

DETECTION OF PARASITIC NEMATODES IN PIGS REARED INTENSIVELY IN SOUTHWESTERN NIGERIA

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ABSTRACT. Infection with gastrointestinal helminths has been a key factor affecting profitable animal production globally. Pig production in Nigeria has been adversely affected by presence of endoparasites. However, type of husbandry system can affect the prevalence of the parasites, thus, there is a need for this study to look at the prevalence of gastrointestinal parasites in the production of pigs in this tertiary institutional farm in Southwestern Nigeria. Faecal analysis for intestinal helminths was conducted on the pigs using saturated sodium chloride floatation technique. One hundred and fifty faecal samples were taken with only *Ascaris suum*, *Oesophagostomum* spp and *Trichuris* spp ova identified in single and mixed infection. The overall prevalence rate was 20%. Mixed infections remained more dominant (15.31%) with *Ascaris suum* having the highest occurrence as a single infection (3.33%), followed by *Oesophagostomum* spp (2%) and *Trichuris* spp (1.33%). Females had higher prevalence of nematode infection (14.67%) compared to males (5.33%). Comparing breeds, Large White had 14.67% prevalence of nematode infection which is higher than that of Duroc (5.33%). Weaners had no presence of helminths, whereas growers had the highest prevalence (9.33%), while piglets and adults had the same prevalence of nematode infection (5.33%). One of the factors that affect good productivity in pig farming is low presence of helminthes. Pork eaters are hereby encouraged to buy their meat from institutional farms as they produce safer meats for consumption.

Key words: faecal analysis, gastrointestinal parasites, Nigeria, prevalence, swine

INTRODUCTION

Livestock production sector is very important in Nigeria because of its economic benefits and the involvement in one way or the other of over 80% of the population (Kagira, 2010). Lowered availability of protein sources in the country has led to an over reliance on carbohydrates especially in developing countries (Ezeibe, 2010). The pig industry is an important arm of the livestock sub-sector of the overall agricultural sector in Nigeria. This assertion derives from the fact that porcine production has the potential to contribute great value to the nation's economy (Otuma and Uchewa, 2009). The industry has continued to grow very rapidly in the country due to the fact that pigs have high fecundity, short

generation interval, early maturity and relatively small space requirement for their production, making them viable sources of both improved nutritional and economic benefits to the farmers (Sowemimo *et al.*, 2012). Pigs can be raised under a variety of production systems ranging from simple backyard to large scale integrated pig farms (Ezeibe, 2010) and are susceptible to a wide range of infectious organisms including bacteria, viruses and parasites (Aliaga-Leyton *et al.*, 2011). Intensive management involves good housing so as to prevent roaming, with good feeding and good source of water. Parasitic infections are usually neglected, leading to decreased efficiency and profitability of swine production. This is reflected in the alteration

of the quality and quantity of pork resulting from reduced feed efficiency, poor growth and anaemia (Nsoso *et al.*, 2000).

Intestinal parasitism in pigs affects its performance as it is related to good feed conversion, reduced growth ratio, poor weight gains and condemnation of affected body parts after slaughter (Nsoso *et al.*, 2000). They form a main obstruction to competent and cost-effective livestock production (Omotosho *et al.*, 2015). Management systems for the animals have a strong influence on the epidemiology of parasites. Several studies on intestinal organisms in pigs have been carried out in Nigeria (Sowemimo *et al.*, 2012; Aiyedun., 2014; Gagman *et al.*, 2014; Wosu, 2015; Aiyedun and Oladairo, 2016; Onyeabor and Wosu, 2017; Abiola *et al.*, 2018). An unmanageable load of endoparasites is associated with lowered outputs of animals and animal by-products, thus contributing to loss or reduced productivity.

This study is aimed at identifying and determining the prevalence of gastrointestinal parasites in pigs raised intensively on a farm based in Oyo State College of Agriculture and Technology, Igbjo-Ora which is one of the tertiary institutions in Oyo state, Nigeria. This study also adds to the updated information on intestinal helminths in pigs in Nigeria.

