (54.41%) of the samples were from the female pigs (Table 1). Also, five 5 (16.13%) of the samples that were positive belonged to the male pigs while 7 (18.92%) of the positive samples were from the female pigs (Table 1). A total fifty-four 54 (79.41%) samples were from the adult pigs while fourteen 14 (20.59%) samples were from the young pigs (Table 2). Overall, 12 (17.65%) samples out of the total 68 samples were positive for only one type of gastrointestinal protozoan parasite (*Eimeria*). All twelve (12) of the positive samples were from the adult pigs with none from the young pigs observed to be infected (Table 2). From the total of thirty-three (33) faecal samples examined for gastrointestinal helminths, eight (8) samples were found to be positive for *strongyle* eggs with an overall prevalence of 24.24% (Table 3). A prevalence of 4(26.67%) was observed from the fifteen (15) male pigs examined while a prevalence of 4(22.22%) was observed from the eighteen (18) faecal samples examined from the female pigs (Table 3). Out of the 31 samples collected and examined from adult pigs, 8(25.8%) were observed to be positive for strongyle eggs while from the only two (2) faecal samples processed from the young pigs, none was found to be positive for any form of the parasites (Table 4). Out of the total fifty (50) blood samples collected from local pigs from backyard farms in Zuru township, none of the pigs were observed to be infected with haemoparasites. A soft tick, which was identified as *Ornithodoros* spp was encountered on some the pigs.

DISCUSSION

The present study revealed prevalence of 17.65% *Eimeria* infection in pigs from Zuru which agreed with the findings of Kaur *et al*. (2002) from Punjab. Similarly, lower prevalence's of *Eimeria* infections in pigs from different parts of the world were previously reported by Jufare *et al*. (2015), from Ethiopia (12%), Geresu *et al*. (2015) from Ethiopia (11.8%), Abdu and Gashaw, (2010) from Ethiopia (5.6%) and Weka and Ikeh, (2009) from Nigeria (15.6%). A relatively higher prevalence's were reported elsewhere as documented by Tiwari *et al*. (2009) from West Indies (88%), and Weng *et al*. (2005) from China (47.2%). The variation in the prevalence from the present study may be attributed to different geographical locations, host factors, climatic conditions as well as management practices

Table 1. Prevalence of gastrointestinal protozoa in relation to sex of Pigs from Zuru, Kebbi State.

Sex	Number examined	Number positive	% Prevalence *Eimeria* infection
Male	31(45.59)	5	16.13
Female	37(54.41)	7	18.92
Total	68 (100)	12	17.65

Table 2. Prevalence of gastrointestinal protozoa in relation to age of Pigs from Zuru, Kebbi State

Age	Number examined	Number positive	(%) Prevalence of *Eimeria* infection
Adult	54(79.41)	12	22.22
Young	14(20.59)	O	O
Total	68(100)	12	17.65

Table 3. Prevalence of Gastrointestinal Helminthes infection in relation to sex in Pigs from Zuru, Kebbi State

Sex	No. Examined (n=33)	No. Positive	(%) Prevalence
Male	15(45.45)	4	26.67
Female	18(54.55)	4	22.22
Total	33(100)	8	24.24

Table 4. Prevalence of Gastrointestinal Helminthes infection in relation to age from pigs in Zuru, Kebbi State

Age	No. Examined (n)	No. Positive	(%) Prevalence
Young	2(6.06)	0	0.0
Adult	31(93.94)	8	25.8
Total	33(100)	8	24.24

adopted in different regions which are known to contributein the epidemiology of infections. In the present study it was observed that the prevalence of *Eimeria* infections in adult pigs was the only noticeable finding. The prevalence in adult pigs may be due is to prolonged exposure of adults to infective stages of protozoa. Contrary reports on the high prevalence of *Eimeria* infection younger pigs were previously reported by Tsunda *et al*. (2013). This may be due to immature immunity in younger animals and continuous dissemination of infection in the environment by adult carrier animals which make young animals more susceptible towards the infection (Abdu and Gashaw, 2010). The present study revealed that *Eimeria* infections of pigs in Zuru is also common as several researchers have also documented (Corliss, 1998; Almeida *et al*., 2003; Zewdneh *et al*., 2013; Tsunda *et al*., 2013; Laha *et al*., 2014). This might be due to favorable environmental conditions for propagation of the parasites and possibly lack of administration of coccidiostat or anticoccidial drugs by the farmers.

