**International Journal of Science Academic Research**
Vol. 02, Issue 08, pp.2067-2069, August, 2021
Available online at http://www.scienceijsar.com

ISSN: 2582-6425

**Research Article**

# PARASITIC HELMINTHS PREVALENCE OF PIG DUNG AND HOUSEFLIES CAUGHT IN THE ENVIRONS OF 3 PIG FARMS IN PORT-HARCOURT METROPOLIS

***Anigbo, Nkem Juliet, Ogugbue, C.J. and Okpokwasili, G.S.C.**

[1]Rivers State Ministry of Education, Nigeria
[2]Department of Microbiology, University of Port Harcourt Abuja campus, Rivers state, Nigeria

**Received** 20th June 2021; **Accepted** 25th July 2021; **Published online** 30th August 2021

**Abstract**

The presence of zoonotic parasites in pig dungs used as soil fertilizer and on houseflies that shuffle between the dung filth and human habitats poses a risk to human health. The aim of this study was to assess the dissemination of parasitic helminths in pig dungs by houseflies caught in its vicinity of 3 pig farms in Port-Harcourt metropolis. The samples were examined for the presence of parasitic helminths using sedimentation method. The results indicated the presence of eggs of hookworm and oocysts of *Isospora belli* in pig dungs obtained from site U which an indication of poor management protocols, but not on the houseflies caught at those pig farms. Routine deworming practices could help in reducing the risk of transmitting potential helminths diseases from pigs to the unsuspecting public.

**Keywords:** Parasitic helminths, Pig dungs, Houseflies, Dissemination.

## INTRODUCTION

Pork meat is referred as the "other white meat". In Nigeria, the establishment of piggeries is on the increase due to the high demands of the meat championed by the nation's growing human population and health issues (Njoba *et al.,* 2018a). In the Southeastern part of the country, pig farming is mostly a family business (Onunkwo *et al*., 2011) or as a part of the component of the urban economy contributing majorly to job creation, poverty alleviation and meat production (Akanni *et al.,* 2017). Pigs contribute about 40% of meat consumed globally (Karaye *et al.,* 2016). Piggeries are now one of the confined animal feeding operations (CAFO) and the greatest challenges facing pig farmers is the accumulation and the need to dispose huge amount of wastes; a few alternatives exist like been used to produce biogas, feedstock or commonly used as a soil fertilizer. However, indiscriminate litter of swine wastes as soil mulching and its channeling to receptacle leads to seepage into ground water, usually in bypass via cracks and fissure. Pig wastes contains myriad of microbes especially parasites and its filtration into the environment poses a large risk to human and animal health (Davies, 1997; D'Dizer *et al.,* 1984; Michael, 2011) of which some may be inhabited by microbes causing systemic or local infection. Parasite infections causes substantial negative effects in the econometrics and profitability of pig farming enterprises. Subsistent pig farming in which piggeries are sited within residential areas to prevent animal theft, makes for close association between pigs and humans which exacerbates transmission of zoonotic infections (Agustina *et al.,* 2017). Sometimes, human may acquire parasite infection via ingestion of food, meat, or water contaminated with viable egg of the parasites (Idika *et al*., 2017). Houseflies are generally known as a synanthropic fly because they indiscriminately travel between filth and human food and can contributes significantly to the spread of diseases.

***Corresponding Author:** ***Anigbo, Nkem Juliet,***
Rivers State Ministry of Education, Nigeria.

## MATERIALS AND METHODS

### Study Area

This study was carried out in Port Harcourt, Rivers State for a duration of 12 calendar months using bi-monthly sampling. Three (3) piggery houses were selected based on the willingness of the operators to participate and their waste management system; Site A at Oyigbo (Sole Investment), Site R at Rumuodumaya (a World Bank assisted Agricultural Project) and Site U at Aluu. Site "A" piggery has its waste channeled to a nearby Burrow-pit, Site "R" piggery runs an anaerobic lagoon reservoir whereas Site "U" operates a dump site waste management.

### Collection of Houseflies

The houseflies were trapped using sterile entomological sweep nets. An estimate of about 100 flies were collected for each sampling at different locations. Forty(40) houseflies each were obtained from each piggery and for 500m away from the piggery houses, forty(40) houseflies collected from a serene environment serve as control. The houseflies were attracted using a bait (ripe fruit) (Ugbogu *et al.,* 2006). They are aseptically transferred into sterile bottles and taken to the laboratory for bacteriological analyses.

