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Assessment of Gastrointestinal Parasites and Lung Worms in Pig in some Local Government Areas of Abia State, Nigeria

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Abstract

Gastrointestinal parasites and lung worms of pigs (Susscrofa) has been a major problem in the pig industry, which affects both economic and production strength of the farmer. This study was carried out in three local government areas of Abia state which are Umuahia north, Umuahia south and Ikwuano Faecal and blood samples were analysed to identify the presence of egg and the blood pictures were examined. This work was done in both sexes, to as well provide adequate measures in controlling gastrointestinal parasites so as to enhance productivity in the pig industry. Out of the total number of 164 faecals sample of different pigs that were collected andstudied13 (7.92%) were positive for helminth parasite. The distribution of helminth eggs of pigs based on sex shows that 7 (5.83%) were males and 6 (13.64%) were females. The helminth parasite were Metastrongylusspp. (2.43%), Trichurisspp. 2 (1.22%), Hyostrongylusspp. 3(1.83%) and Globocephalus Spp. 2 (1.22%). Metastrongylusspp. (2.43%) and HyostrongylusSpp (1.83%) are the commonest parasites of pigs in the study.

Keywords: Gastrointestinal parasites, lung worms, pig, Abia State.

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 helminthiasis. This is a major setback to efficient, effective and result oriented livestock production (Akerejola *et, al*., 1997; FAO, 2000; Mutual *et., al*., 2007; Paul *et al*., 2009; Geresu *et, al*., 2015and Jufare *et, al*., 2015). Most intestinal parasites are helminthes. They inhabit the gastrointestinal tracts of their host which transverses the mouth, oesophagus, stomach, small intestine, large intestine and the rectum (Barbosa *et, al*., 2015). They are eukaryotic multicellular parasitic cells that have digestive, circulatory, nervous, excretory and reproductive systems (Schantz, 1991; Agbolade *et, al*., 2004;

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Inpankaew *et al*., 2015).Pigs are one of the most common livestock reared in Nigeria with a lot of potentials for economic development (Pam *et al*.,2013 and Sowemimo *et, al.,* 2014Lekuleand Kyvsgaard, 2003; Nsoso*et al*., 2000).

In the last 10 years, the pig industry has experienced unequalled patronage with commensurate increment in production. These has consequently led to the production of more protein of animal origin, increased employment opportunities, alleviation of poverty and generation of foreign exchange for economic development (Akerejola, 1997; Paulo and Nonga, 2015).

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Gastrointestininal**n**ematodes which includes *Ascarissuum* (large roundworm) *Oesophagostomum species (*Nodular worm), *Trichurissui s*(Whipworm), *Hyostrongylusrubidus* (red stomachworm), *Strongyloidesransoni* (Intestinal threadworm of pigs), *Globocephalusurosubulatus (Pig hookworms), Trichinellaspiralis* (garbage worm). *Macrocanthorhycushirudinaceous* (thorny headed worm*)*constitutes the most important group of the gastrointestinal parasite of pigs. The damage caused by the adult gastrointestinal nematodes include haemorrhagic gastroenteritis and anaemia (Marufu*et al*., 2008).

.Lungworms include *Metastrongyluselongatus (apri*), *Metastrongyluspudendotectus, and Metastrongylussalmi.* They usually have an indirect life cycle through the earthworms. Direct life cycle has been reported. Adults vary in length from 14 to 66mm. First stage lungworm larvae hatch from eggs in pig faeces and survive in faeces or moist soil for long periods of time. In some places the first stage larvae can survive over winter. After being ingested by the earthworms, larvae are able to develop to the third infective stage in about 10 days.. The parasites preferentially localize along the caudo-dorsal border of the diaphragmatic lobes. Their presence results in alveolitis and bronchiolitis leading to coughing. Exudates that forms around lungworms and their ova partially or completely obstruct airways resulting in alveolar emphysema and atelectasis. Secondary bronchopneumonia is a common sequelae. (Kusiluka and Kambarage, 1996).

