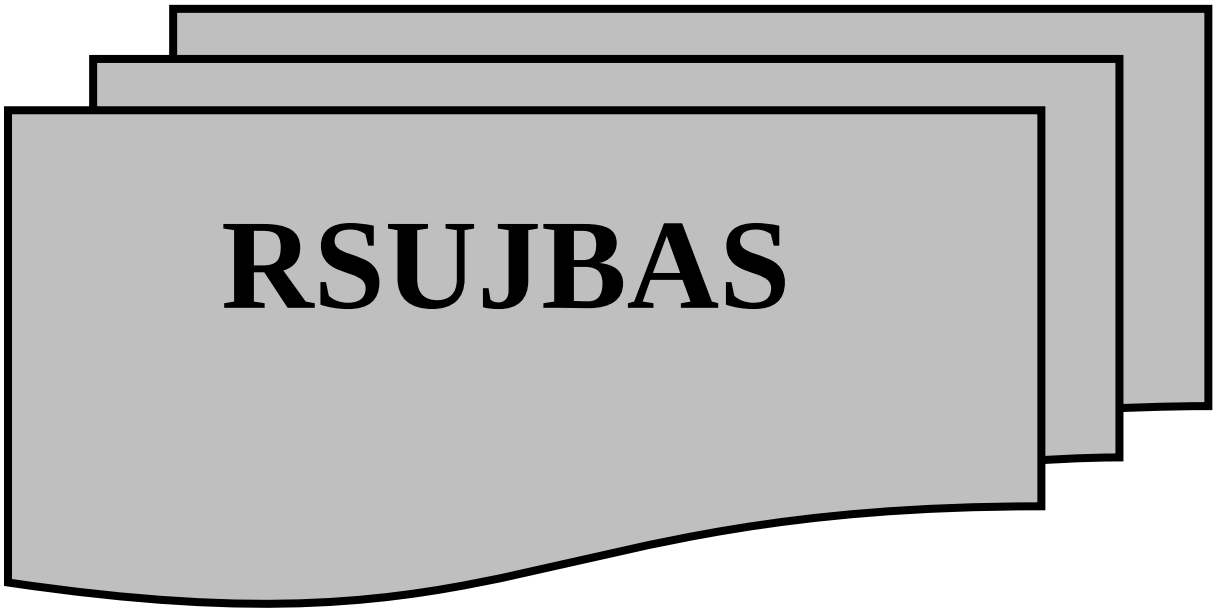
RSU JOURNAL OF BIOLOGY

AND

APPLIED SCIENCES

ISSN: 2811 – 1451



ABOUT US

Rivers State University Journal of Biology and Applied Science (RSUJBAS) publications is a quarterly, open access, international journal for all academic research in science discipline. Microbiology, botany, zoology, environmental biology, chemistry, physics, mathematics, computer science, biochemistry medical laboratory sciences and other applied science related areas. RSUJBAS is a platform set for elites to influence, contribute and communicate to the global environment through their various academic researches. We synergistically engage our noble effort to contribute to the knowledge development, discoveries and innovations in all fields of study. In RSUJBAS we publish research papers on current academic issues with standard scientific reviews. RSUJBAS publishes original research articles, review articles, case studies, short communications, survey report, comparative studies and many more.

Aims and Scope

Rivers state University Journal of Biology and Applied Sciences aims to publish high quality papers that communicate fundamentals and contemporary discoveries both theoretical and practical. Most importantly RSUJBAS seeks to establish a platform for communicating emerging trends in various discipline such as Microbiology, Botany, Zoology, Environmental Biology, Chemistry, physics, Mathematics, Computer Sciences, Biochemistry, Medical Laboratory, Sciences, and other applied sciences related areas.

Description:

- Area of concentration: All science academic disciplines
- Frequency of publishing: Quarterly
- Mode of publishing: both online and print publication
- Language of publication: English
- Double blinded Review Process
- Zero Level Plagiarism Tolerance

Why Publish with us

Low Article Processing Charge (ACP) to promote the research work
Easy and Rapid review process
Instant publication upon acceptance
Dedicated editorial and review team for fast review process
RSUJBAS provides hard copies of publication every quarterly

EDITORIAL BOARD

All Correspondence to
Prof Sam Wenedu (Editor -in -Chief)
Department of Microbiology, Rivers State University
Edictor.ibasya@yoo.com

Or

OLUCHI DICKSON
Publication Manager
Dicksonoluchi87@gmail.com

CONSULTING EDITORS

GUIDELINE FOR MANUSCRIPTS

Manuscripts should be typewritten on an A4sheet having B1.5=line spacing throughout the text. The margins should be 2B54cm (1 inch) in all sides and page number should be consecutively on the bottom of the page. The manuscript should be written in Times New Romans using '12' font size.

