



A SURVEY FOR HAEMO-PARASITE OF PIGS SLAUGHTERED IN JOS ABATTOIR PLATEAU STATE NIGERIA

*¹Gagman, H. A., ²Ajayi, O. O. and ¹Yusuf, A.S.

¹Department of Biological Sciences, Bauchi State University Gadau, Bauchi State, Nigeria

²Department of Zoology, University of Jos, Plateau State, Nigeria

*Correspondence author

ABSTRACT

A survey for haemo-parasite of pigs slaughtered at the Jos Abattoir was carried out between May and November 2007, to determine the sex, age, breeds related incidence and possible risk factor(s) to the spread of infection using direct smear and staining technique. Out of the total of 532 pigs examined, 92(17.29%) were positive for four genera of protozoan parasites with *Trypanosoma spp* accounting for 10(1.88%), *Babesia spp* 23(4.32%), *Anaplasma spp* 17(3.20%), and *Eperythrozoon spp* 42(7.80%). The female pigs harboured more of the blood parasites, 50(9.40%), than the male pigs, 42(7.80%). The sex related rate of infection ranged from 1.5% - 4.51% and from 0.75% - 3.38% for female and male pigs respectively. However, chi square analysis shows no significant differences in the sex related prevalence of haemo-parasites ($p \geq 0.05$). The parasites established themselves more in the adult pigs, 79(18.8%) than in the young pigs 13(11.61%). The infection rates ranged from 0.89% to 5.36% and from 2.14% to 8.57% for adult and young pigs respectively. Chi square analysis shows a significant difference in the infection rate between adult and young pigs ($p \geq 0.05$). The blood parasites encountered in the different breeds of pigs were as follows: 87(17.51%) in the large white, 2(17.51%) in the large black and 2(15.00%) in the mixed breed. There was no significant difference in the rates of infection among the different breeds of pigs ($p \geq 0.05$). Generally there was low rate of occurrence 17.29% for haemo parasites of pigs slaughtered at the Jos Abattoir.

Keywords: Endemicity haemo-parasite, infection, pigs, rate,

INTRODUCTION

A parasite is an organism that has sustained contact with another organism to the detriment of the host organism, Weng, *et al*, (2005). Parasites are those organisms, which derived their means of survival from other animals called hosts and can deprive their host sometimes from surviving Hall, (1980). A parasite is any living organism (plant or animal) which lives inside or on the surface of another organism (the host) and from which it gains its food supply and other means of livelihood Henderson, (1990).

Parasites of pigs cause major economic loss globally to pig and pork industries and farming community as a consequence of reduced feed conversion and weight gains. Boes *et al*, (2000), Joaching and Dulmar, (2001). Haemo-parasites of pigs are endemic and prevalent within the tropics and subtropics Levine, (1985). The most prevalent of blood parasites of pigs include the following: *Trypanosoma congolense*, the most common among the pigs in the tropics, *Trypanosoma species*, *Eperythrozoon peruvum*, *Eperythrozoon suis*, *Babesia trautmani*, *Babesia perroncitoi*, *Anaplasma species* Finelle, (1973) and Levine, (1985).

Pigs become infected with haemo-parasites due to the bite of blood sucking arthropods such as tsetseflies, ticks, lice etc Weng *et al*, (2005). *Eperythrozoon*, *Rickettsiae*, *Theileria*, and *Babesia* species are transmitted by louse and ticks Ngole *et al*. (2001), Bell-Sakyi *et al*. (2004). The development of parasites eminently depended on the suitable tropical

environment. Robert and Rodric, (2005). The objectives of this research are to determine sex, age, and breed related rate of infection with haemo-parasite of pigs slaughtered at the Jos Abattoir and also to determine the possible risk factor to the spread of the epidemic.

MATERIALS AND METHODS

Study Site

Collection of samples was carried out from pigs slaughtered at Jos Abattoir. Jos Abattoir is located in Jos South Local Government Area of Plateau State (Figure 1). Jos South Local Government Area is located south of Jos North between longitude 8° 48'W and latitude 9° 94'N., in North Central Geo-political Zone of Nigeria. The headquarters is at Bukuru, which is about 15 kilometers from Jos town, the capital of Plateau State. The area is about 1,250 metres above sea level. The abattoir is a processing unit for pork hence provides job opportunity for butchers and markets for farmers (Animal breeders).