The gastrointestinal parasites and lungworms infections are mainly diagnosed by coproscopy (Soulsby, 1982). Pathological lesions caused by various worms and the morphology of various adult parasites can aid in the diagnosis at necropsy. Several highly sensitive and specific techniques that rely on the demonstration of parasite nucleic acid sequences have been developed. These techniques depend solely either on the use of DNA probes or on the polymerase chain reaction or Random amplification of polymorphic DNA (RAPD-PCR) (Kauffman, 1996).
Treatment with anthelmintic reduces the severity and prevalence of gastrointestinal nematode and lung worm infection, this may influence their epidemiology.(Kusiluka and Kambarage, 1996).
The objective of the present study is to assess gastrointestinal parasites and lung worms of pigs in Umuahia North, Umuahia South and Ikwuano Local Government Areas of Abia State, Nigeria

METHOD

Study Area

The study was conducted in Abia State which occupies about 5824 square kilometers. It is bounded on the north and southeast by Anambra, Enugu, and Ebonyi states, in the West by Imo and in the Southeast by Cross-River, Akwa Ibom and to the South by River state. It lies between latitude 4 to 6°N and longitude 7 to 8°E. This study area is within the tropical rainforest of Eastern Nigeria with seventeen local government areas but only Ikwuano, Umuahia North, and Umuahia South Local Government Areas were covered. Ikwuano, Umuahia South and Umuahia South Local Government Areas belong to the same senatorial zone of Abia State which is Abia Central senatorial zone. It is low-lying with a mean annual rainfall of about 187.7mm/year especially intense between the months of April through October, with a short dry spell usually occurring in August. The rest of the state is moderately high plane. It is heated by the direct rays of the sun all year round with mean daily temperature of about 27°C with the highest temperature in the months of February through April (Enwezor *et, al*., 1990).

Sample size

The sample was collected by convenience method and the size was calculated as recommended by Thrushfield(2005) using the formula $N = Z2PQ/L2$

Where N = sample size and Z = standard normal at 95% confidence interval (1.96)

$$L = 1 - P.$$

$$\frac{(1.96)2\ X\ 0.31\ (1 - 0.31)}{0.05}$$

$$\frac{3.84\ X\ 0.31\ XO.69}{0.05} = 164 \text{ samples}$$

The study was carried out on 164 pigs from pig farms of different sexes in Umuahia North, Umuahia South and Ikwuano Local Government Areas. The sampling method used was sampling by convenience (Thrustfield, 2005).

Materials

Two 2ml syringes and needle, Cotton wools, Disinfectants, Glass slides, Cover slip, Capillary tube, Microscope, Centrifuge, Haematocreit reader, Alcohol, Sterile gloves, Saturated salt solution, Spatula, Sieve, Sample bottle, EDTA bottle, Neuberhaemocytometer, faeces, Blood, Weighing balance.

Sample collection and laboratory analysis

Samples were collected from different locations which abattoirs and different farms in Ikwuano, Umuahia North and Umuahia South Local Government Areas respectively. Each animal was carefully restrained and the ear vein was properly disinfected and blood was collected and transfered into the sterile EDTA bottle after the animals were carefully restrained. Faecal sample

were collected per rectum from individual pig using sterile unused hand gloves and labeled accurately and faecal samples were placed in ice-packed containers for transportation and later placed in a refrigerator at 4 °C. The sex of various pigs, breed and appropriate weight were taken before the samples were collected. In all, a total of 164 pigs were sampled and laboratory examinations were carried out within 24 hours of sampling. The samples were immediately transported to the veterinary animal production and physiology laboratory Micheal Okpara University of Agriculture Umudike for laboratory processing after the exercise to the veterinary parasitology laboratory MichealOkpara University of Agriculture Umudike for immediate processing (OIE, 2008)

Faecal samples analysis

About 3g of the faecal sample was weighed out using the manual weighing balance and mixed thoroughly with a spatula in a saturated salt solution in a petri-dish. The mixture was filtered using a sieve and the solids were discarded. The sediment were put in a test tube and saturated salt solution was used to fill the test-tube to the meniscus level and cover slip was placed on the test tubes. After about 10 minutes the cover slips were removed and placed on a glass slide and viewed under a low magnification objective lens (x10) of the microscope. The egg type was determined based on the morphological characteristics as described by WHO (1991).

The data collected from analysis of faecalwas Statisticalyanalysed using Statistical Packagesfor Social Sciences (SPSS) version 20 for percentages and frequencies. Microsoft excel 2010 was used to create tables and graphs.