For original research paper, the manuscript should be arranged in the following order: Tittle page, Abstract, Keywords Introduction, Materials and Methods Results, Discussion, Acknowledgement, References, Tables with legends and supplementary materials

The tittle page should contain the title, the name(s) of the author(s), the name(s) and address (es) of the instruction(s) where the work was carried out, including a valid e-mail address from the corresponding author along with telephone numbers. The title of the manuscript should be specific and concise but sufficiently informative.

The Abstract should not exceed 250 words and it should contain brief summary of the findings including brief introduction, methodology, results, and conclusions,

The keywords should have a minimum of five and maximum of seven words.

The introduction should provide a clear statement of the problem and indicates aim of the study citing relevant literature to support background statements.

The Materials and Method should include the methods and methodology of the research.

The results should be presented in the form of tables of figures. It should be presented with clarity and precision. Statements used to present results should be written in the past tense. Detailed interpretation of data should not be included in the results but should be put into the Discussion section.

The Discussion should interpret the results clearly and concisely, and should integrate the research findings of this and past studies on the topic. Highlight the significant/unique findings of the research under conclusion.

The acknowledgment of people, grants or funds should be brief.

LIST OF CONTRIBUTORS

Kingsley- Opara, Ngozi
Research Scholar, Department of Computer Science, Ignatius Ajuru University of Education, rivers State, Nigeria.

Prof. Asagba, Prince Oghenekaro.
Visiting Scholar, Department of Computer Science, University of Education (IAUE), Rumolumeni, Port Harcourt, Rivers State Nigeria.
Emial:asagbapince@uniport.edu.ng

Gabriel.B.C., Gabriel M.N.O.Asagba
School of Graduate Studies Ignatius AJURU University of Education ((IAUE), Rumolumeni, Port Harcourt, Rivers State Nigeria.
Department of Computer Science
Gabrielbariyira@gmail.com, meegabzgmail.com

WAIDOR, Tamaramiebi Keith & ASAGBA, Prince Oghenekaro
Department of Computer Science
Faculty of Natural and Applied Sciences
Ignatius Ajuru University of Education, Port Harcourt
Zalimaxxx@gmail.com

Department of Computer Sciences,
University of Port Harcourt, Rivers State Nigeria.
Prince.asagba@uniport.edu.ng

Fibersima, Alalibo Ralph
Visiting Scholar, Department of Computer Science,
University of Port Harcourt, Rivers State Nigeria.
Fiberesima.a.r@outlook.com

Asagba, Prince Oghenekaro.
Visiting Scholar, Department of Computer Science,
University of Port Harcourt, Rivers State Nigeria.
Asagba.prince@uniport.edu.ng

Kingsley- Opara, Ngozi
Research Scholar, Department of Computer Science,
Ignatius Ajuru University of Education, Rivers State Nigeria.
Email: ngoziopara@g.mail.com

Prof Asagba, Prince Oghenekaro.
Visiting Scholar, Department of Computer Science,
University of Port Harcourt, Rivers State Nigeria.

ASSESSMENT OF GASTRO-INTESTINAL HELMINTHS AMONG FREE-RANGE CHICKEN (GALLUS GALLUS DOMESTICUS) IN OGBA/EGBEMA/NDONI LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

ELELE, KINGSLEY
Ignatius Ajuru University of Education, Rumuolumeni Port Harcourt, Nigeria
Department of Biology, Faculty of Natural and Applied Sciences
E-mail: Kingsley.elele@gmail.com
Tel: 08029359564
&
ANWURI, NDUBUISI
Ignatius Ajuru University of Education, Rumuolumeni Port Harcourt, Nigeria
Department of Biology, Faculty of Natural and Applied Sciences
&
ALLEN, GENTLE UME
Ignatius Ajuru University of Education, Rumuolumeni Port Harcourt, Nigeria
Department of Biology, Faculty of Natural and Applied Sciences

Abstract

The prevalence of gastrointestinal helminthes among free-range chicken (Gallus gallus domesticus) in Ogba / Egbema / Ndoni Local Government Area, Rivers State Nigeria, was studied. Twenty-eight birds selected from 4 communities (Erema, Akabta, Obuburu and Akabuka) were euthanized for the study. The formol ether sedimentation and the Zinc sulphate floatation methods were employed. Of the total birds examined, 25(89.3%) tested positive for 6 genera of gastrointestinal parasites (3 nematodes and 3 cestodes). Nematodes were Ascaridia galli 7(28.00%), Heterakis gallinarum 6(24.00%) and Syngamus trachea 1(4.00%) while Cestodes were Raillientina tetragona 4(16.00%), Raillientina cesticillus 2(8.00%) and Choanotaenia infundibulum 2(8.00%). Mixed infection accounted for 3(12.00%). The infection rates according to the sexes sampled were males 94.4% (17/18) while females had 80% (8/10) indicating that the males were more parasitized than the females. Chi square statistics shows that the relationship with respect to sex was statistically non-significant with p=0.236. Parasites were seen in the following preferred sites: Large intestine – Ascaridia galli 6(40.0%), Heterakis gallinarum 2 (13.33%), Syngamus trachea 1(6.67%), Raillientina tetragona 2(13.33%), Raillientina cesticillus 1(6.67%) and Choanotaenia infundibulum 1(6.67%). Small intestine – Ascaridia galli 1(12.50%), Heterakis gallinarum 2(25.00%), Raillientina tetragona 2(25.00%), Raillientina cesticillus 1(12.50%) and Choanotaenia infundibulum 1(12.50%), Caecum –Heterakis gallinarum 2 (100%). The site prevalent distribution was statistically non-significant (p>0.05). Birds from the communities sampled showed the following prevalence rates: Erema - 80% (8/10), Oboburu - 85.7% (6/7), Akabuka – 100% (7/7) and Akabta – 100% (4/4). The community related prevalence is statistically non-significant (p=0.510). This study has revealed the parasite infection status of free-range chicken (Gallus gallus domesticus) in the study area.

