INVESTIGATION OF INTESTINAL PARASITES OF PIGS IN IJEBU - IGBO, USING FLOATATION METHOD

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A RESEARCH REPORT SUBMITTED TO SCIENCE LABORATORY TECHNOLOGY DEPARTMENT, SCHOOL OF SCIENCE, ABRAHAM ADESANYA POLYTECHNIC, IJEBU-IGBO, OGUN STATE, NIGERIA.

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CERTIFICATION

This is to certify that this research was carried out by **ABATI, SHAKIRUDEEN MODUPE (11/06/1854)** of the Department of Science Laboratory Technology, Abraham Adesanya Polytechnic, Ijebu-Igbo, Ogun State, under my supervision and guidance.

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DEDICATION

This research report is fully dedicated to the Almighty God who has been the reason for my existence and also to my parents, Mr. and Mrs. ABATI.

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Abati, Shakirudeen

TABLE OF CONTENT

CHAPTER THREE

LIST OF TABLES

ABSTRACT

A study was undertaken to determine the prevalence of intestinal parasites in pigs from Ijebu-Igbo, Ogun State, Nigeria. Intestinal content were collected randomly from 36 pigs between November and December 2014, processed by floatation method and then examined for the presence of helminth ova, protozoa oocysts and cysts. Out of the 36pigs samples examined, 30(83.3%) were infected with one or more parasite species. Six types of parasites were identified, including *Trichuris suis, Ascaris suum, Hookworm eggs, strongyloides sp., Taenia sp. and Fasciola sp.* The prevalence of intestinal parasites was significantly higher in male pigs than in females. The results of this study provide base line information about the parasites in pig pens in Ijebu Igbo, Ogun State, Nigeria.

CHAPTER ONE

1.0 INTRODUCTION

Nigeria is located in tropical Africa, an area that is described as "Parasites Paradise" (Olso, 2000). Environmental factors and vector abundance have been incriminated in the distribution of most parasitic diseases. The continuous drive to increase meat production for the protein needs of the ever increasing world population has some parasitological problems attached (Boes *et al.,* 2000). The sustainable development of the swine industry in faced with a number of constraints among which are the disease caused by intestinal parasites (Aliaga-leyton *et.al.,* 2011) Gastro intestinal parasites are responsible for a substantial loss of productivity in swine and other livestock industry. Gastro intestinal paratism in swine affect swine's performance in terms of efficient feed conversion, poor growth rate, reduced weight gain and the condemnation of affected organs after slaughter (Nsoso *et al.,* 2000). They constitute a major impediment to efficient and profitable livestock production (Joachim *et al.,* 2001).

A parasite according to Henderson, (1990), is any living organism (plant or animal) which lives inside or on the surface of another organism (the host) and from which it gains it food supply. Houghton, (2001), defined the word "parasite" as micro-organisms that lives in or on different kind of organism (i.e. the host) from which it gets some or all of its nourishment. Some cause problems while others can live for long periods in the bowel without causing symptoms or requiring treatment. Types of intestinal parasites include; *Helminths* and *Protozoa.*

Pigs, also called hogs or swine, are ungulates which have been domesticated as a source of food, leather and similar products since ancient times. More recently they have been involved in biochemical research and treatment (Wikipedia, 2008). The domesticated breed of pig today are descendants of two prominent wild types i.e. *Suis vittatus* and *S. scrota*. Despite pigs' reputation for gluttonly and another reputation for dirtiness, a lesser known quality is their intelligence (Muller *et al.*, 1997).

Water-borne transmission of intestinal parasites has been linked to domestic livestock and farming practices. The danger for human for becoming

infected with protozoa of animal origin is higher than with helminths (Burton and Turner, 2003).

1.1 AIM AND OBJECTIVES

This study was undertaken to investigate intestinal parasite of pig, to know what parasites can be transmitted to human on consumption of pork (Pig meat) and on handling pig waste products. The aim is also to study the presence of intestinal parasites in pig intestinal content from several pigs slaughtered in Ijebu North slaughter pens.

CHAPTER TWO

2.0 LITERATURE REVIEW

Intestinal parasites are a significant threat to any herd, and can lead to considerable loss of productivity, spreading rapidly throughout a herd. There are a range of such parasites affecting pigs, including.

Lungworm (*metastrngylus*) affecting breeding and finishing stock with access to outdoor.

Gullet and stomach worms (*Oesophagostemum* & *Hyostrongylus*) affecting adult breeding stock.

Round worm (*Ascaris suum*) in the small intestine, affecting both growing pigs and sows.