RESULTS

Out of the 164 large white breed of pig from which samples were collected 120 (73.71%) were males and 44(26.83%) were females with total weight of 17865kg and mean weight of 108.93kg. The Percentage (%) of pigs infected with helminthes is 7.92%..The distribution of helminth eggs of pigs sex in Umuahia North, Umuahia South and Ikwuano Local Government Areas in both sexes is presented in Table 1.Out of the total number of 164 (120 males and 44 females) faecal samples examined, 13 (7.92%.) were positive for helminth parasites. Out of 120faecal samples of males examined 7 (5.83%) were positive and out of 44faecal samples of females examined 6 (13.64%) were positive. The eggs of helminth parasites found in this study were those of *Oesophagostomum*spp. 2(1.22%), *Metastrongylus*spp. (2.43%), *Trichuris*spp. 2 (1.22%), *Hyostrongylus*spp. 3(1.83%) and *Globocephalus Spp*. 2 (1.22%) as seen in Plates I, II, III, IV and V.The distribution of helminth eggs of pigs sex is presented in Table 1. Of the total number of 164 faecal samples examined, 13 (7.92%.) were positive for helminth parasites out of which 7 (4.2%) were males and 6 (3.66%) were females. *Metastrongylus*spp. (2.43%) and *HyostrongylusSpp* (1.83%) are the commonest parasites of pigs in the study.

Table 1 Prevalence of helminthes based on sex in Umuahia North, Umuahia South and Ikwuano Local Government Areas

Sex	Number sampled	Number infected	Prevalence (%)
Male	120	7	5.83%
Female	44	6	13.64%
Total	64	13	7.93%

Table 2 Distribution of Helminth based on sex

	Sex		
Helminth eggs	Male	Female	Total
Oesophagostomumspp(%)	1(0.61)	1 (0.61)	2(1.22)
Metastrongylusspp(%)	2(1.22)	2(1.22)	4(2.43)
Trichurisspp(%)	1(0.61)	1(0.61)	2(1.22)
HyostrongylusSpp(%)	2(1.22)	1(0.61)	3(1.83)
Globocephalus*Spp* (%)	10.61)	1(0.61)	2(1.22)
Total	7(4.26)	6 (3.66)	13(7.92)