Key words: cestodes, chicken, free-range, helminthes, Ogba/Egbema/Ndoni.

1.0 INTRODUCTION

Poultry is one of the most important sources of protein and farm manure, for man and is the main stream income for many homes today (Frantovo, 2002). In the last few years, with increase in poultry production, a lot of losses have been incurred due to disease causing agents such as viruses, bacteria and parasites (Sayyed *et al.,* 2000).

The term "Free range chicken" is used to describe chickens which are reared by allowing the birds to roam around in search of food with little or no attention by the farmers. In this system, low levels of management skills are employed and the birds roost in coops in low sanitary conditions with little control measures against parasitic diseases (Onyirioha, 2011). Free-range system is easy and less expensive method and it is also a good source of meat, eggs, income and other importance as necessary to the farmers, and generally play a vital role in the national economy as a revenue provider to developing countries and improves the nutritional status and income (Onyirioha, 2011). The domestic chicken feed on a wide range of food substances ranging from grains, fruits to insects which may harbor infective stages of parasites thereby predisposing them to parasitic infection, particularly gastrointestinal parasites (Oniye *et al.,* 2000; Frantovo, 2002).

In aviculture, parasitic diseases such as *Eimeria* spp. (protozoa) and *Ascaridia spp., Capillaria spp. and Heterakis spp.* (Helminths) are detrimental to the health of the birds especially the free-range ones, resulting in poor yields both in eggs and meats. (Ensuncho *et al*., 2015; Afolabi *et al*., 2016; Berhe *et al*., 2019)

Helminth parasites have more complex biological cycles including intermediate hosts such as snails, earthworms and insects and this has a unique economic influence in free-range systems (McDougald, 2008; Lozano *et al*., 2019).

2.0 MATERIALS AND METHOD

2.1 Sample Area

The study was carried out in selected communities in Ogba/Egbema/Ndoni Local Government Area of Rivers State, Nigeria. The communities are; Erema (5.2220°N and 6.7070°E; Akabuka (5.2100°N and 6.6398°E); Akabta (5.2388°N and 6.6982°E) and Oboburu (5.2266°N and 6.6025°E). The people are predominantly farmers and traders. The major sources of animal proteins are free-range chicken, fishes and bush meat. The area is characterized with tropical rainforest, high humidity and rainfall. Two rivers run through the area: - Orashi through the Western end and Sombreiro through the Eastern end. The Local Government is host to major oil companies such as Total E & P limited and Nigeria Agip Oil Company and several other industries (Ellah, 1995).