Whipworm (*Trichuris suis*) in the large intestine, affecting breeding-finishing uints.

Of these, probably the most common gastro intestinal parasite in outdoor pigs is the large roundworm, *Ascaris suum* (Roepstorff, 1993). Infestations will build up during the summer months and peak in early autumn (Taylor, 1995). The growth in numbers of outdoor herds has also increased the incidence of other parasitic diseases associated with natural pasture, such as

lungworm (Taylor, 1995) when pigs without parasites are placed on clean land they can maintain low parasite status for years. However, once parasites are present their eggs are shed in feaces and can persist for years under some climatic conditions, and when eggs are ingested by other future generations, infestations can rapidly build up. Resting land for as long as possible between batches can break this cycle (Day *et al.*, 2003).

Neonatal exposure to *Ascaris suum* may result in increased persistence and size of adult burden in pigs raised outdoors. The higher life-time burden is likely to have significant economic importance (Mejer *et al.*, 2006).

Several studies on intestinal parasites affecting pigs have been undertaken in Nigeria and other parts of the world.

In a study investigated among 450 pigs for helminths infections from Jos Plateau, Nigeria, Fabiyi (1979) reported a total of 15 species of helmints which include *Trichuris suum, Metastrongylus Salini, Oesophagostomum dentatum, Ascaris suum, Ascarops Stronglylina, Physocephalus sexalatus, Hyostrongylus rubidus, cysticercus tenuicollis Globocephallus Urosubulatus, Strongyloides ransomi, cysticercus cellulose, hydatid cyst* of *Echinococcus granulosus and spirometra erinacei.*

In another study conducted among 383 pigs for parasitic infection in Eastern Centre Province, Burkina Faso, Tamboura *et al.* 2006, reported that 91% of the pigs were infected with one or more prevalent parasites and *Ascaris suum* was the most prevalent parasite (prevalence of 40%). Parasites of pigs and their potential to infect humans have recently become major issues among the public because of reported outbreaks of water-borne parasitic diseases such as *Giardia Lamblia* and *Cryptosporidium spp.* (Olso *et al.*, 2000).

In 2012, Sowemimo *et al.*, also determine the prevalence of intestinal parasites in pig in Ibadan, Oyo State, Nigeria. 271 pig fecal samples examined, 97 (35.8%) were infected with one or more parasite, which include *Trichuris suis Ascaris suum,* human hookworm, *stephanurus dentatus* and *Isospora suis*. The prevalence of intestinal parasites was significantly higher in male pig (hog) than in female with a prevalence of 80.4%.

According to Anon (1999), more pork is consumed than other meat in the world. Pork consumption varies widely among countries and regions with per capital intake in 1998 ranging from 2kg/year in many Africa countries to

60kg/year in Germany (Anon, 1999). Swine industry in developing countries with particular references to Nigeria is faced a number of constraints prominent among which is diseases.

2.1 *ASCARIS SUUM*

Ascaris suum is a nematode found in pig. However, cases with larva *migrans* and *eosinophilic* pneumonia have been reported in human (Olso *et al.*, 2000). In some molecular studies carried out in some regions on human intestines, *A. suum* infection spread by pig were determined to be existent / prevalent. In a study conducted in Denmark, *Ascaris* infection transmitted from domesticated pigs were determined by through PCR-RFLP studies. Thus, *Ascaris* was noted to be *zoonotic* diseases (Nejsum *et al.*, 2004).

2.2 *MACRACANTHORHYNCHUS HIRUDINACEUS*

The thorny-headed worm is whitish in colour, is striated and thick at the anterior part. The vary in length between 3 to 14 inches and produce nodules in the small intestine.

2.3 *METASTROGYLUS ELONGATUS*

This is small, whitish thread-like parasites which are frequently encountered in the lungs of pigs.

2.4 *BALANTIDIUM COLI*

Balantidium coli is the only ciliated protozoan capable of causing disease in human. Pigs are the reservoir for the human infection. Ingestion of B. coli cysts from pig dungs through water and food intake results in transmission (Garcial *et al.*, 1993).

2.5 *WHIP WORM: TRICHURIS SUIS*

Whip Worm (Trichuris suis) are common intestinal parasites of swine eggs passed with the feaces develop into infective larvae in the environment in about a month. The larvae are ingested and penetrate the intestinal wall, damaging tissue, robbing the pig of essential nutrients and causing diarrhea. Pigs infected with whip worm are also prone to other intestinal infection such as *Salmonellosis* and Swine dysentery. Whip worm (*Trichuris suis*) can be particular devastating in young pigs (3 months old or less) (Uchewa *et al.*, 2009).