Collection of Blood Sample

Blood samples were collected according to method demonstrated by Adejinmi *et al*. (2004) blood samples were collected from the jugular veins of each pig with a sterile hypodermic needle and syringe.

About 2ml of blood was collected from each animal into bottles containing ethylenediamine tetra-acetic acid (EDTA) as anticoagulant.

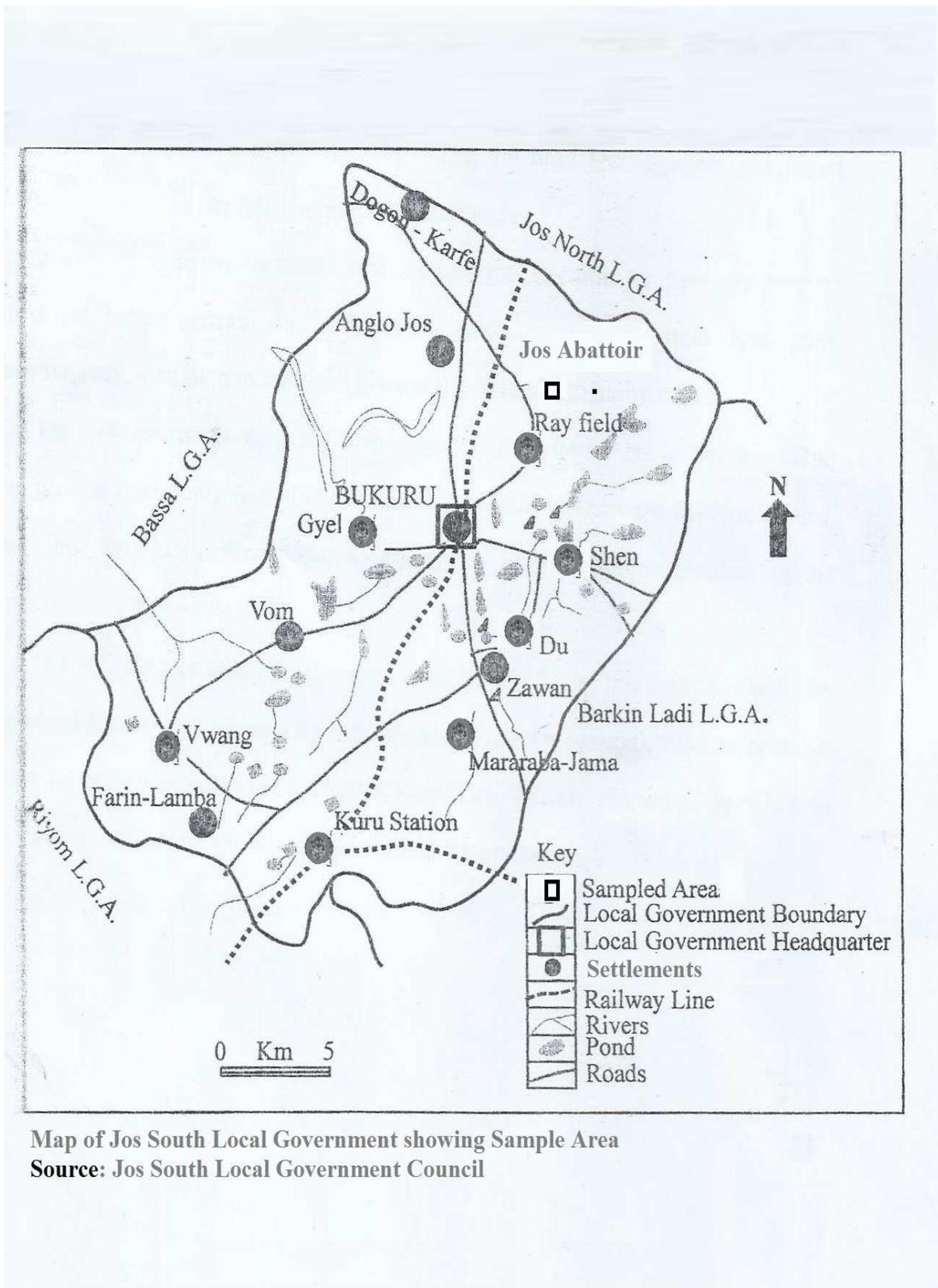


Figure 1: Map of Jos South Local Government Area indicating the location of the abattoir

