

**Short Communication****Open Access****Gastrointestinal parasites among swine bred in Edo State, Nigeria**

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University of Benin, Benin City, Nigeria\*Correspondence to: [zainab.omoruyi@uniben.edu](mailto:zainab.omoruyi@uniben.edu)**Abstract:**

**Background:** Swine production in Nigeria is encountering several constraints among which are diseases. This study was designed to determine the prevalence of gastrointestinal parasites of swine with respect to sex, age, location and hygiene practices in the breeding sites in three piggery farms; University of Benin Animal Farm; Osasio Farm Uselu in Egor Local Government Area (LGA), and Ojemai Farm Ekehuanwa Road, Oredo LGA, Benin City, Edo State, Nigeria.

**Methods:** A total of 150 pigs were sampled from the 3 piggery farms. Faecal sample (10g each) was aseptically collected from the rectum of each selected pig and processed by concentration method to microscopically identify parasites in both saline and iodine preparations. A designed pre-tested structured questionnaire was interviewer-administered to each piggery owner to collect information on husbandry practices, animal health care issues and potential risk factors associated with parasitosis. Data was analysed using SPPSS version 20 software, while odd ratios (OR) with 95% confidence intervals (CI) were calculated on each potential risk factors.

**Results:** Of the 150 pigs examined, 130 (86.6%) were infected with five gastrointestinal parasitic agents. *Strongyloides ransomi* 81 (54%) was the most frequently identified parasite, followed by *Ascaris suum* 68 (45.3%), *Giardia lamblia* 31 (20.6%), *Entamoeba polecki* 10 (6.6%) and *Trichuris suis* 10 (6.6%). Single and mixed infections were not significantly associated with the observed prevalence ( $p>0.05$ ). Similarly, the sex of pig was not significantly associated with the prevalence of parasites ( $p=0.8824$ ). The prevalence of parasitosis among the grower (87.8%) was not significantly different from the adult swine (87.5%) ( $p>0.05$ ). Osasio had the highest infection rate (90.0%) but this rate was not significantly different from the two other farms ( $p>0.05$ ).

**Conclusion:** This study confirms high prevalence of gastrointestinal parasitic infections in pigs bred in Edo State, Nigeria. It is therefore recommended that farmers improve on their biosecurity and adhere to routine de-worming regimen of pigs.

**Keywords:** age, gender, prevalence, gastrointestinal, parasite, swine

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**Parasites gastro-intestinaux chez les porcs élevés dans l'État d'Edo, au Nigéria**

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**Contexte:** La production porcine au Nigéria rencontre plusieurs contraintes parmi lesquelles les maladies. Cette étude a été conçue pour déterminer la prévalence des parasites gastro-intestinaux des porcs en fonction du sexe, de l'âge, de l'emplacement et des pratiques d'hygiène dans les sites de reproduction de trois porcheries; Ferme

animale de l'Université du Bénin; Osasio Farm Uselu dans la région du gouvernement local d'Egor (LGA) et Ojemai Farm Ekehuanwa Road, Oredo LGA, Benin City, État d'Edo, Nigéria.

**Méthodes:** Au total, 150 porcs ont été échantillonnés dans les 3 fermes porcines. Un échantillon fécal (10 g chacun) a été prélevé de manière aseptique dans le rectum de chaque porc sélectionné et traité par une méthode de concentration pour identifier au microscope les parasites dans les préparations salines et d'iode. Un questionnaire structuré pré-testé conçu a été administré par un intervieweur à chaque propriétaire de porcherie pour recueillir des informations sur les pratiques d'élevage, les problèmes de santé animale et les facteurs de risque potentiels associés à la parasitose. Les données ont été analysées à l'aide du logiciel SPSS version 20, tandis que les rapports impairs (OR) avec des intervalles de confiance (IC) à 95% ont été calculés sur chacun des facteurs de risque potentiels.

**Résultats:** Sur les 150 porcs examinés, 130 (86,6%) ont été infectés par cinq agents parasitaires gastro-intestinaux. *Strongyloides ransomi* 81 (54%) était le parasite le plus fréquemment identifié, suivi par *Ascaris suum* 68 (45,3%), *Giardia lamblia* 31 (20,6%), *Entamoeba polecki* 10 (6,6%) et *Trichuris suis* 10 (6,6%). Les infections simples et mixtes n'étaient pas associées de manière significative à la prévalence observée ( $p > 0,05$ ). De même, le sexe du porc n'était pas significativement associé à la prévalence des parasites ( $p = 0,8824$ ). La prévalence de la parasitose chez le producteur (87,8%) n'était pas significativement différente de celle des porcs adultes (87,5%) ( $p > 0,05$ ). Osasio avait le taux d'infection le plus élevé (90,0%) mais ce taux n'était pas significativement différent des deux autres fermes ( $p > 0,05$ ).