2.6 KIDNEY WORM: *STEPHANUDUS DENTATUS*

Is one of the most damaging parasites. The mature kidney worm is about inch long and can be found in or around the kidney or along the tubes leading from the kidney to the bladder. The adult female produces eggs that are passed through the urine. The young larvae will migrate into the liver and cause considerable damage before migrating on the kidney where the larvae will mature unlike other parasites, the lifecycle of this parasite is quite long, a total of 15 months. (Nejsum *et al.*, 2004).

2.7 THREAD WORMS: *STRONGYLOIDES*

Thread worms are another inhabitant of the intestinal tract. Their eggs pass out in the feaces and hatch with in a few hour under favourable condition. This parasite can also multiply outside the animal host, can be transmitted form the sow to the pig before birth (prenatal infection), can be transmitted through the colostrums and is capable of penetrating unbroken skin. As a result, mature thread worms have been detected in baby pigs as early as 4 days old. The resulting yellow diarrhea and possible death loss in baby pigs can be a difficult problem (Garical *et al.*, 1993).

Table 1: LOCATION OF INTESTINAL PARASITES OF PIG

Common Name	Scientific Name	Location with in the Host
Round worms	*Nematodes*	Caecum
Kidney worms	*Stephanurus dentatus*	Kidney
Large white worms	*Ascaris suum*	Small Intestine
Lung worms	*Metastrongylus apri*	Lung
Muscle worm	*Trichinella spiralis*	Small Intestine
Nodular worms	*Oesophagustomum*	Large Intestine
Balantidium coli	*Balantidium coli*	Large Intestine
Thread worm	*Stronglus ransomi*	Small Intestine
Whip worm	*Trichuris suis*	Large Intestine
Thorny-headed worm	*M. hirudinaceus*	Small Intestine
Coccidian	*Isospora*	Small Intestine
Tape worm	*Cestodes*	Caecum

CHAPTER THREE

3.0 MATERIALS AND METHOD

3.1 STUDY AREA

The study was conducted in Ijebu-Igbo, Ogun State, Nigeria. It is located in Northern part of the state. It is bounded by Oluyole local government of Oyo State in the north, in the west by Ijebu East local government, in the south by Ijebu North East, Odogbolu and Ijebu-Ode and in the East by Ikenne local government. The average annual temperature ranging from 23^0C to 28^0C and average annual rainfall of 36mm. The samples are collected from three abbatoirs in Ijebu-Igbo which are Oke Alafia in Oke-Agbo and Depolu tuntun at Ojowo and Oke-Sopen. The samples are collected between 6:30am and 8:00am daily the time pigs are slaughtered in the area.

3.2 SAMPLE TYPE / SAMPLE SIZE

The intestinal content were collected from different part of the pig intestine. Some samples are collected from Caecum & Colon of the slaughtered pig. The sample were collected by cutting the regional parts of the Caecum,

colon and squeezing out the content of the intestine into a covered plastic container with the use of hand gloves.

A total of ten (10) samples was collected per week from the three abbatoirs in four (4) weeks.

3.3 SAMPLE ANALYSIS

Samples collected were analyzed using simple test tube floatation method.

3.3.1 SIMPLE TEST TUBE FLOATATION METHOD

100ml of sodium chloride solution was used as the floatation fluid. 2g of the sample (intestinal content of the pig) was weighed using a weighing balance and put into a beaker.

100ml of floatation fluid was poured into the intestinal content and thoroughly mixed together using stirring rod. The sample suspension was poured into another beaker through a tea strainer. The strained sample suspension was poured into a test tube supported in a rack. The suspension was filled up to the top of the test tube. Cover slip was carefully placed on the top of the test tube and it was allowed to stand for about 15-20minutes.

The cover slip was carefully removed and placed on a microscopic slide and it was examined. The adherent drop of the sample suspension was examined under the microscope at 10x and 40x objective lens.

3.4 DATA ANALYSIS

Data obtained were analyzed using descriptive statistic.