Other factors which might be responsible are constant exposure to infections, continuous deposit of infective stages by the adult carrier animals as well as poor animal husbandry practices as also documented (Jufare *et al*., 2015). In this study, the prevalence of gastrointestinal helminthes infection in swine was found to be 22.22% in Zuru, Kebbi State. African swine fever and worm infections are considered the most important disease constraints by smallholder pig farmers as previously documented (Muhanguzi *et al*., 2012; Dione *et al*., 2014), this may also be true as far as pig farms in Zuru are concerned. In this study, the prevalence of the infection might be due the production systems and environmental conditions which are most favorable to influence the development of these parasites in the area were these pigs are kept. Several surveys have indicated that outdoor production of pigs resulted in heavier and more prevalent parasitic infections compared to conventional intensive production under indoor conditions (Metiner and Board, 2009). The findings of negative prevalence of haemoparasites from pigs in the study area agrees to another report previously documented in Nigeria (Ameen *et al*., 2008). The absence of any haemoparasites, although surprising but could be due to the regular use of chemoprophylaxis and/or acaricidal use by small scale farmers. However, the regular use of drugs and acaricides to control ectoparasitism might lead to development of drug resistance as well as presence of drug residue in meat if withdrawal period is not observed before slaughtering. There were ticks observed on the pigs which were identified in the Parasitology and Entomology Laboratory, to as a genus of the soft tick; *Ornithodoros moubata*. Although the tick is known to be a vector for disease transmission including the African Swine fever virus, but no haemoparasite was still identified in all the blood samples processed. It is a common possibility that the use of oxytetracycline significantly contributed to the absence of hemoparasites in the pigs. Oxytetracycline is a drug of choice for most farmers, not only in Zuru, which is used in treating most sick animals as first line measure (Jacob *et al*., 2004; Chengula *et al*., 2013). This factor is likely to have influenced the prevalence of hemoparasites in the areas. Furthermore, Gachohi *et al*. (2012) also stated that dry areas, open grasslands and sparse vegetation were equally not suitable for vectors. Additionally, environmental factors such as precipitation, temperature, soil type and land use can influence the distribution of vectors and the host of a particular disease (Ostfeld *et al*., 2005). Similarly, considering the number of adult pigs sampled, prevalence was expected in the adult pigs than in the young as similar observation was reported by Kamani *et al*. (2010) who reported that adult animals are more readily susceptible to hemoparasitism than the younger ones.

The observation of the negative results for haemoparasites could also be as a result of poor sampling, effects of poor transportation, sample preservation and to some extent choice of laboratory method. Although, varieties of laboratory methods were applied for all the samples to increase the chance of identifying any incriminating organism, yet no parasite was identified. Laboratory techniques for haemoparasites identification requires expertise, however, this may be lacking during the course of processing the samples.

Conclusion

It is concluded that, gastrointestinal protozoan infection is also prevalent in backyard pig farms in Zuru. Absence of infection in the young (piglets) may be due to lack of exposure of the weaners and growers to infective stages of the parasite organisms or may be due to good sanitary conditions of the houses. The most prevalent gastrointestinal helminthes encountered was found to be any member of the strongyle worms.

Recommendations

Further studies to include large sample size and application of more advanced laboratory techniques need to be employed to have a reliable epidemiological data for effective prevention and control measures to be instituted.

Conflict of Interest: Authors declared that there is no conflict of interest in course of publishing this paper.

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