### Collection of Pig Dungs and Manure

The fresh morning pig dungs were collected along the pens and aseptically transferred into sterile bottles. Also, dumped manure waste were collected aseptically from the deposit site and transferred into a sterile bottle which were already labeled appropriately. The samples were taken to the laboratory for further microbiological studies (Seshie-Doe, 2017)

### Evaluation for the Parasitic Helminths

To determine for the presence of parasitic helminths in pig dungs and, on the houseflies, the method described by Ochei

and Kolkhtar (2012) was employed. A measure of 0.5 g of the pig dungs and 1g of houseflies was transferred to 10 ml of 10% formalin in a 5 ml test tube. The mixture was homogenized and allowed to stand for 30 minutes to ensure adequate fixation. The fecal/insect suspension was sieved through two layers of gauze in a funnel into a centrifuge tube. About 3-4 ml of diethyl ether was added and shaken well for 30 seconds. The tube was centrifuged for 2-3 minutes using universal centrifuge (Universal 32-model). The plug of debris was loosen using an applicator stick and the tube inverted to pour off the ether, the debris and the formalin. The sediments were transferred onto a slide, covered with coverslip and viewed for parasites using iodine. The number of each type of parasite in the entire preparation was counted and reported as parasites per gram of feces/per gram of houseflies.

## RESULTS AND DISCUSSION

The helminth profile of the excreta and houseflies associated with study areas as presented in Table1. The month of October Excreta obtained from Oyigbo and Rumuodumaya was observed not to have neither egg nor oocyst of known helminths including hookworms. The samples obtained from Aluu farm facility was observed to contain eggs of hookworms. The houseflies studied in the same month of October were observed not to contain neither eggs nor Oocyst of known helminths including hookworms. Furthermore, samples obtained for the months of December, February, April, June and August from the Oyigbo farm facility did not contain any eggs nor Oocyst of known helminths including hookworms for both excreta and housefly. The study carried in the month of August for Rumuodumaya was observed to contain at least two (2) eggs of hookworms. The farm facility in Aluu was observed to possess eggs of hookworm in excreta or pig dungs for the months of October (1-2), December (1-2), February (2-3), April (3), June (3-4) and August (6) eggs of hookworm and *Isospora belli* oocyst seen while the houseflies were observed not to possess neither egg nor oocyst of known helminths including hookworms. *Toxoplasma gondii*), and gastrointestinal tract. Other parasites widely reported in previous studies are *Toxoplasma gondii*, *Trichinellaspiralis*, *Taeniasolium*, *Sarcocystissuihominis*, *Ascarissuum*, *Entamoebapolecki*, and *Fasciolopsisbuski*. The month of October Excreta obtained from site A and R was observed not to have neither egg nor oocyst of known helminths including hookworms whereas the samples obtained from farm U facility was observed to contain eggs of hookworms. The houseflies studied in the same month of October were observed not to contain neither eggs nor oocyst of known helminths including hookworms. Furthermore, samples obtained for the months of December, February, April, June and August from the Oyigbo farm facility did not contain any eggs nor oocyst of known helminths including hookworms for both excreta and housefly. The study carried in the month of August for Rumuodumaya (R) was observed to contain at least two (2) eggs of hookworms. The farm facility in Choba (U) was observed to possess eggs of hookworm in excreta or pig dungs for the months of October (1-2), December (1-2), February (2-3), April (3), June (3-4) and August(6)eggs ofhookworms and*Isospora belli*oocyst seen,while the houseflies were observed not to possess neither egg nor oocyst of known helminths. The report of Cannon-Franco *et al*. (2012) agreed with our present study when he documented the presence of *Isosporasuis*, *Eimeriasuis* (42.5%), *E. espinosa* (35%), *Strongyloidesransomi* (28.8%), *E. perminuta*, E. cerdonis (3.8%), E. porci (2.5%) and eggs of *Taenia* spp.in his study on waste from a swine farm in Santa Rosa de Cabal – Risaralda, Colombia. Forster *et al*. (2009) reported that vectors could also lead to spread in the spread of protozoan-parasitic organisms especially metazoans. They reported the potential of houseflies within the pig's pen to carry causative agents for a number of gastrointestinal tract infections such as *Ascarissuum*, *Strongyloidesransomi*, *Metastrongylus* sp. and *Strongylida*sp; this report aligns well with the findings in the site U as they reported a high number of *A. suum* eggs (62.0% of all found nematode eggs), many eggs of *strongylid* nematodes (21.0%), some eggs of *S. ransomi* and few eggs of *Trichurissuis* but in contrast to the