MATERIALS AND METHODS

This research was done on an institutional farm in the southwestern part of Nigeria. It was conducted in Igbo-Ora, Ibarapa Central North Local Government Area of Oyo State on latitude 7.53° and longitude 3.08° with a population of 102,979 according to the 2006 population census. The temperature typically ranges from 21.5°C up to 32.5°C. The main occupation of the people in the study area are farming, teaching, hunting and petty trading.

One hundred and fifty pigs (150) kept in different pens were sampled for collection of faecal samples. The pigs were properly fed and well managed in the intensive management system. The 150 sampled pigs were restrained, and faeces collected directly from each rectum using a long forceps into a clean 30 ml sterile bottles labeled with animal identification number, approximate age, sex and breed of pigs. The sampling period was from January to March 2016. All the samples were labeled separately and conveyed to the laboratory in a cool box containing ice packs to avoid the eggs developing and hatching. The preserved fecal samples were processed using saturated salt solution for floatation methods (Dryden *et al.*, 2005). The helminth eggs were examined using light microscope with egg identification done based on structural and morphometric criteria (Thienpoint *et al.*, 1986).

RESULTS

Table 1 shows that the general occurrence of the nematodes observed in this study is 20%. Three nematode species were identified in this study with *Ascaris suum* having the highest incidence (3.33%), followed by *Oesophagostomum* spp. (2.00%) and then *Trichuris* spp. (1.33%). Table 2 shows that females had the higher incidence (14.67%), weaners did not show any incidence and large white breeds had the highest prevalence (14.67%).

Table 1. Prevalence of parasitic nematodes according to species identified from screened pigs.

Species	No Identified	Prevalence (%)
<i>Oesophagostomum</i> spp	3	2.00
<i>Trichuris</i> spp	2	1.33
<i>Ascaris suum</i>	5	3.33
<i>Oesophagostomum</i> spp + <i>Trichuris</i> spp	2	1.33
<i>Oesophagostomum</i> spp + <i>Ascaris suum</i>	4	2.67
<i>Trichuris</i> spp + <i>Ascaris suum</i>	4	2.67
<i>Oesophagostomum</i> spp + <i>Trichuris</i> spp + <i>Ascaris suum</i>	10	6.67

Table 2: Prevalence of parasitic nematodes according to the sex, age, and breed of sampled pigs.

Variable	Category	No Examined	No Infected	Prevalence (%)
Sex	Male	68	8	5.33
	Female	82	22	14.67
Age	Piglet	22	8	5.33
	Weaners	8	0	0.00
	Growers	78	14	9.33
	Adults	42	8	5.33
Breed	Large white	135	22	14.67
	Duroc	15	8	5.33

DISCUSSION

An incidence of gastrointestinal helminths might be associated with the favourable environmental conditions for the survival and proliferation of the factors responsible for their transmission, which is sufficient reason for strict preventive measures. The results obtained from examination of faecal samples from this institutional farm show the occurrence of three parasitic nematodes, which are *Oesophagostomum* spp, *Trichuris* spp and *Ascaris* spp that were found to infect swine in the farm. Faecal analysis confirmed the existence of gastrointestinal parasites with 20% general occurrence for pigs examined in Oyo State College of Agriculture and Technology, Igbo-Ora. Nematode infections caused by low to moderate

excretion of nematode eggs are usually sub-clinical and associated with economic losses, and this may be the cause of low productivity in pigs in the study area (Abiola *et al.*, 2018; Nsoso *et al.*, 2000). The overall prevalence findings of this study are a bit lower than that in the study done by Sowemimo *et al.* (2012) in an institutional farm also within Oyo State. It is generally known that pigs raised intensively have lowered helminth abundance than those raised on other management systems. It is however possible that this farm had better management system than the farm where Sowemimo *et al.* (2012) carried out his research.

The moderate prevalence of 20% reported in this research is higher compared to reports

from intensively managed pigs in other studies conducted by Tamboura *et al.* (2006) and Nissen *et al.* (2011), in which incidences of 3% and 1% were respectively reported. The overall prevalence reported in this work is comparable to the 24.1% reported by Wosu (2015) in pigs in Nsukka, Nigeria. However, the prevalence recorded in the current research is lower than that reported previously in the country by Sowemimo *et al.* (2012), Okorafor *et al.* (2014), Onyeabor and Wosu (2017), and Abiola *et al.* (2018) that reported prevalence of 35.8%, 32.7%, 30.7% and 84.1% respectively. The lower incidence of gut helminths reported here might possibly be the outcome of good management practices on the farm, provision of high-quality commercial feed and prudent usage of anthelmintic drugs. Results from earlier studies revealed that the prevalence of intestinal helminths in well managed swine farms is usually significantly low (Liu and Lu, 2002).