Analysis and Examination of Blood Sample

➤ **Preparation of Thick Blood Film**

Thick blood film was prepared using Standard Method described by Adams *et al*, (1977), Cheesbrough (2000). A blood sample was drop on a clean grease-free glass slide and made into a thick circular film, waved in the air and allowed to dry. It was fixed in 70% methanol for 3 minutes and air dried. It was stained with Giemsa stain for 30 minutes, washed under tap water till the blue Giemsa colour disappeared. The slide was air-dried and examining under the oil immersion objective of the microscope for the presence of haemo-parasites. The parasites were identified using the keys adopted by Chandler (1961) and Cheesbrough (2000).

➤ **Preparation of Thin Blood Film**

A drop of blood was placed on one end of a grease-free glass slide. Another slide with a narrower edge was held at 45° to the drop of blood until the blood spread at its margin. The slide was steadily and rapidly moved backwards to make a thin film. The film was air-dried and fixed in 70% methanol for about 2 minutes, stained with Giemsa's stain for 30 minutes. The slide was washed under tap water, air-dried and examined under the oil immersion objective of the microscope for the presence of haemo-parasites adopted by Cheesbrough, (2000), Chandhri and Goupte (2003). The parasites where identified using keys adopted by Cheesbrough, (2000) Chandhri and Goupte, (2003)

➤ **Statistical Analysis**

A Pearson's chi-square test was used to test a correlation between occurrence of haemo-parasites and age, sex and breeds of pigs.

RESULTS

Table 1 shows the overall rate of infection with haemo-parasites of pigs slaughtered at the Jos Abattoir. Four species of haemo-parasite were identified. These include *Trypanosoma sp*, *Babesia sp*, *Anaplasma sp* and *Eperythroozon sp*. *Eperythroozon sp* has the highest infection rate of 7.89% followed by *Babesia sp* 4.32% and *Anaplasma sp* 3.20% *Trypanosoma sp* recorded the lowest rate of 1.88%. The sex related prevalence of haemo-parasites of pigs is shown in Table 2. The parasites established themselves more in males 17.95% than in females 16.78%. *Eperythroozon sp* established themselves more than any of the parasites in both females and males 4.51% and 3.38% respectively. This is followed by *Babesia sp* 4.03% and 2.07%, *Anaplasma sp* 1.50% and 1.69%, and *Trypanosoma sp*, recorded the least rate of 2.01% and 0.75% in both females and males respectively. Chi square analysis revealed no significant difference in the infection rate between females and males pigs at (p<0.05).

The age related rate of infection with haemo-parasites is shown in Table 3. The blood parasites encountered more 18.8% in adult than 11.61% in young pigs. *Eperythroozon sp* recorded the highest prevalence rate of 8.57% and 5.36% for both adult and young pigs respectively. Chi square analysis revealed significant difference in the infection rate between the adult and young pigs (p<0.05).

The rate of infection with haemo-parasites among the various breeds of pigs is recorded in Table 4. The parasites were more encountered among the large white at a rate of 17.51% followed by the mixed breeds 15.00% and the least infection rate was recorded among the large black 13.33%. chi square analysis revealed that, there was no significant difference in the rate of infection with haemo-parasites among the different breeds of pigs (p<0.05).

Table 1: Overall rate of infection with haemo-parasites of pigs slaughtered at the Jos Abattoir

S/N	Parasite	No. of pig examined	No infected	Percentage
1	<i>Trypanosoma spp</i>	532	10	1.88
2	<i>Babesia spp</i>	532	23	4.32
3	<i>Anaplasma spp</i>	532	17	3.20
4	<i>Eperythroozon</i>	532	42	7.89
5	Total	532	92	17.29

Table 2: Sex related prevalence of haemo-parasite of pigs slaughtered at the Jos Abattoir.

