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PREVALENCE OF *ASCARIS* SPP. IN PIG FARMS OF NUMAN LGA, ADAMAWA STATE, NIGERIA

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ABSTRACT

Gastrointestinal parasite (GIP) infection has been a major drawback in pig production in Nigeria due to multiplicity of factors that facilitate pathogen survival and proliferation in the tropics. About 166 Faecal samples were collected based on; sex, age, breed, type of feed, and management system. The samples were subjected to fecal floatation technique, and prevalence was determine using epitools. An overall prevalence of 9 (5.4%) was recorded for *Ascaris* spp. infestations at different farm levels. Our result shows that, for sex the female has higher prevalence of 4(6.8%) than Male 5(4.6%), For age the young have higher prevalence of 7(5.5%) than adult 2(5.0%), while for management, Free range have higher prevalence of 3(9.3%), followed by semi intensive 4(4.5%) and least intensive 2(4.3%). The local breed 9(5.4%) and local feed 9(5.4%) could not be calculated because no data for exotic breed and commercial feed respectively. In conclusion, the result shows that, the young pigs and female pigs have higher prevalence than adult and male pigs while Free range pigs have higher prevalence, more than intensively manage pigs.

1. INTRODUCTION

Pig production is an important part of rural economy where it provides animal protein, generating employment and reducing poverty (Akanni *et al.,* 2017). Globally pork meat contributes about 40% of meat consumed (Karaye *et al.* 2016). In Nigeria, pigs are kept for pork production, to meet the high demand due to rapidly growing population (Njoga *et al.* 2018a), Gastrointestinal parasites infection has been a major constraint to pig farming in Nigeria due several factors that favor pathogen survival and proliferation in the tropics (Njoga *et al.* 2018b; Okoli *et al.* 2018). The common parasite of pigs are *Ascaris species* (Nganga *et al.,* 2008). *Ascaris species* are the largest of the nematodes in pigs with adult worms measuring between 25-40 cm in length.

Pigs become infected by ingestion of the eggs from the soil (Murrell, 1986). Following ingestion, the larvae hatch from the eggs in the caecum and proximal colon. The larvae then enter the bloodstream and after three days they migrate to the liver (Murrell *et al.,* 1997; Dold and Holland, 2011). After about six to eight days' post infection, larvae continue to migrate through the lungs, where they cause damage to tissues through haemorrage, emphysema and oedema. Clinical signs in pigs are coughing and dyspnea and sometimes may be the cause of acute respiratory disease outbreaks (Haimi-Hakala *et al.,* 2017; Lassen *et al.,* 2019). The main negative effect of *Ascaris species* infection are economic losses for producers, such as: reduced feed conversion, reduced fertility, low number of piglets

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born and weaned, low weight piglets at birth and at weaning, as well as losses relating to viscera of high condemnation rate in slaughterhouses (Roepstorff *et al.,* 1998).

Despite profuse reports on prevalence of GIP infection in pigs in other parts of Nigeria (Nwoha and Ekwurike 2011; Sowemimo *et al.* 2012; Okorafor *et al.* 2014; Karaye *et al.* 2016; Akanni *et al.* 2017; Obisike *et al.* 2018; Lekko *et al.* 2018; Jatfa *et al.* 2019), there is scarcity of published data on GIP infection in pigs in Numan. Therefore, the current study is designed to identify the common important gastro-intestinal parasites of pigs predominant in the production areas within Numan Local government area.

2. MATERIALS AND METHODS

Study Area

The study was conducted within Numan metropolis, a town that is located in the North East of Nigeria located between latitudes 9º 28' 0.59" N and longitude 12º 01' 34.80" E. Numan, is a town port located in Adamawa State, Nigeria, situated on the Benue River. It is approximately 50 kilometers from Yola, the state capital and is opposite the Gongola river, which is a major tributary of river Benue. The main ethnic group in Numan is the Bachama, though the area is also a home town to other groups such as Mumuye, Higi, Fulani, Chamba, Margi, Kilba, Gude and Bata peoples. The city has a population of about 77,617 residents based on the 2006 census.

Faecal Sample Collection

Faecal samples were collected based on; sex, age, breed, type of feed, and management system. About 166 fresh faecal samples was randomly collected from farm across the town using a plain sample bottle containing 20% formalin (WHO, 2003, Ngowi, et al., 2004, Taylor et al., 2016), and transported in an ice pack to the department of veterinary medicine laboratory, University of Maiduguri, Borno State, Nigeria.