The species of worms identified here have earlier been reported by Abiola *et al.* (2018) in Ibadan, Oyo state. This seemingly low prevalence may be explained by the fact that good management systems such as proper biosecurity measures usually produce low helminth presence and give very little room for helminth development (Lekko *et al.*, 2018).

There was higher prevalence of GIT helminth infection in grower pigs than adult, which corroborates the findings of Abiola *et al.* (2018) whose results are similar. This might be as a result of the fact that adult pigs are more likely to have accumulated the infection overtime which enhances them to develop resistance against re-infections. Also, it is possible that the higher prevalence of growers could result from the fact that they had the higher number sampled. This study reveals the same prevalence of helminths in the piglets and adults, but from the number of adults and piglets it becomes obvious that we

had more adults infected than piglets, and this can be explained by the fact that adult animals have longer contact with these infectious agents.

The female pigs had a higher prevalence of helminth infection (14.67%) than the males (5.53%). This report differs from that of Abiola *et al.* (2018) who reported more males being infected. Due to the act of gestation and lactation, females tend to stay longer on the farm to maximize their production cycle and the longer they stay it is probable that they are more exposed to infection. Also, immunosuppression and hormonal changes that come during pregnancy and lactation can be predisposing factors to infection (Biobaku and Amid, 2018). Mixed infections had a higher prevalence than single infections in this study. This differs from the work of Obisike *et al.* (2018) who reported higher infection in single infections. This difference in prevalence could be due to the significant reduction in immunity experienced by multiple infections.

Ascaris suum is the most prevalent nematode parasite seen in this study (3.33%), and this is in tandem to findings of report from Abiola *et al.* (2018) who worked within the same state but disagrees with the works of Sowemimo *et al.* (2012). The prevalence of *Ascaris suum* in this work could be explained by the presence of its thick eggshell which is resistance to harsh circumstances and toxic chemicals (Nansen and Roepstorff, 1999). Also, lack of an intermediate host could also be a factor in having this prevalence. This parasite is a zoonotic helminth (Miller *et al.*, 2015) and also shares the same similarity in protein structure with the human ascarid worm (*Ascaris lumbricoides*). This similarity makes the worm a potential human disease agent when found in pigs which acts as reservoir agents for *Ascaris lumbricoides* (Leles *et al.*, 2012).

The nodular worms of pigs (*Oesphagostomum spp*) are the next most prevalent helminth in this study (2.00%). This worm is associated with stunted growth in pigs especially female pigs, and this surely will affect production as well as the economy of the farmers. (Abiola *et al.*, 2018). This worm is also known to be present in the environment and can stay for a long time causing re-infection especially in intensively managed pigs if not properly decontaminated (Obisike *et al.*, 2018).

The swine whipworm (*T.suis*) has the least prevalence (1.33%) of the helminth parasites observed. This organism has some biological features in common with *A. suum*. This prevalence is slightly lower than the report from Aiyedun (2014) which recorded 5.00%. This prevalence may be explained by the effect of environmental conditions on the development of *T. suis* eggs which are more susceptible to dehydration and high temperature than most nematode eggs. Trichuriasis is a zoonotic condition which has been reported in humans and animals.

CONCLUSION

Flotation technique was chosen as the diagnostic technique to be used for this work as against using both flotation and sedimentation because we had limitation in resources during the period when this study was carried out. The parasites observed in this study had prevalence which are generally low. The nematode parasites seen in this study have public health implications, thus there is a need to do more detailed research in the area of preventive and control measures with regards to gastrointestinal helminths in pigs. The low prevalence is also seen as an indication that the intensive system of keeping pigs is better and should be encouraged as a farming system for pig farmers. Intensive husbandry system of pig rearing should be encouraged. There is a need

for the control of helminths in which the control measures should integrate better nutrition with anthelmintic measures.

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