Parasite type	<i>Trypanosoma spp</i>	<i>Babesia spp</i>	<i>Anaplasma spp</i>	<i>Eperythroozon</i>		
Sex	No of Pig Examined	No infected (%)	No infected (%)	No infected (%)	Total infected (%)	
Sows	298	6(2.01)	12(4.03)	8(1.50)	24(451)	50(16.78)
Hogs/boars	234	4(0.75)	11(2.07)	9(1.69)	18(3.38)	42(17.95)

Table 3: Age related prevalence of haemo-parasites of pigs slaughtered at Jos Abattoir.

Parasite type		<i>Trypanosoma spp</i>	<i>Babesia spp</i>	<i>Anaplasma spp</i>	<i>Eperythrozoon</i>	
Age	No of Pig Examined	No infected (%)	No infected (%)	No infected (%)	No infected (%)	Total infected (%)
Piglet(young)	112	1(0.89)	4(3.50)	2(1.79)	6(5.36)	13(11.61)
Adult	420	9(2.14)	19(4.52)	15(3.57)	36(8.57)	79(18.8)

Table 4: Breeds related prevalence of haemo-parasites of pigs slaughtered at Jos Abattoir.

Parasite type		<i>Trypanosoma spp</i>	<i>Babesia spp</i>	<i>Anaplasma spp</i>	<i>Eperythrozoon</i>	
Breed	No of Pig Examined	No infected (%)	No infected (%)	No infected (%)	No infected (%)	Total infected (%)
Large white	497	9(1.81)	21(4.23)	16(3.22)	41(8.25)	87(17.51)
Large black	15	1(6.67)	1(6.67)	0(0.00)	0(0.00)	2(13.33)
Mixed breed	20	1(5.00)	0(0.00)	1(5.00)	1(5.00)	2(15.00)

DISCUSSION

Four genera of haemo-parasites were encountered during the investigation, namely *Trypanosoma*, *Babesia*, *Anaplasma*, and *Eperythrozoon*. This is consistent with the findings of Okon (1976), Adejimi *et al*, (2001) there was no significance difference in the Sex, and breeds related rate of infection with Haemo-parasites in the Pigs. However, there is significant difference in the infection rate between young and adult pigs. This difference may not be unconnected with the free range system of rearing of pigs where the pigs roam about. In this case the adult pigs move far away from their pen house than the young pigs, hence adult are exposed to blood sucking insects which are vectors of haemo-parasite than the young pigs. Another reason could be that, most of the young once are still breast feeding or newly wean, hence have more immunity than their adult's counterparts.

The infection rate of haemo-parasite is generally low. This could be due to high fats deposit in the subcutaneous tissue layer of the pigs which make it difficult for the insect vectors of haemo-parasite of pigs to penetrate through the skin in their biting and sucking mode of feeding.

Eperythrozoon suis causes eperythrozoonosis, a *haemotrophic* disease in swine. The disease is clinically characterized by anaemia, jaundice, marked paleness of the mucous, presence of blood of water aspect, delay of growth and increase mortality in feeder pigs Hoelzie *et al*, (2003).

17.29% of the 532 pigs sampled were found to be infected with the four genera of the haemo-parasites this is contrary to the findings of Dipeolu *et al*, (1982) who reported that 81% of local pigs were positive for blood parasites while 41% exotic pigs had haemo-parasites in Ibadan. The differences in this study and that of Dipeolu *et al*, (1982) may be due to the fact

that the pigs are exposed to more insects vectors of blood parasites in the western part of Nigeria than in the north also from 1981 to 2007 there is great improvement in veterinary medical care, which greatly reduces infections rates of haemo-parasites. *Babesia* of swine causes babesiosis. Piglets and adults swine are equally susceptible. In the acute stage of disease, there is fever, anemia, haemoglobinuria, Jaundice, and Oedema of the affected parts. Pregnant sows may abort and mortality may reach 50% Soulsby, (1982).

There is need for appropriate treatment against these parasites in infected pigs. This when carried out will improve the living standard of the owners since pigs have great economic potentials among the rearers in Jos. Also the treatment is important to avoid transmission of zoonoses among the pork eaters and sometimes even the none eaters as they interact with the park eaters. A free ranged system of animal husbandry should be discouraged among pig farmers. This should be backed up by legislation and penalties for defaulters. These will minimize exposure of pigs to parasites. Porks should be thoroughly prepared to get rid of the parasite (Adults, Eggs, Cysts) before eating.