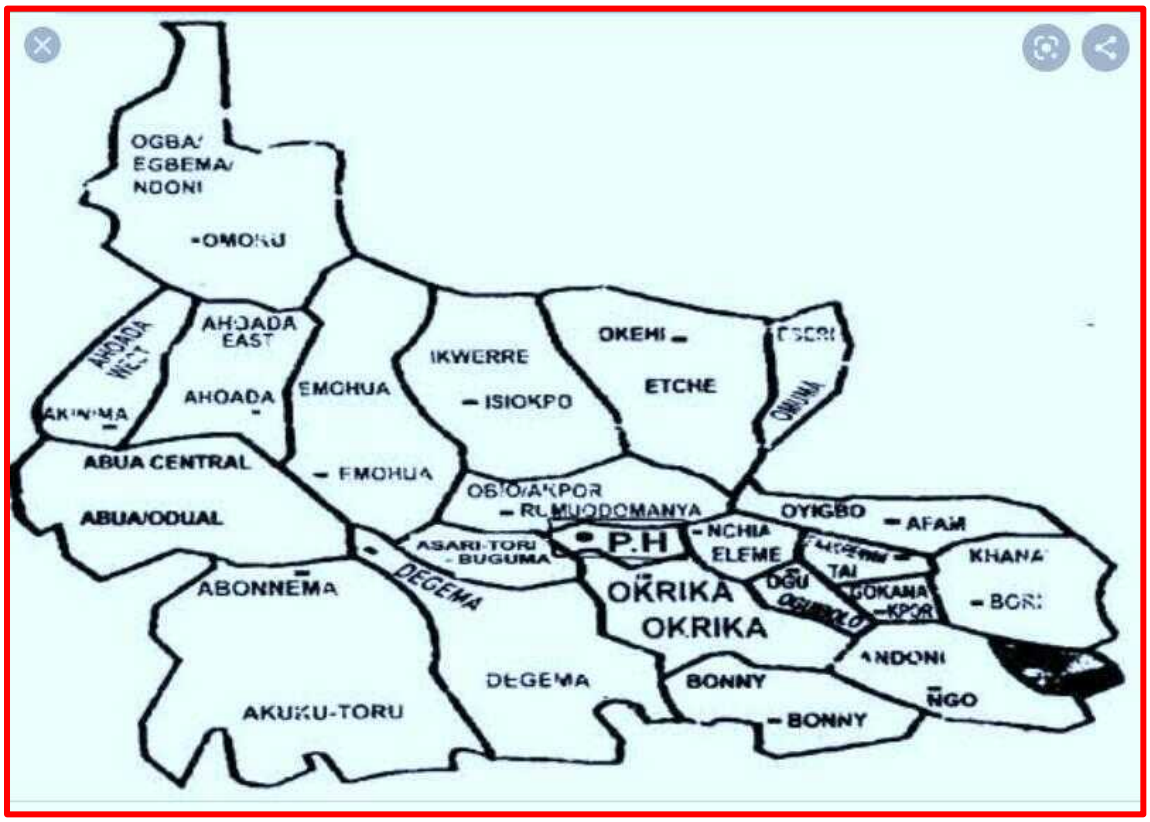


Fig. 1: Map of Rivers State showing the study Local Government Area: (Ogba/Egbema/Ndoni)

2.2 Sample Collection

A total of 28 free-range chickens (18 males and 10 females) were sourced from the communities; 10 from Erema; 7 each from Oboburu and Akabuka while in Akabta 4 chicken were bought. The birds were bought at varied prices from farmers in the communities at giveaway prices ranging from one thousand and two hundred to one thousand and five hundred naira only. The birds were transported alive to Research Laboratory, Ignatius Ajuru University of Education, Rumuolumeni, Port Harcourt for parasitological assay.

2.3 Ethical consideration

Verbal consents were sought from poultry farmers in the respective communities in Egni, Ogba/Egba/Ndoni Local Government Area, Rivers State, Nigeria.

2.4 Collection of Specimen

The study was conducted over a period of 8 weeks from October to December 2020. After collecting each of the birds, they were examined for clinical signs of infection and labeled properly, before proceeding to the laboratory for parasitological examination. Each of the birds was euthanized through manual cervical dislocation and the gastrointestinal tract carefully removed for onward examination. The gastrointestinal tracts were separated into different regions: the gizzard, crop, small intestine, large intestine and caecum, each region was cut open using dissecting sets and the contents examined according to standard parasitology methods, after Cheesbrough (2005).

2.5 Parasitological Examination

The formol either concentration technique for sedimentation, and zinc sulphate floatation technique for floatation, as described by Cheesbrough (2005) was employed for this study.

2.5.1 Sedimentation Method

For this method, the formal ether concentration technique, after Cheesbrough (2005) was used: Using electrical weighing balance, a measured 2g of faecal sample was collected with a spatula and introduced into an empty sample bottle, after thorough stirring of the faecal sample with the use of a pipette, 10mls of normal saline was added into the sample bottle and stirred with a glass rod to obtain a faecal suspension. The solution was filtered into a clean and empty sample bottle with a sieve. Another 10ml of normal saline was added to the filtered sample and stirred till a suspension was obtained. The suspension was filtered for the second time into an empty test tube. 3ml of normal saline was added to the already filtered sample and allowed to stand for about 15 seconds. 3ml of ether was added to the solution and mixed gently. The solution was then centrifuged at 3000rpm for 5 minutes. At the end of the centrifugation, the following layers were observed in the test tube: ether at the top (colourless clear liquid); a plug of debris (dark coloured thick substance); formal solution (a colourless liquid with suspended debris) and sediment (solid at the bottom of the tube). The supernatant (top layers of the centrifuged specimen) was carefully decanted after stirring with a glass rod, and the sediment was left.
Another 3ml of normal saline only was added to the sediments, stirred with a glass rod, centrifuged again for the second time at 2000rpm for 3 minutes. The supernatant was carefully decanted again. 1ml of normal saline was added to the sample sediment and introduced into a preservation bottle.

The final phase involved examination of the prepared specimen, with a pipette. The specimen was collected and put on a microscope slide. A drop of Lugol's iodine was added, covered with a cover slip then viewed under the microscope using the 4x, 10x and 40x objective lenses.