**Conclusion:** Cette étude confirme la forte prévalence des infections parasitaires gastro-intestinales chez les porcs élevés dans l'État d'Edo, au Nigeria. Il est donc recommandé que les éleveurs améliorent leur biosécurité et adhèrent au régime vermifuge de routine des porcs.

**Mots-clés:** âge, sexe, prévalence, gastro-intestinal, parasite, porcin

## Introduction:

Swine production is one of the fastest growing livestock sectors worldwide and forms an integral part of the rural economy in many parts of the world by providing additional animal protein sources for human consumption, generating employment and reducing poverty (1). Swine production has a number of advantages over other livestock sectors, which includes higher and quicker returns on investment, early maturity, short generation interval and smaller space requirements for production (2). Parasitic diseases from infection by protozoans, helminths, and some arthropods have an immense influence on the lives of humans and animals, causing variety of illnesses that could be rapidly fatal in some cases or chronic, incidental or even asymptomatic (3). The major diseases of pigs include Africa swine fever, swine influenza, parasitic and non-infectious diseases. Parasitic diseases are a major obstacle to the growth of the pig industry.

Helminthiasis in pigs is often associated with subclinical infections resulting in poor feed conversion and delayed achievement of market weight (4). The common pig parasites identified in previous studies include *Strongyloides* species, *Ascaris* species, *Trichuris* species, *Entamoeba histolytica* and *Entamoeba coli* (5,6,7). In Nigeria, intestinal parasitism is a debilitating condition in piggery. In spite of this, helminthiasis is often neglected because of its in apparent clinical signs. This branch of livestock industry in developing countries like Nigeria is however, saddled with religious,

cultural, social and environmental challenges as well as infectious diseases (5). Stunted growth and prolonged fertility are often associated with helminthiasis. This is a major setback to efficient, effective and result oriented livestock production (8). The aim of this study is to determine the prevalence of gastrointestinal parasites of swine in selected piggery in Benin City, Edo State, Nigeria.

## Materials and method:

### Study area

This study was carried out in three different pig farms; University of Benin Animal farm; Osasio farm, Uselu, Egor LGA, and Ojemai farm, Ekehuanwa Road, Oredo LGA, in Benin City, Edo State, Nigeria. Benin City is the capital of Edo State, located in South-south Nigeria. It has an estimated population of 1,147,188 (9). The State relies on trading, private transport system, farming (pig, cattle and goat) from the northern part of Nigeria as one of its sources of protein.

Egor LGA has an area of 93 km<sup>2</sup> and lies between longitude 5<sup>o</sup> 34'E and latitude 6<sup>o</sup> 23'N, with a population of 339,899 (9) and a population density of 70 people/km<sup>2</sup> with headquarters in Uselu town. It shares borders with Ovia Northeast in Oredo, Ovia Southwest, and Ikpoba-Okha LGAs. Oredo has an area of 249 km<sup>2</sup> and a population of 295,818 inhabitants by the 2006 census and lies between longitude 5<sup>o</sup> 37'E and 15<sup>o</sup> 26'E and latitude 6<sup>o</sup> 19'N and 58<sup>o</sup> 83'N.

### Study population and ethical approval

A total of 150 pigs were randomly

selected, 50 from each farm. Prior to the conduct of the study, ethical approval was obtained from Ethics and Research Committee, Ministry of Health, Benin City, Edo State, and informed consent was obtained from the swine breeders.

#### Sample collection and processing

Faecal specimens were aseptically collected in the morning into universal containers from the rectum of piglets, growers and adult swine bred (n=150) in the selected study area. The samples were properly labelled and transported to the laboratory of University of Benin Teaching Hospital, Benin City, Edo State for processing.

The faecal samples were processed using sedimentation technique (10). About 1 g of faecal sample was mixed in 4 ml 10% formal saline, properly mixed and sieved. To the filtrate, 3 ml of diethyl ether was added, mixed and spun at 3000rpm for 3 minutes. The supernatant was discarded and the sediment was resuspended, and examined in both saline and iodine preparations under the light micro-

scope (Nikon, Tokyo, Japan) using 10x and 40x objectives. Eggs were identified on the basis of their morphological features as described by Soulsby (11).

#### Statistical analysis

The data obtained were analysed using SPSS version 20 software, and odd ratios (OR) with 95% confidence intervals (CI) were calculated for each potential risk factor.

#### Results:

The overall prevalence rate of gastrointestinal parasites in the study sites was 86.6% (130/150) with prevalence rate of 90% in Osasio, 85% in Ojemai and 84% in University of Benin farm ( $p=0.972$ ) (Table 1). Five gastrointestinal parasites of medical importance were identified; *Strongyloides ransomi* was the predominant intestinal parasite in the study with 54% (81/150) (Table 2).