Feacal Analysis

The faecal samples were grossly examined for the presence of adult parasite. Microscopic Examination was also carried out using Floatation techniques (Taylor et al., 2016). The technique was carried out as follows: faecal sample of 2–3 grams was mixed gently using a pestle and mortar with a physiological solution (saturated salt solution); it was then sieved using a sieve into a floatation bottle (Bijou bottle), which was filled to the brim and was covered with a cover slip for 15–20 minutes. The cover slip was removed and placed on a clean glass slide. It was put under a light microscope and viewed at a microscopic magnification of 100mm.

Statistical Analysis

Prevalence and 95% CI were calculated using Epitools Epidemiological Calculators (Sergeant, ESG, 2018).

3. RESULTS AND DISCUSSION

Prevalence of Ascaris spp in Numan local government area

Out of 166 fecal sample examined, an overall prevalence of 9 (5.4%) was recorded for *Ascaris spp* infestations at different farm levels. Table 1

Table 1. Prevalence of *Ascaris spp* in Numan local government area

No. of Samples Examined	No. of Negative Samples	No. of Positive Samples	Prevalence Rate (%)	Lower 95% CI	Upper 95% CI
166	157	9	5.4	2.88	9.98

Prevalence and Risk factors associated with Ascaris spp infection

Our result shows that, for sex the female has higher prevalence of 4(6.8%) than Male 5(4.6%), For age the young have higher prevalence of 7(5.5%) than adult 2(5.0%), while for management, Free range have higher prevalence of 3(9.3%), followed by semi intensive 4(4.5%) and least intensive 2(4.3%). The local breed 9(5.4%) and local feed 9(5.4%) could not be calculated because no data for exotic breed and commercial feed respectively. Table 2 and Figure 1-4

Table 2. Prevalence and Risk factors associated with *Ascaris* spp infection

Risk Factors	No. of Samples Examined	No. of Negative Samples	No. of Positive Samples	Prevalence rate (%)	Lower 95% CI	Upper 95% CI
Sex						
Male	108	103	5	4.6	1.99	10.38
Female	58	54	4	6.8	2.71	16.43
Age						
Adult	40	38	2	5.0	1.38	16.5
Young	126	119	7	5.5	2.72	11.02
Breed						
Local	166	157	9	5.4	2.88	9.98
Exotic	0	0	0			
Management						
Free range	32	29	3	9.3	3.24	24.22
Intensive	46	44	2	4.3	1.2	14.53
Semi-Intensive	88	84	4	4.5	1.78	11.11
Type of Feed						
Local	166	157	9	5.4	2.88	9.98
Commercial	0	0	0			

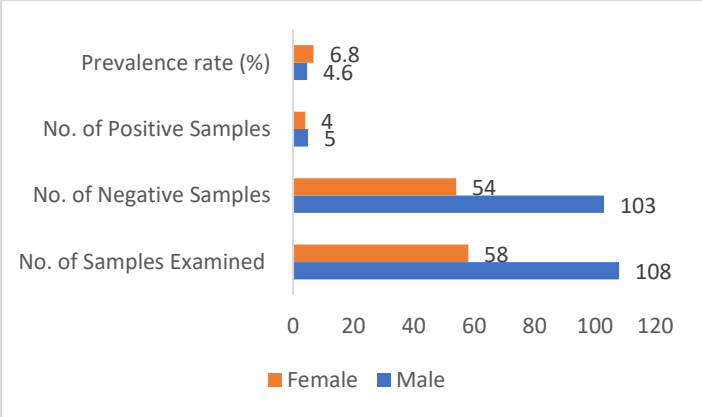

Figure 1. Prevalence of Risk Factors of sex associated with Ascaris *spp* infection

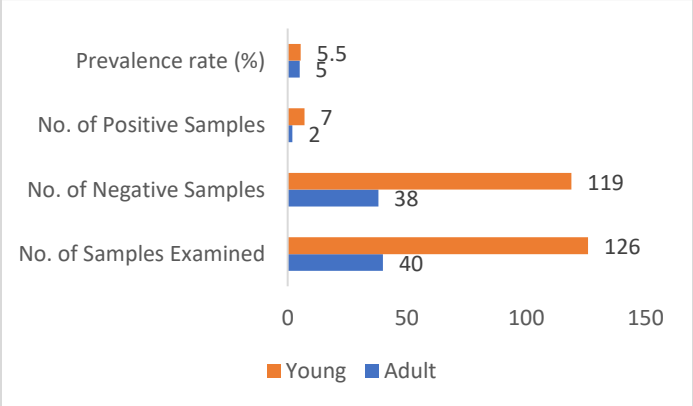

Figure 2. Prevalence of Risk Factors of Age associated with Ascaris *spp* infection