2.5.2 Floatation Method

For this method, the zinc sulphate floatation technique, after Cheesbrough (2005) was also used. Before the laboratory experiment commenced, the zinc sulphate solution was first prepared thus: using the electric weighing scale, 165 grams of zinc sulphate salt was measured after which 500ml of distilled water was added to the salt and mixed thoroughly until homogeneity was achieved. The test tube was filled to one quarter with zinc sulphate solution. 2 grams of faecal specimen was introduced into the test tube using a spatula and emulsified until a solution is obtained. The test tube was filled with the zinc sulphate solution and mixed well. The faecal suspension was strained to remove large faecal particles. The suspension was returned to the tube and kept in a completely vertical position in a rack. With the use of a pipette more zinc sulphate solution was carefully added until the test tube was filled to the brim. A clean (grease- free) cover slip was placed on top of the test tube and care was taken not to trap air bubbles. The experiment was left to stand for between 30-35 minutes in order to give time for the eggs and cysts to float. After the expected time, the cover slip was carefully lifted from the test tube by a straight pull upwards, placed downward on a microscope slide and viewed using the 4x, 10x and 40x, objectives lenses.

2.6 Data analysis

Data generated from the work were subjected to chi-square statistics. Values below probability level of 0.05 were termed significant. Also, the raw data were transformed using simple percentages.

3.0 RESULTS

3.1 Overall Prevalence

The results obtained from this parasitological investigation revealed that of the 28 birds examined, 25(89.3%) were positive for various gastrointestinal parasites. The gastrointestinal parasites isolated and identified include 3 genera each in nematodes and cestodes. The Nematode prevalence were *Ascaridia galli:* 7 (28.0%), *Heterakis gallinarum*: 6 (24.0%), *Syngamus trachea* has the least prevalence of 1 (4.0%) and cestodes were *Railietina tetragona*: 4(16.0%), *Railietina cesticillus:* 2 (8.0%) and *Choanotenia infundibulum* with an overall prevalence of 2 (8.00%). Mixed infections were observed in three birds with prevalence of 12.0% (Fig. 1).

3.2 Sex Related Prevalence

Sex related prevalence revealed that of the 18 males and 10 female's birds studied, - 17 males tested positive for the various gastrointestinal parasites which represent 94.4% prevalence while 8 females tested positive for various gastrointestinal parasites representing 80%prevalence. Data analysis showed that there was no difference in relation to sex at ($p>0.05$) (Table 1).

3.3 Site specific prevalence

Among all the sites of the gastrointestinal tract investigated in this study, helminth parasites were seen in only 3 sites as follows: Large intestine: Nematode - *Ascaridia galli* 6 (40.00%), *Heterakis gallinarum* 2 (13.33%), and *Syngamus trachea* 1 (6.67%). Cestodes: - *Raillientina tetragona* 2 (13.33%), *Raillientina cesticillus* 1(6.67%) and *Choanotaenia infundibulum* 1 (6.67%). Mixed infection occurred in 2 (13.33%). Small intestine: - *Ascaridia galli* 1 (12.50%), *Heterakis gallinarum* 2 (25.00%), *Syngamus trachea* 0 (0%). Cestodes:- *Raillientina tetragona* 2 (25.00%), *Raillientina cesticillus* 1(12.50%) and *Choanotaenia infundibulum* 1 (12.50%). Mixed infection occurred in 1 (12.50%). Caecum: - Only the nematode *Heterakis gallinarum* 2(100%) was seen. The distribution of gastrointestinal parasites in the preferred sites was however statistically non-significant as ($p>0.05$) (Table 2.)

3.4 Station/Community Related Prevalence

In each of the 4 communities, gastrointestinal helminthes were found in the birds sampled as follows: In Erema community, 10 free-range chickens were sampled out of which 8 were positive for gastrointestinal helminthes, thereby giving us a percentage prevalence rate of 80%. In Oboburu community, 7 free-range chickens were sampled out of which 6(85.7%) were positive for gastrointestinal helminthes. In Akabuka community, 7 free-raange chikckens were sampled out of which 7(100%) were positive for gastrointestinal helminthes. Finally, in Akabta community, 4 free-range chickens were sampled out of which 4(1000 were positive for gastrointestinal helminthes. Statistically, the distribution of gastrointestinal helminthes in relation to station/community was non- significant ($p=0.510$) (Table 3.)

4.0 DISCUSSION

The findings from this study revealed an overall prevalence rate of 89.3% which represents 25/28 of the birds examined. This prevalence is significantly higher than that of Dawet *et al*., (2012); Luka and Ndams, (2007); Imam *et al*., (2017) & Asumang *et al*., (2019) who reported 37.9%, 62.0%, 72.0%; and 65.5% prevalence's respectively except Idika *et al*., (2014); who reported 96.8% and Mwale and Masika (2011) who recorded a prevalence rate of 99.0% in their studies. This result is however in slight agreement with the result of Eshetu *et al.,* (2001) who reported a percentage prevalence of 91.0%, in their study of gastro-intestinal helminths of scavenging chickens in four rural districts of Amhara region, Ethiopia; Matur *et al.,* (2010) who reported an overall percentage prevalence of 90.2%, in their study on gastrointestinal helminth parasites of local and exotic chickens slaughtered in Gwagwalada, Abuja (FCT), Nigeria; Eslami *et al.,* (2009) who also reported an overall prevalence of 90.0%, in their study of parasitic infections of free-range chickens from Golestan province, Iran, and Yoriyo *et al.,* (2005; 2008a) who reported a prevalence of 87.0% & 87.8% respectively in Bauchi State, Nigeria.