CONCLUSION

The haemo-parasites recorded in this study are *Trypanosoma*, *Babesia*, *Anaplasma* and *Eperythrozoon* species which occurred among 92 (17.29%) out of 532. Though the infection rate in this finding is low as compared to previous researches, the infection with parasites is endemic. Some of the parasites constitute known zoonoses for man and may be involved in the epizootiology of a number of parasites that affect other domestic species in the area Fabiyi, (1979). The present result should therefore, be of interest to veterinarians, pig farmers and health workers.

REFERENCES

- Adams K. M. G, Paul, J. and Zama V. (1977). Medical and Veterinary protozoology, an illustrated guide, Revised edition, published by Churchill living stone Edinburg and London pp 32 – 48.
- Adejinmi, J. O *et al* (2004). Studies on the blood parasite of sheep in Ibadan Nigeria. *African Journal of Biomedical Research*. **7**: 41 – 43.
- Bell-Sakyi L., Koney E. BM, *et al* (2004), *Ehrlichia ruminantium seroprevalence* in domestic ruminants in Ghana. Longitudinal Survey in the Greater Region. *Veterinary Microbiology* **100**: 175 – 188.
- Boes, J., Willingham, A. L. Nansen, P. (2000). Prevalence and distribution of pig helminthes in Dongtin region China. *Journal of Helminthology*, **74**: 45-52.
- Chandhri S. S. Goupte S. K (2003), Manual of General Veterinary Parasitology, First edition, *International book distributing co.* pp 19 – 48.
- Chandler, A. C., Read, C. P. (1961). *Introduction to Parasitology*. John Wiley and sons Inc. London 10th edition pp 140-145.
- Cheesbrough M. (2000). District laboratory practice in tropical countries, part 2. Press sundicate of the University of Cambridge U.K Pp 320 – 321.
- Dipeolu, O. O. Majaro, O. M and Akinboade, O. A. (1982), Studies on blood parasites of pigs in Ibadan. *Journal of Veterinary Parasitology* 10: 87 – 90.
- Fabiya, J. P. (1979). Helminths of the Pig on Jos Plateau, Nigeria: relative prevalence, abundance and economic significance; *Journal of Helminthology* **53**: 65-71.
- Finelle, (1973), African Animal Trypanosomiasis. *World Animal Review* 7: 1 – 6 and 8: 24 – 27.
- Hall, T. B. (1980). *Diseases and parasites of Livestock in the Tropics*. Wing Tai Cheung printing Company Limited Hong Kong. Pp 192-214.
- Henderson D. C (1990), The Veterinary sheep farmers. Farming press books Pp 477
- Hoelzle, *et al* (2003), Development of diagnostic PCR assay based on novel DNA sequence for the detection of *Myeoplasma suis* (*Eperythrozoon suis*) in porcine blood *Veterinary Microbiology* 93: 185 – 199.
- Joaching, A., Dulmar, N. (2001). Occurrence of helminthes in the pig fattening units with different management system in Northern Germany. *Veterinary Parasitology*. **9**: 135-146.
- Levine N. D. (1985) Veterinary Protozoology Iowa state University press, pp. 34 – 39.
- Ngole, I. U, Ndamukong K. J. N and Mbuh J. U (2001). Intestinal Parasites and Blood Picture of Dwarf Forest Goats Slaughtered in Buea South West, Cameroon. *Bulleting of Animal Health and Production in Africa*. **49**: 134 – 138.
- Okon E. D. (1976). *Blood parasites of local pigs in Ibadan Nigeria*. Tropical Animal Health and production 8: 96 – 97.
- Robert, M. C. and Rodric, C. I. (2005) Common internal parasites of swine, University of Missouri *Mu Extension*. **30**: 1-7.
- Souslsby, E. J. L. (1982), *Helminths, arthropods and protozoa of domesticated animals* Bailerier Tindel and cox limited London seventh edition pp 517 – 755.
- Weng, Y. B. Hu, Y. J., Li, Y., Li, B.S., Lin, D. H., Xie, Gasser, R. B., Zhu, X. Q. (2005). Survey of intestinal parasites of pigs from intensive farms in Guangdong province, people's Republic of China. *Journal of Veterinary Parasitology*. **127**: 333-336.