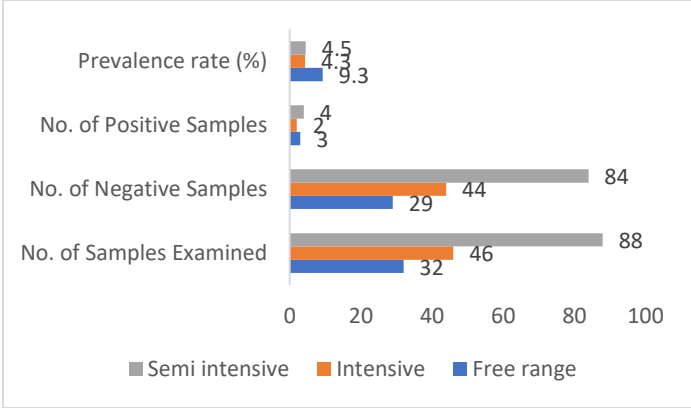

Figure 3. Prevalence of Risk Factors of Management associated with Ascaris *spp* infection

Figure 4. Plate (A, B, C) Ascaris *spp* viewed with light microscope at X 100mm magnification.

Gastrointestinal parasitism of pigs affects 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). This study has an overall prevalence of 9 (5.4%) of *Ascaris spp* which is lower when compares with the findings of 16.5 %,12.5%, 24.17 %, from Nasarawa, Plateau and Benue state (Karaye et al., 2016; Akanni et al. 2017: Yaji et al., 2019) but higher than report of (Dogo et al.2017; Abonyi et al., 2020) who reported 4.4% and 0.7% from Plateau and Enugu State.

In our study the young pigs are more at risk, with a prevalence of 7(5.5%) when compared to adult pigs 2(5.0%). This confirms the report of (Abonyi et al., 2020) who reported that the young pigs are more at risk than adults. This may have immunological undertone. In young animals the immune system is not fully develop as result they are more susceptible to parasitic infections. This disagree with studies by (Akanni et al. 2017; Yaji et al., 2019) reported that adult pigs 50(35.7), 84(37.5%) harbor more parasite

than young pigs 12(12%), 50(29.5). Female have higher prevalence of 4(6.8%) than Male 5(4.6%), this is in agreement with studies of (Abonyi et al., 2020) female 262(30.7%) and male 138(25.3%) but disagree with studies of (Akanni et al. 2017; Yaji et al., 2019) male 36(36%), 72(39.6%) and female 26(26%), 62(28.4%) respectively. In female pigs, stress and hormonal changes associated with gestation, farrowing and lactation in sows tend to lower their general immune status and resistance to GIP infection, resulting in higher worm burdens than in males. Additionally, sows are reared for longer period than the boars and this extended period of rearing exposes them to the worm infestation much more than the males (Abonyi et al., 2020). For management, Free range have higher prevalence of 3(9.3%), than intensive management 2(4.3%) This confirms the report of (Jatfa et al., 2018).

Prevalence of *Ascaris spp* has been reported from different parts of the world *A.suum* (12.18%), at pig breeding centre in Chongquing, China (Lai et al., 2011), *A.suum* (18.5%) in Pankshin Urban (Agumah et al*.,* 2015), *Ascaris suum* (40%), Kabale District in Uganda (Nissen et al., 2011) *A. suum* eggs 17 (11.3 %), in America (Krishna et al., 2016), *A. suum* 12.6% in Ethiopia (Geresu et al., 2015), *Ascaris sum* (2%) in Ejisu Municipality of Ghana (Atawalna et al., 2016), *A.suum* (23%), in Bangladesh (Julius and Oladapo, 2016).

Ascaris has zoonotic potential which is significant from public health point of view. *Ascaris* infections in humans is acquire through consumption of contaminated food and water by faeces of pigs containing eggs of the parasites (Onunkwo et al. 2018). The use of pig manure in vegetable farming and consumption of pork meat has tendency of spreading the infection in the study area (Nwanta et al. 2011).

The difference in the findings of these study with others could be attributed to disparity epidemiological and climatic factors capable of influencing gastrointestinal infections such as husbandry systems, breed, season, nutritional status, availability of veterinary services, interpretation of results/observation and number of samples examine. Moreover, some of the findings emanated from abattoir surveys which are naturally biased, because most sick or unproductive animals culled from the farms are salvaged at the abattoirs; hence higher chances of pathogen recovery from abattoir-based than farm-based studies (Obonyo et al., 2013; Abonyi et al., 2020).

4. CONCLUSION

Our result shows that, the young pigs and female pigs have higher prevalence than adult and male while Free range pigs have higher prevalence, more than intensively manage pigs. Poor management practices and climatic factors may have favored the endemicity and proliferation of the parasites resulting in high prevalence of gastrointestinal parasites. This calls for drastic preventive and control measures against gastrointestinal parasites to boost pig production and reduce public health consequences.

5. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interest regarding the publication of this article.

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