**Table 1. Profiles of Helminths and their eggs in pig dungs and houseflies caught in the vicinity of pig farms during the study duration**

| Months | Sample viewed | A | R | U |
|---|---|---|---|---|
| October | Excreta | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Eggs of hookworm seen(1-2) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |
| December | Excreta | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Eggs of Hookworm seen (1-2) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |
| February | Excreta | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Eggs of Hookworm seen (2-3) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |
| April | Excreta | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Eggs of Hookworm seen (3) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |
| June | Excreta | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Eggs of Hookworm seen (3-4) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |
| August | Excreta | Eggs/oocysts not seen | Eggs of Hookworm seen (1-2) | Isospora belli occyst and Eggs of Hookworm seen (6) |
| | Housefly | Eggs/oocysts not seen | Eggs of hookworm/Oocysts not seen | Not seen |

According to Tumusiime *et al*. (2020) helminths are parasites of vast economic importance to both the environment and the community. These parasites can attack both livestock and decrease the yield in meatification and also lead to loss of the farm entirely. These fatalities created by these parasites have been credited by a number of peer reviewed articles to the success of these parasites to live in any part of the pig both internal and external organs leading to their classification into both ectoparasites and endoparasites (Atawalna *et al.,* 2016). Some of the organs of pigs attacked by parasites as reported by previous researchers are lungs (*Metastrongylus* spp.), kidney (*Stephanurusdentatus*), muscle (*Cysticercuscellulosae*, potential of houseflies examined in this study to transmit these parasite on their exoskeleton. Their investigation further prove that housefly can be a transmitter of pig infections in their study in Germany, however, the findings in this study showed otherwise. The presence of parasites in the pig dungs especially in site U was correlated to lack of hygiene among farmers and pig handlers in that they do not deworm the pigs or also to the non-compliance of the personnel handling the pigs to proper use of disinfectants in the routine cleaning of the pig pens. The site A under survey, made use of ivermectin as their choice of drug for Antihelminths which could be attributed to the dearth of eggs of hookworm observed in the

pig dungs. The livestock farming inputs such as veterinary drugs or the services of veterinarians may not readily available in location U which probably gave rise to parasitic helminths invasion there. The discrepancies in the findings could be attributed to disparity in epidemiological and climate factors capable of influencing dynamics such as husbandry systems, breed, season, nutrition status, availability of veterinary services, health status of breeders or individual differences in interpretation of test observational results and total number of samples examined. In this case the waste management strategy of the individual farms could probably be identified as a source to mitigate the spread of these parasites from the farm locations to other non-target destinations. Be it as it may, the houseflies examined showed no records of harboring or carrying these parasitic worms in their exoskeleton or gut signifying that the only possibilities of parasitic worms in the adjoining areas is if the pig dungs are released in the environment without any form of treatment to destabilize the helminths. The helminthologic indices of the pig dungs and houseflies- caught in vicinity of the pig farms have showed the presence of egg of hookworm and oocyst of *Isospora belli*in siteU, which facilitates transmission of infections to human in cases of occupational exposure where cohabitation with animals still exists (Onunkwo *et al.,* 2018). Use of pig dungs as manure in fruits and vegetable gardens may exacerbates dissemination of the infection. Therefore, strict farm level biosecurity, proper cooking of meat prior to consumption, good farm management practices and hygienic preparation or processing of edible tissues are recommended as possible solution to curb the transmission of parasites from infected study area (site U) to the populace. Routine prophylactic deworming programme should be institute in each pig farm enterprises as possible panacea to prevent parasitic invasion which reduces profitability of such businesses.

## REFERENCES


Akanni, O. N., Anyaka, K. C., Migap, C. F., and Jatau, J. O. 2017. Prevalence of gastrointestinal parasites in pigs in Jos South local Government of Plateau State. Nigeria. *Haya SaudiJournal of Life Science*. 2: 140- 142.