CHAPTER FOUR

4.0 RESULTS

A total number of 36 pigs were analyzed for the intestinal parasitic infections. The male pig (Boar) were 22 (61.1%) and female pig (Sow) were 14 (38.9%). Total number of 36 pig's caecum and colon samples were examined. 30 pigs were infected with one or more parasitic species, giving an overall prevalence of 83.3% (Table 1). (Table 2) shows the prevalence of parasite infection in relation to sample location. 18 samples were examined in Oke Agbo with a prevalence of parasite infection of 14 (77.8%). Ojowo have prevalence of 3(60%) while Oke Sopen with a prevalence of 13 (100%) Six types of intestinal parasites were identified. These include *Trichuris suis, Ascaris suum, Hookworm egg, Taenia sp., Strongyloides sp.* and *Fasciola sp.* (Table 3) shows the rate of infection in relation to the sex of the pig. *Trichuris suum* having a prevalence of 47.2%, while *Ascaris suum* have a prevalence of 52.8%. Hookworm eggs with a prevalence of 75%. *Strongyloides sp.* have a prevalence of 13.9% while *Taenia sp.* and *Fasciola sp.* both have the same prevalence of 8.3%. Table 4 shows infection rate in

relation to part of the digestive system. Hookworm has higher preference for the Caecum and Colon.

Table 2: The Sex Profile of Pigs Examined

Sex	Number examined	Number infected	Uninfected number
Male (Boar)	22(61.1%)	20	2
Female (Sow)	14(38.9%)	10	4
Total	**36**	**30(83.3%)**	**6**

Table 3: Prevalence of Parasite Infection in Relation to sample location

Location	Number examined	Number infected	Prevalence (%)
Oke-Agbo	18	14	77.8
Ojowo	5	3	60
Oke-Sopen	13	13	100
Total	**36**	**30**	

Table 4: Prevalence of Mixed Infection in Relation to Sex of the Animal

Sex	Number examined	T.S	A.S	H.E	T.S	S.S	F.S
Male	22	12(54.5)	13(59.1)	18 (81.8)	2(9.1)	2 (9.1)	2 (9.1)
Female	14	5(35.7)	6(42.9)	9(64.3)	1(7.1)	3(21.4)	1(7.1)
Total (%)	**36**	**17(47.2)**	**19(52.8)**	**27(75)**	**3(8.3)**	**5(13.9)**	**3(8.3)**

Keys:

T.S - *Taenia Sp.*

A.S - *Ascaris suum*

H.E - *Hookworm eggs*

T.S - *Trichuris suis*

S.S - *Strongyloides sp.*

F.S - *Fasciola sp.*

Table 5: Parasite Preference for different part of the Digestive System

Parasite	Caecum	Colon
Ascaris suum	9	10
Trichuris suis	9	8
Hookworm eggs	13	12
Taenia sp.	2	1
Strongyloides sp.	2	3
Fasciola sp.	1	2
Total	**36**	**36**

CHAPTER FIVE

5.0 DISCUSSION AND CONCLUSION

This study revealed that the overall prevalence of intestinal parasites recorded among 36 pigs in Ijebu-Igbo, Ogun State was 83.3%. The prevalence was significantly higher than 80.4% reported in Ibadan, Oyo State, Nigeria (Sowemimo *et al.*, 2012) and 40% from Burkina Faso (Tamboura *et al.*, 2006). The higher prevalence of intestinal parasites recorded in this study could be as a result of poor management practices in the farm, such as Inadequate daily cleaning and disinfectants of pens, giving low quality feeds and lack of anti helminthic drugs at the right time. In this study, six types of intestinal parasite were identified as compared to 15 species of helminths reported from 450 pigs in Jos, Pleateau, Nigeria (Fabiyi, 1979). Out of the seven nematode species listed as helminths of veterinary importance by Nansen and Roepstorff (1999), three (3) were observed in this study and they include *Ascaris suum, Trichuris suis* and *strongyloides sp.* The study revealed that Hookworm eggs was the most prevalent parasite followed by *Ascaris suum.* It has been reported that *Ascaris suum* is among the causes of visceral larva migrans in humans

(Sakakibara *et al.*, 2002). In this study, the prevalence of intestinal parasites was significantly higher among male pigs than in females, which is in comparism with the findings of Sowemimo *et al.*, (2012) where male pigs also have higher prevalence than the females.

Hookworm eggs is another parasite identified in this study having a prevalanece of 75%. Its shown there is the possibility of pigs acting as transport host for human parasites (Steenhard *et al.*, 2000). The presence of hookworm in the pigs poses health risk for humans especially farm workers. *Teania sp* and *Fasciola sp* also have the same prevalence of 8.3% which is lower than 26.4% reported from Ontario, Canada by Aliagaleyton *et al.*, 2011.

In conclusion, the result of this study has revealed that pig feaces could be an important source for some parasites capable of infecting humans. In a community, where pigs are reared and pig meat (pork) is consumed by a large part of the population, they could be involved in *zoonotic helminthosis* and a further investigation should study the possible impact of parasitic infection of pigs on public health in Nigeria.

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