However this result is slightly higher than those of the following researchers; Ashenafi and Eshetu (2004) who reported a prevalence of 86.3 and 75.8%, in their study on gastrointestinal helminths of local chickens in Central Ethiopia; Yoriyo *et al.,* (2008b) who reported a prevalence of 77.0%, in their research on the prevalence of gastro-intestinal helminths in free-ranging chickens and guinea fowls in Bauchi and its environs; Matur (2002) who recorded a percentage prevalence of 71.0%, in FCT Abuja. This could be attributed to variations in sample sizes and sanitary conditions of the stations and helminth extraction method.

The high incidence of gastro-intestinal parasites in the present study could be attributed to poor sanitary condition of the area. The continuous exposure of chickens to the free-range conditions which facilitate infections as local chickens satisfy their nutrient requirements by moving from place to place, seeking their food in the superficial layers of the soil which is often contaminated with living organisms of all kinds, including various insects or worms, human and animal wastes which serve as intermediate hosts for parasites that infest poultry and other animals (Gadzama, 2001). The difference in prevalence could also be due to the number of birds sampled by the researchers, and the geographical location where these birds are found.

This study further reveals that higher infection rate was found among males which were more in the number of birds examined. This result is in conformity with the report of Yoriyo *et al.,* (2008b) who found higher infection among male chicken than females. The results also correlate with that of Adang *et al.,* (2014), who found helminths infection among male chicken higher than that of the female chickens. This result is however contrary to the findings of Berhe *et al.,* (2019), who found higher prevalence rate of parasitic infection among female chickens than male chickens. The lower prevalence rate of gastro-intestinal parasite in female chickens may be attributed to the reduction of their feeding habits and feeding niche during breeding season and incubation period. In addition to that, the chicken owners tend to give special treatment to the females during such period which reduces their chance of picking infection. But the male chickens increase their niche by moving freely in search of food and mate which increases the chances of picking infection.

The following component parts of the gastrointestinal tracts studied harbored the following helminthes as follows; Large intestine: Nematodes: - *Ascaridia galli*, *Heterakis gallinarum*, and *Syngamus trachea*, Cestodes: - *Raillientina tetragona* and *Railientina cesticillus*. This result agrees with Luka and Ndams, (2007), who reported the presence of three nematodes in the large intestine and four cestodes in the large intestine, in their research carried out in Samaru, Zaria, Nigeria. In the small intestine, the following gastrointestinal parasites were seen: Nematodes: - *Ascaridia galli*, *Heterakis gallinarum*. Cestodes: - *Railientina tetragona*, *Railientina cesticillus*, and *Choanotaenia infundibulum*. This is also in-line with the result of Luka & Ndams, (2007), who reported 4 nematodes and 6 cestodes in the small intestine. In the Caecum only the nematode *H. gallinarum* was seen. This result further agrees with Luka and Ndams, (2007), who also found *H. gallinarum* in the caecum of the chicken sampled.

Community related prevalence showed that Erema, Oboburu, Akabuka and Akabta had prevalences of 80%, 85.7%, 100% and 100% respectively. This showed that there was no significant difference in infection at $p < 0.05$. This high level of prevalence's could be attributed to small size of sample. However, sample size could be increased to further evaluate infection rate. Furthermore, the sanitary level of the communities also needs to be revisited.

The sedimentation method yielded more results, revealing more parasite eggs than the floatation method. This may be because of the length of time it takes for the parasites to float to the cover slip of the set up and also the overall time consumed in viewing one slide from the floatation method, whereas several slides can be viewed from the sedimentation method once the process has been completed.

5.0 CONCLUSION

From the results obtained in this study, it is concluded that; both nematodes and cestodes are equally common helminths which affect chicken *(Gallus gallus domesticus)* in free-range condition.

6.0 RECOMMENDATIONS

Farmers under the free-range and intensive systems of poultry keeping should be educated by veterinary extension officers on the various kinds of gastrointestinal parasites in association with chickens and poultry as a whole and the dangers they pose. The prevalence level shown by the birds in the study area is a clue to the susceptibility of the domestic fowl to many infectious diseases that may be detrimental to human consumption. It is therefore recommended that handlers and managers of poultry farms should improve their management skills and issues concerning hygiene.

Veterinary extension officers are also requested to pay particular attention to the managerial practices of farmers in the area and provide the necessary assistance in protecting the health and wellbeing of poultry as well as contributing to public health protection. It is also recommended that further studies should be carried on the subject matter, covering different methods and parameters to enhance better results (Asumang *et al.,* 2019).

Conflict of Interest

The authors declared that there is no conflict of interest.