Atawalna, J., Attoh-Kotoku, V., Folitse, R. D., andAmenakpor, C. 2016. Prevalence of gastrointestinal parasites among pigs in the Ejisu Municipality of Ghana. *Scholars Journal of Agriculture and Veterinary Sciences*. *3*(1): 33-36.

Agustina, N., Cuevas, M., Fernanda, Ojeda, Agustina, A., Ovejero and Ramiro, J.A. 2017. Habitat selection and coexistence in small mammals of the southern Andean foothills (Argentina). *Journal of Agricultural science and technology information.* 62*(*3).112-120

Cañon-Franco, W. A., Henao-Agudelo, R. A. and Pérez-Bedoya, J. L. 2012. Recovery of gastrointestinal swine parasites in anaerobic biodigester systems. *Revista Brasileira de Parasitologia Veterinária*. *21*(3): 249-253.

Davies, S.J., Brown, M.T., and Camilleri, M. 1997. Preliminary assessment of the seaweed Prophyrapurpurea in artificial diets for thick-lipped grey mullet (*Chelonlabrosus) Aquaculture.* 152(1-4):249-258.

Forster, M., Laabs, V., Lamshoft, M., Groeneweg, J., Zuhlke, S., Spiteller, M., andAmelung, W. 2009. Sequestration of manure-applied sulfadiazine residues in soils. *Environmental Science & Technology, 43*(6), 1824-1830.

Idika, K.I, Onuorah, E.C., Obi, C. F., Umeakuana, P., Nwosu, C., Onah, D.N. and Chiejina, S.N. 2017. Prevalence of gastrointestinal helminth infections of dog in Enugu State, South Eastern Nigeria. *Journal of Parasite Epidemiology and Control,* 2(3):62-65.

Karaye, G. P., Iliyaru, D., Dago, A. G., and Madu, H. K. (2016). Prevalence of swine gastrointestinal parasites in four selected Local Government Areas of Nasarawa State, Nigeria. *International Journal of Livestone Resources*. 6: 21-26.

Michael, E. 2011. The Environmental Impact of the disposal of waste in large scale pig production. Earth Times Business News.

Njoga, E.O., Onunkwo, J. I., Okoli, C. E., Ugwuoke, W. I., Nwanta, J. A., and Chan, K. F. 2018. Assessment of antimicrobial drug administration and antimicrobial residues in food animals in Enugu State, Nigeria. *TropicalAnimal Health Production,* 50:897-902.

Ochei, J. and Kolkhtar, A. 2012. Medical Laboratory Science, Theory and Practice. Bulakh PM and DeshmukhS.eds. New Delhi: Tata McGraw-Hill Publishing company limited.

Onunkwo, J. I., Njoba, E. O., Nwanta, J. A., Shoyinka, S. V. O., Onyenwe, I. W. and Eze, J. I. 2011. Serological survey of porcine brucella infection in southeast, Nigeria. *Niger Veterniary Journal,* 32(1):60-62.

Onunkwo, D.N., Amaduruonye,W., Nathaniel, J., Ezike, J.C. and Daniel-Igwe, G. 2018. Haematological and serum biochemical indices of broiler chickens fed roselle seed meal (Hibiscus sabderiffa L.) as replacement for groundnut cake. *Nigeria Journal of Animal Production.* 45*(*2): 196-202.

Seshia-Doe, A. F. 2017. Observed sanitary risks and water quality parameters indicating faecal contamination in urban and peri-urban groundwater sources, Greater Accra, Ghana (Doctoral dissertation, University of Ghana).

Soulsby, E. J. T. 2012. Helminths, arthropods and protozoa of domesticated animals (7th ed.) affiliated East- West Press Private Limited.

Tumusiime, M., Ntampaka, P., Niragire, F., Sindikubwabo, T., andHabineza, F. 2020. Prevalence of Swine Gastrointestinal Parasites in Nyagatare District, Rwanda. *Journal of Parasitology Research*. *2020*.

Ugbogu, O. C., Nwachukwu, N. C., andOgbuagu, U. N. 2006. Isolation of Salmonella and Shigella species from house flies (*Muscadomestica* L.) in Uturu, Nigeria. *African Journal of Biotechnology*, *5*(11).


*******