PREVALENCE OF GASTROINTESTINAL NEMATODES AND TRYPANOSOMES IN INTESIVELY MANAGED PIGS IN NSUKKA URBAN AND ENVIRONS.

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Abstract
Four month cross sectional survey was carried out to determine the prevalence of trypanosomes and gastrointestinal nematodes (GIN) of pigs in intensively managed farms in Nsukka Municipal and environs. A multi-stage sampling procedure was used to select communities. 20 farms were randomly selected based on herd size and willingness of the farmers to engage in the study. Blood and fecal samples were collected from 1400 pigs and screened for trypanosomes and GIN following standard procedures. Structured questionnaires, oral interviews, visitations/observations and farm records were also used in data collection. Results showed that whereas PCV of the pigs increased with age, infection with GIN lowered it. No pigs screened was positive for trypanosomes but 400 (28.57%) were positive for GIN. The GIN seen include *Strongyles* (25.70%), *Trichuris suis* (11.43%), *Ascaris suum* (0.71%), mixed infection (*Strongyles* and *Trichuris suis)*, 9.29%. There was relationship between sex and nematode infection. In females, 30% (137.96 ± 51.84 epg) prevalent rate was significantly ($p < 0.05$) higher than 26.67% (9.56 ± 2.93 epg) recorded in males. Within herd structure, adults were significantly ($p < 0.05$) more infected than growers and finishers (45.00 vs. 28.05 and 21.05%). Herd size ranged from 20 to 200 and all the farmers breed and fatten their pigs. Although 19 (90%), 4 (20%) of them occasionally treat pigs with anthelminthic and or antitrypanosidal drugs, none has knowledge of herd health but applies some measure of hygiene.
Keywords: Swine, prevalence, trypanosomosis, nematode infection, herd health, Nsukka.

Introduction
Nigeria's per capita daily protein intake is estimated to be 45.4g against the FAO minimum recommendation of 58.3g (Iyangbe and Orewa, 2009). This low protein intake is due to the high cost of conventional sources of animal protein such as cattle, goat, sheep and poultry (Abonyi *et al.,* 2012). This can be met by rearing food animals that have short generation interval such as rabbit, poultry and swine. The pig, no doubt fits as this possible alternative because it is highly fecund, has short gestation period, matures early and requires relatively small land space compared to ruminants. Major constraints to the effective rearing of pigs in Nigeria include high mortality rate as a result of infections with gastrointestinal parasites and trypanosomosis (Anene *et al*., 2001). Porcine trypanosomosis affects swine performance by causing anemia, anorexia, loss of condition and anestrus (Fakae 1989). Studies have shown that *Trypanosoma brucei* is the most commonly encountered in Nsukka area and other parts of South Eastern Nigeria (Onah, 1991). Trypanosomes-helminthes infections are common and frequently associated with malnutrition and climate stress both of which are known to influence host resistance to infection (Fakae 1989). There is dearth of information on the prevalence of porcine trypanosomosis and nematodosis in Nsukka Urban and its surrounding communities. The present study was designed to determine the prevalence of trypanosomosis and gastrointestinal nematode infection in intensively managed pigs within Nsukka area.

Materials and methods
The study areas were pig farms located in Nsukka Municipal and its environs. A multi-stage sampling procedure was used to select 10 town/communities for this study. Based on pig population range of 20 to

200 heads and willingness of the farmers to engage in this study, a total of 20 pig farms were randomly selected (two per community). For the purpose of this study, herd structure comprised three categories: (i) growers (1-5 months), (ii) finishers (6-12 months) and (iii) adults (>12 months). 820 growers, 380 finishers and 200 adult pigs were sampled. Generally, the research methodology involved parasitological analysis, oral interviews, visitations/physical observations, farm records and use of structured questionnaires. Blood samples were collected from the ear and tail veins of the pigs using sterile hypodermic needles. The blood samples were put in labeled plastic capped sample bottles containing Ethylene diamine tetra acetic acid (EDTA), after which the bottles were gently rocked to ensure proper mixing of the blood with the anticoagulants. The blood samples were preserved in an ice pack and within one hour of collection, taken to the laboratory for parasitological examination. Faecal samples were collected per rectum and were put in plastic containers with cap, labeled and taken to the laboratory for parasitological examination following standard procedures (MAFF 1977). Similarly, blood samples were examined by routine methods.

Statistical analysis

Data generated were analyzed using SPSS version 15; descriptive statistics was used to determine the prevalence while differences between the means were analyzed using one way analysis of variance or student t-test as the case may be. Doncan's multiple range tests was used to separate the variant means -and probability of < 0.05 were considered significant.