The overall mixed infection rate was 21.3% with University of Benin farm having the highest mixed infection rate (Table 3). Sow were

Table 1: Frequency distribution of gastrointestinal parasites in relation to location

Location	Number examined	Number infected (%)	<i>p</i> value
Uniben Farm	50	42 (84)	0.972
Ojeimai Farm	50	43 (85)	
Osasio Farm	50	45 (90)	
Total	150	130 (86.6)	

Table 2: Frequency distribution of parasites among swine in Benin City, Edo State, Nigeria

Species	Number positive	% Prevalence
<i>Strongyloides ramsoni</i>	81	54
<i>Ascaris suum</i>	68	45.3
<i>Giardia lamblia</i>	31	20.6
<i>Entamoeba polecki</i>	10	6.6
<i>Trichuris suis</i>	10	6.6

Table 3: Prevalence of single and mixed infections of gastrointestinal parasites in the three different study sites

Site	Number examined	Single infection (%)	Mixed infection (%)	<i>p</i> value
Uniben Farm	50	30 (60)	12 (24)	0.789
Ojeimai Farm	50	32 (64)	11 (22)	
Osasio Farm	50	36 (72)	9 (18)	
Total	150	98 (65.3)	32 (21.3)	

Table 4: Distribution of gastrointestinal parasites in relation to sex of swine

Sex	Number examined	Number infected (%)	Odd ratio (OR)	95% CI	<i>p</i> value
Female (sow)	61	54 (88.5)	0.9646	0.6001 - 1.554	0.8824
Male (boar)	89	76 (85.4)			
Total	150	130 (86.6)			

Table 5: Distribution of gastrointestinal parasites in relation to age of swine

Age (weeks)	Number examined	Number infected (%)	<i>p</i> value
1 - 10 (piglet)	45	38 (84.4)	0.875
11 - 20 (grower)	41	36 (87.8)	
> 20 (adult)	64	56 (87.5)	
Total	150	130 (86.6)	

more infected (88.5%) compared to Boar (85.4%) but the difference was not statistically significant associated (OR=0.9646, 95% CI = 0.6001, 1.554;  $p=0.8824$ ) (Table 4). For age distribution, the growers had a higher prevalence of 87.8% compared to adult 87.5% and piglets 84.4%, though the difference was not statistically significant ( $p>0.05$ ) (Table 5).

## Discussion:

This study confirms the reports of previous study on the prevalence of gastrointestinal parasites in swine (12), which indicates that gastrointestinal parasitic infection is one of the major challenges facing breeding pigs in Edo State. The prevalence of 86.6% reported in this study is higher than the rate of 74.8% reported in Makurdi, Benue State (13) and 79.0% in a commercial farm in Abia State, Nigeria (14). This may be attributed to poor sanitary condition, nutritional challenges and poor routine treatment in the

present study. The result of this study is consistent with the reports of Okorafor et al., (12) and Tidi and Ella (5) who also reported high prevalence of similar gastrointestinal parasites in pigs in Nigeria. A higher prevalence (91.0%) than the present findings was reported in Burkina Faso, a West African country like Nigeria (16).

The faecal examination during the study revealed the presence of five common gastrointestinal parasites of swine similar to reports that *Trichuris suis*, *Ascaris suum*, *Strongyloides ransomi* and *Entamoeba polecki* were the most prevalent parasites of swine in a research farm (12). This could be attributed to the extensive system of farm management widely practiced within the study area, lack of veterinary services, irregular deworming observed in the farms, and low income to maintain the farms. Single infection was more prevalent (65.3%) compared to mixed infection (21.3%), though this was not significantly different ( $p=0.789$ ). This is consistent with the study by

Atawalna et al., (15) which reported that single infections were more prevalent in parts of Ghana. The possible explanation to the mixed infection might be the fact that pigs are reared extensively and also their feeding troughs are not cleaned regularly which might aid acquisition of more infective eggs of parasites from contaminated environment.

The results of this study also showed that sex and age of the swine were not significantly associated with infection ( $p>0.05$ ) however sow had a slightly higher prevalence (88.52%) compared to boar (85.4%). This finding agrees with other studies that reported higher prevalence of intestinal parasites in sow than boar in Nigeria (5) and Burkina Faso (16) but disagrees with previous studies that reported higher prevalence in boar than sow (17,18). This could be due to the fact that female pigs are kept much longer for breeding purposes as compared to the male pigs, which are usually fattened and sold off (12). With regards to age, adult pigs recorded the higher prevalence though the prevalence in relation to the infection was not significant. It has been suggested that the confinement of the piglets and growers in the pens tend to reduce their chances of contact with the disease agents.

With respect to location, the prevalence of infection among the pigs in the three farms were high and although the prevalence was slightly higher in Osasio farm, this was not significantly different from the other farms. The high prevalence of infection in all the farms could be the result of common poor management system and types of husbandry practiced in the farms.

In conclusion, this study confirmed the presence of five gastrointestinal parasites that are significant threat to pigs in the study areas. Based on the possibility of transfer of some of these helminths from pigs to man, there is urgent need to develop strategies to control the parasites in pigs.

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