Acknowledgements

We wish to express our profound thanks to Prof. R. B. Bob-Manuel for her untiring academic advice; the Head, Department of Biology Dr. O. A. F. Wokoma for his constant encouragements; Dr. L. B. Gboeloh for painstakingly proofreading this manuscript and also offering very useful advice, the laboratory technologists; Mr. Simeon Iguono, Mr. Michael Emabie and Mr. Victor Egede for their technical assistance during the laboratory sessions.

References

Adang KL, Asher R & Abba, R. (2014): Gastro-intestinal Helminths of Domestic Chickens *Gallus gallus domesticus* and Ducks *Anas platyrhynchos* Slaughtered at Gombe Main Market, Gombe State, Nigeria. *Asian Journal of Poultry Science: 8 (2): 32-40.*

Afolabi OJ, Simon-Oke IA, & Olasunkanmi, AO. (2016). Intestinal Parasites of Domestic Chicken (*Gallus gallus domesticus*) in Akure, Nigeria. *Journal of Biomedicine*. 1(4):1-4

Ashenafi H & Eshetu Y (2004). Study on gastrointestinal helminths of local chickens in Central Ethiopia. *Journal of Veterinary Medicine. 155(10): 504-507.*

Asumang P Akoto, J Delali E, Wiafe F, Kamil Z, Iddrisu B, Afua VD, Wilson G. Siaw N, & Pinamang, G. (2019). Study of the Prevalence of Gastrointestinal Parasites in Local and Exotic Breeds of Chickens in Pankrono–Kumasi, Ghana, Hindawi. *Journal of Parasitology Research Volume 2019, Article ID 5746515, 7 pages*.

Berhe M, Mekibib B, Bsrat A & Atsbaha G (2019). Gastrointestinal Helminth Parasites of Chicken under Different Management System in Mekelle Town Tigray Region, Ethiopia. *Journal of Veterinary Medicine*. doi: 10.1155/2019/1307582

Cheesbrough, M. (2005). District Laboratory Practice in Tropical Countries, Part 1. Cambridge Low Price Editions. *Cambridge University press Cambridge, pp.224-226.*

Dawet A, Yakubu DP, Daburum YH, Dung JP & Haledu UI (2012). Gastrointestinal helminths of domestic chickens *(Gallus gallus domesticus*) in Jos, Plateau State, Nigeria. *Niger. J. Parasitol. 33: 85-89.*

Ellah, F. J. (1995). *Ali-Ogba: A history of Ogba/Egbema/Ndoni*. Fourth Dimension Publishers, Enugu, Nigeria

Ensuncho HC, Herrera BY, Montalvo PA, Almanza, PM, Vergara Á J, Pardo RE, & Gómez ML. (2015). Frecuencia de Parásitos Gastrointestinales en Gallinas Criollas (*Gallus domesticus*) en el Departamento de Córdoba, Colombia. *Revista Electrónica de Veterinaria – REDVET*, 16(6):1-9.

Eshetu Y, Mulualem E, Ibrahim H, Berhanu, A, & Aberra, K, (2001). Study of gastrointestinal helminths of scavenging chickens in four rural districts of Amhara region, Ethiopia. *Revision Science Techniques Office International Epizootic, 20(3): 791-796.*

Eslami A, Ghaemi P, & Rahbari, S. (2009). Parasitic infections of free-range chickens from Golestan province, Iran. *Iran. J. Parasitol., 4: 10- 14.*

Frantovo, D. (2002). Some parasitic nematodes (Nematoda) of birds (Aves) in The Czech Republic. *Acta Societatis Zoologicae Bohemicae 66(1):13-28*

Gadzama BI (2001). "Supporting Small-Scale enterprises for Women farmers in the Sahel". *Journal of International Development, Vol. 3 No. 4, pp. 355-386.*

Idika IK, Obi CF, Ezeh IO, Iheagwam CN, Njoku IN. & Nwosu CO. (2014). Gastrointestinal helminth parasites of local chickens from selected communities in Nsukka region of South Eastern Nigeria. *Indian Society for Parasitology.*

Imam, TS., Dambo, R., Sa'id, M. A. & Suleiman, K. (2017). Detection of Gastro-Intestinal Helminthes in Local Chicken (*Gallus gallus*) Sold at Sharada Market, Kano Metropolis, Nigeria. *Kano, Nigeria. Journal of dryland Agriculture 3(1). p 19 – 27.*

Kose M, Sevimli FK, Kozan EK, & Cicek HS. (2009). Prevalence of gastrointestinal helminths in chickens in Afyonkarahisar district, Turkey. *Kafkas Univ. Vet. Fakultesi Dergisi, 15: 411-416.*

Lozano J, Anaya A, Salinero AP, Lux-Hoppe EG, Gomes L, Paz-Silva A, Rebelo MT, & Madeira De Carvalla L. (2019). Gastrointestinal parasites of free-range chickens: A worldwide issue. *Bulletin UASVM veterinary medicine,* 75 (2): 11 – 117.