Results

The results of this study showed that out of 1400 pigs screened, none of them was positive for Trypanosome. The PCV of different age groups of the pigs sampled showed that it increased linearly with age. The PCV of the infected pigs was significantly ($p < 0.05$) lower than the uninfected. The prevalence of gastrointestinal nematode ova isolated from the pigs examined showed that out of 1400 pigs screened, 400 (28.57%) were infected with gastrointestinal nematode ova (Table 1). *Strongyle* ova had the highest prevalence of 25.70% representing 360 positive cases. This was followed by *Trichuris* ova with prevalence of 11.43% representing 160 positive cases, *Ascaris* ova with prevalence of 0.71% representing 10 positive cases. The prevalence of mixed infection was 9.29% representing 130 positive cases for *Strongyle* and *Trichuris* ova respectively. There was a relationship between sex and nematode infection in the study area. Thus, of the 1400 pigs examined, 160 out of the 600 males examined were positive representing 26.67% prevalence with mean epg of 9.56 ± 2.93 while out of 800 female pigs examined, 240 were positive representing 30.00% prevalence with mean epg of 137.96 ± 51.84 (Table 1). Similarly, our finding showed that age of the animals affects level of infection. Thus, out of the 820 growers examined, 230 were infected; representing 28.04% prevalence with mean epg of 7.43 ± 2.13. Similarly, of the 380 finishers examined, 80 were infected representing 21.05% of prevalence with mean epg of 8.25 ± 6.42 and out of the 200 adults examined, 90 were infected representing 45.00% prevalence with mean epg of 358.56 ± 104.08 (Table 1).

Table 1: Prevalence and counts of nematode eggs isolated from intensively managed pig farms in Nsukka Municipal and environs.

Helminth ova	Number Examined	No. (%) infected	Faecal egg counts/gram of faeces	
			Mean ± S.E	**Range**
All Pigs	1400	400 (28.57)	86.60 ± 32.46	1 – 700
Male	600	160 (26.67)	9.56 ± 2.93[b]	1 - 45
Female	800	240 (30.00)	137.96 ± 51.84[a]	1 – 700

Growers (1 – 5)	820	230 (28.05)	7.43 ± 2.13 [b]	1 – 45
Finisher (6 – 12)	380	80 (21.05)	8.25 ± 6.42 [b]	1 – 53
Adults (> 12)	200	90 (45.00)	358.56 ± 104.08[a]	21 – 700
Strongyle	1400	360 (25.70)	90.28 ± 33.97[b]	1 – 650
Trichuris	1400	160 (11.43)	13.31 ± 4.89[d]	1 – 52
Ascaris	1400	10 (0.71)	33.01 ± 2.64[c]	0 – 1
Mixed infections	1400	130 (9.29)	162.15 ± 79.40 [a]	2 – 700

[a b c d] Figures with different superscripts within column for sex, age of pigs and eggs types are significantly different ($p < 0.05$).

Discussion

Information from oral interviews, farm records and physical observations, showed high neonatal mortality and general low performance of pigs within the farms visited. This is probably related to poor infrastructure and management technique that are characteristics of pig production practice in this area (Abonyi *et al*., 2012). Absence of trypanosomes in this study may be due to the use of wire netting in many of the farms sampled (80.00%). Routine use of trypanocidal drugs (75.00%) could be another reason for this. This finding agrees with an earlier report by Hill and Hall (1996) that netting and routine use of trypanocidal drugs reduces trypanosomosis infection in intensively managed farms. Location of most of the farms in residential areas where there are little or no bushes which is not conducive to survival of the insect vectors (Tsetse and biting flies) that transmit the disease may be another contributing factor. This study revealed a relatively low level of infections with nematode in pigs; with prevalence of 28.50% when compared to the finding of Payne, (1990) where prevalence of 55.00% was reported. Presence of a Veterinary Teaching Hospital within the study area, which few of the farmers admitted taking their sick animals to or visiting for professional advice could also have resulted in the low level of helminthosis. It was noted that among the pigs with positive cases, most were infected with *Strongyles*. The high prevalence of *Strongyles* (25.70%) in this study (Table 1) may be attributed to the fact that its transmission is favored by the high egg excretion rate of the parasite and favourable humid conditions (Fakae 1989). *Trichuris suis* was observed to have a prevalence of 11.43%. This may be due to the fact that ivermectin have poor activity against *Trichuris suis* (Khan and Line 2010) and this was the drug most the farmers use when they suspect gastrointestinal parasites infection. *Ascaris suum* had the lowest prevalence of 0.71%. This comparative low prevalence could be due to the fact that *Ascaris suum* is very susceptible to ivermectin. Females were found to have a higher prevalence of 30 00% than males that had 26.67%. It was observed that most of the adult females sampled were either pregnant or lactating. Pregnant or lactating pigs have been reported to be more susceptible to helminth infections than its male counterparts (Kusiluka *et al.*, 1996). Adults were found to have the highest prevalence of 45.00% than the growers (28.05%) and finishers (21.05%). This may be dependent on the management practice of the farmers. We noticed that most of the farms closely observed sanitary practices in the pens that house young animals (growers and finishers). We observed that the PCV of the adults was higher compared to other age groups. Although they had the highest prevalence of gastrointestinal nematode infestation, they possibly had higher immunity against these parasites and therefore did not show clinical anaemia. The PCV of the infected pigs was lower than that of the uninfected but was within the normal range for pigs. This is an indication that the helminthosis was probably mild. In agreement with this, Khan and Line (2010) observed that when worm burden is mild, it does not elicit anemic condition. In conclusion, this study showed that within the study period, trypanosomes and nematodes were less prevalent in intensively managed pigs in the study area. We recommend that pigs should be treated routinely with anthelminthics and trypanocidal drugs after screening the faecal and blood samples.

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