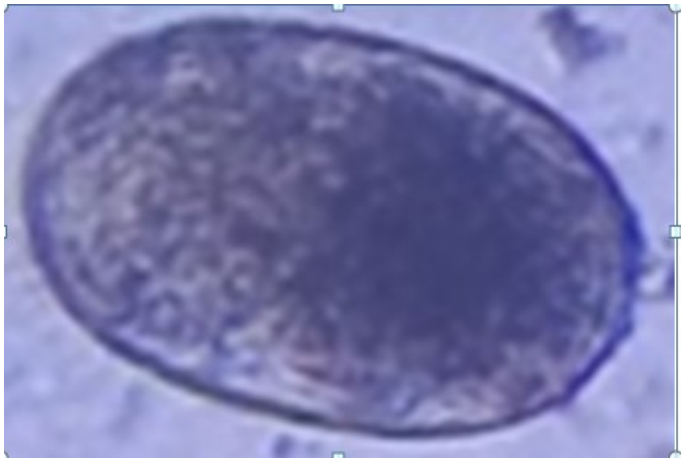

Plate I : Picture of the egg of *Oesophagostomumspp*. Mg. X 600

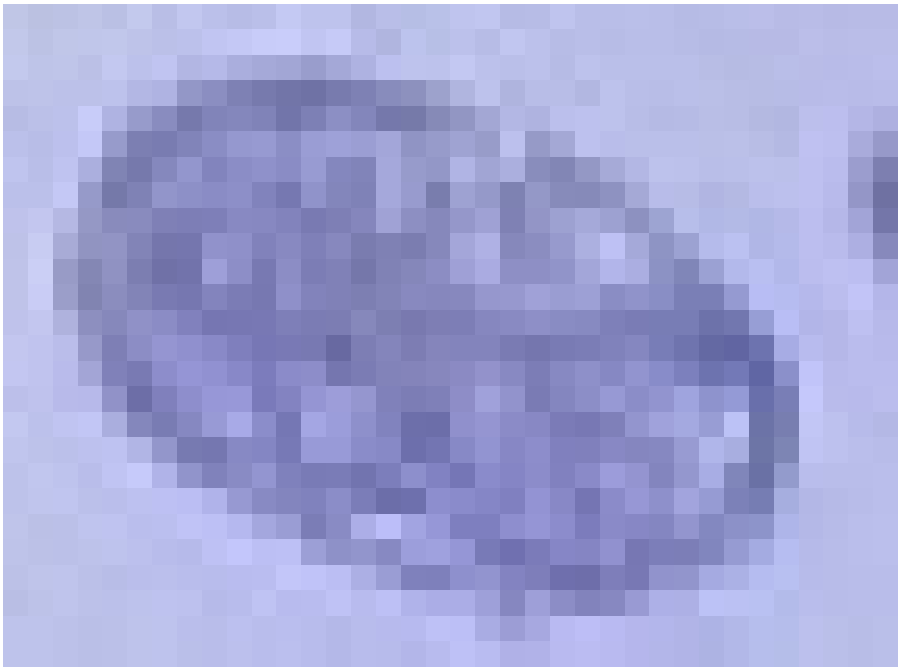

Plate II :Picture of the egg of Metastrongylus*spp*.Mg. X 700

Plate III: Picture of the egg of *Trichurisspp*. Mg. X 800

Plate IV: Picture of the egg of *HyostrongylusSpp*Mg. X 600

Plate V: Picture of the egg of Globocephalus *spp*Mg. X 600

DISCUSSION

The general assessment of gastrointestininal parasites and lung worms in pigin Umuahia North, Umuahia South and Ikwuano Local Government Areas were observed to be7.93% in this study.The eggs of helminth parasites found in this study were those of *Oesophagostomum*spp. 2(1.22%), *Metastrongylus*spp. (2.43%), *Trichuris*spp. 2 (1.22%), *Hyostrongylus*spp. 3(1.83%) and Globocephalus *Spp*. 2 (1.22%).The distribution of helminth eggs of pigs showed that out of the total number of 164 faecal samples from different pigs examined, 13 (7.92%.) were positive for helminth parasites out of which 7 (5.83%) were males and 6 (13.64%) were females. *Metastrongylus*spp. (2.43%) and *HyostrongylusSpp* (1.83%) are the commonest parasites of pigs in the study. is comparable with previous reports from different parts of the country. Helminth parasites were found were those of *Ascaris*spp. (12.34%), *Metastrongylus*spp.(9.74%), *Oesophagostomum*spp. (6.49%), *Trichuris*spp. (5.19%), *Paragonimus*spp. (1.3%) and *Hyostrongylus*spp. (1.3%) with*Ascaris*spp. and *Metastrongylus*spp. beingthe commonest parasites of pigs. In asurvey on the prevalence of swine diseasesinIjebu division of Ogun State, Talabi*et al.*(2010) found the following gastrointestinalne matode eggs: *Ascaris sp.* (45.26%), Strongyles (10.22%), *Strongyloidessp.*(5.11%) and *Trichuris sp.* (2.92%) in the faecal samples evaluated. It does not agree with a study carried out in Plateau State where Ascaris eggs were encountered in 90.40% of the faecal samples examined (Ajayi and Arabs, 1988). These nematodes are able to complete their life cycles in-doors under the intensive system of management, hence many surveys have shown that prevalence levels of infection to these helminths are closely related to hygiene and housing systems (Roepstorff and Nansen, 1994). It does not agree with another investigation in Plateau State. Pam *et al. (*2013) examined 171 pigs for gastrointestinal parasites of which 35.09% pigs were positive and parasites found include *Oesophagostomumdentatum*, *Hyostrongylusrubidus*, *Ascarissuum*, *Paragonimuswestermanni* ,*Metastrongylus*spp. and *Necator*spp.

In this study prevalence of helminthes are lower in the male with 5.83% than in the female with 13.64% This agrees with Sangeeta, *et al.,* 2002andTamboura*et al.*,(2006) that female animalsharbour more parasites than males and also Eijck and Borgsteede, 2005 in their record of high prevalence of *Oesophagostomum spp.*in Sow. This could be as a result of good management practices adopted by the farmers in biosecurity measures, good hygiene and proper treatment. Oesophagostomumsppare one of the most common roundworm infections in confined pigs responsible for nodular inflammations on the caecum and colon of infected pigs (Urquhart, *et, al*., 1998). In most case when a particular animal becomes positive for a parasite, it remains so for the rest of the parasites (Eijck and Borgsteede**,** 2005). Ascaropssppsare the commonest spiruroids besides Gnathostoma and Gongylonema often seen in outdoor pigs. Results from previous studies have shown that the prevalence of gastrointestinal parasites in intensive pig farm is usually considerably lower (Liu and Lu, 2002). Most pigs in the south eastern part of Nigeria are kept under intensive system of management.

CONCLUSION

The result of this study has revealed that regular assessment of helminth parasites in the faeces of pigs is recommended for strategic treatment against helminth parasites and pig farmers are encouraged to prevent the environment from becoming contaminated by infective helminth larvae

by practicing good standards of hygiene since pig faeces could be an important source for some parasites capable of infecting humans. The lower prevalence of intestinal parasites recorded in this study could be as a result of effective management practices in the farm, such as daily cleaning and disinfectants of pens, giving high quality commercial feed and the use of effective anthelmintic drugs at the right time.

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