Luka SA. & Ndams IS. (2007). Gastrointestinal parasites of domestic chicken *Gallus gallus domesticus* Linnaeus 1758 in Samaru, Zaria Nigeria. *Science World Journal;* 2(1): pp 27-29

Matur BM, (2002). Prevalence of some gastrointestinal parasites in pullets of chickens (*Gallus domestica*) in the Federal Capital Territory Abuja. Nigeria. *Journal of Tropical Biosciences. 2(1):78-82*

Matur BM, Dawam NN, & Malann YD. (2010). Gastrointestinal Helminth Parasites of Local and Exotic Chickens Slaughtered in Gwagwalada, Abuja (FCT), Nigeria. *New York Science Journal 3(5): 96-99*

McDougald LR (2008). Protozoal infections. 1077- 1080 pp. In Saif, Y. M. Diseases of Poultry. 12th Edition. *Blackwell Publishing. USA.* pp. 1409

Mwale M, & Masika PJ (2009). Ethno-veterinary control of parasites, management and role of village chickens in rural households of Centane district in the Eastern Cape, South Africa. *Tropical Animal Health and Production 41, 1685–1693.*

Mwale M & Masika, PJ, (2011). "Point prevalence study of gastro- intestinal parasites in village chickens of Centane district, South Africa," *African Journal of Agricultural Research, Vol 6, no.9, pp. 2033–2038.*

Olanrewaju C A & Agbor RY (2014). Prevalence of Coccidiosis among Poultry Birds Slaughtered at Gwagwalada Main Market, Abuja, FCT, Nigeria. *The International Journal of Engineering and Science,* 3(1):41-45.

Oniye SJ, Audu, PA, Adebote DA, Kwaghe BB, Ajanusi OJ & Nfor MB. (2000): Survey of helminth parasites of laughing Dove, (*Streptopelia segalensis*) in Zaria-Nigeria. *African Journal of Natural Sciences, 4: 65-66.*

Onyirioha JNN (2011): Gastro-intestinal Helminth Fauna of Native Domestic Fowl *(Gallus GallusDomesticus)* in Owerri Area of Imo State, Nigeria. *Researcher. 3(1): 124-126).*

Sayyed R, Phulan M, Bhatti W, Pardehi M & Ali S (2000). Incidence of nematode parasites in commercial layers in swat. *Pakistan Veterinary Journal, 20(2): 107-108.*

Yoriyo KP, Adang KL, Fabiyi JP & Adamu SU, (2008a). Helminth parasites of local chickens in Bauchi state Nigeria. *Science World Journal; 3(2):35–37*

Yoriyo KP, Adang KL, Adamu SU, & Sambo Z. (2008b). Prevalence of gastro- intestinal helminths in free-ranging chickens and guinea fowls in Bauchi and its environs. *Bull. Pure Appl. Sci. 27: 1-6.*

Yoriyo KP, Fabiyi JP, Panda SM & Adamu SU. (2005). Intensities of helminth parasites of free ranging chickens in Bauchi and environs. *Yankari J*., 2: 135-139.

Yousuf, MA, Das PM., Anisuzzoman, M. & Banowary, B. (2009). Gastro-intestinal helminthes of ducks: Some epidemiologic and pathologic aspects. *J. Bangladesh Univ., 7: 91 – 97.*

Table 1: Sex related prevalence of the gastrointestinal helminths (n=28)

Sex	Total No. Sampled	No. Positive (%)	No. Negative (%)
Males	18	17 (94.4)	1 (5.6)
Females	10	8 (80)	2 (20)
Total	28	25 (89.3)	3 (10.7)

Chi Square (X^2) = 1.40, df = 1, p=0.236

Table 2: Distribution of type of parasites among the infected sites (n=28)

Site	Parasite type seen							Total
	Nematodes			Cestodes			Mixed infection (%)	
	A. galli (%)	*H. gallinarum* (%)	*S. trachea* (%)	*R. tetragonal* (%)	*R. cesticillus* (%)	*C. infundibulum* (%)		
Large intestine	6(40.00)	2(13.33)	1(6.67)	2(13.33)	1(6.67)	1(6.67)	2 (13.33)	15
Small intestine	1(12.50)	2(25.00)	0 (0)	2(25.00)	1(12.50)	1(12.50)	1 (12.50)	8
Caecum	0 (0)	2 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2
	7(28.00)	6(24.00)	1(4.00)	4(16.00)	2(8.00)	2(8.00)	3(12.00)	25

X^2 = 10.1, df = 12, p=0.611

Table 3: Station/Community Related Prevalence (n=28)

Community	No. Sourced	No. Positive (%) prevalence	No. Negative (%) Prevalence
Erema	10	8 (80)	2 (20)
Oboburu	7	6 (85.7)	1 (14.3)
Akabuka	7	7 (100)	0 (0)
Akabta	4	4 (100)	0 (0)
Total	28	35 (89.3)	3 (10.7)

Chi square (X^2) = 2.31, d.f = 3, p = 0.510

ISSN: 2811 - 1451

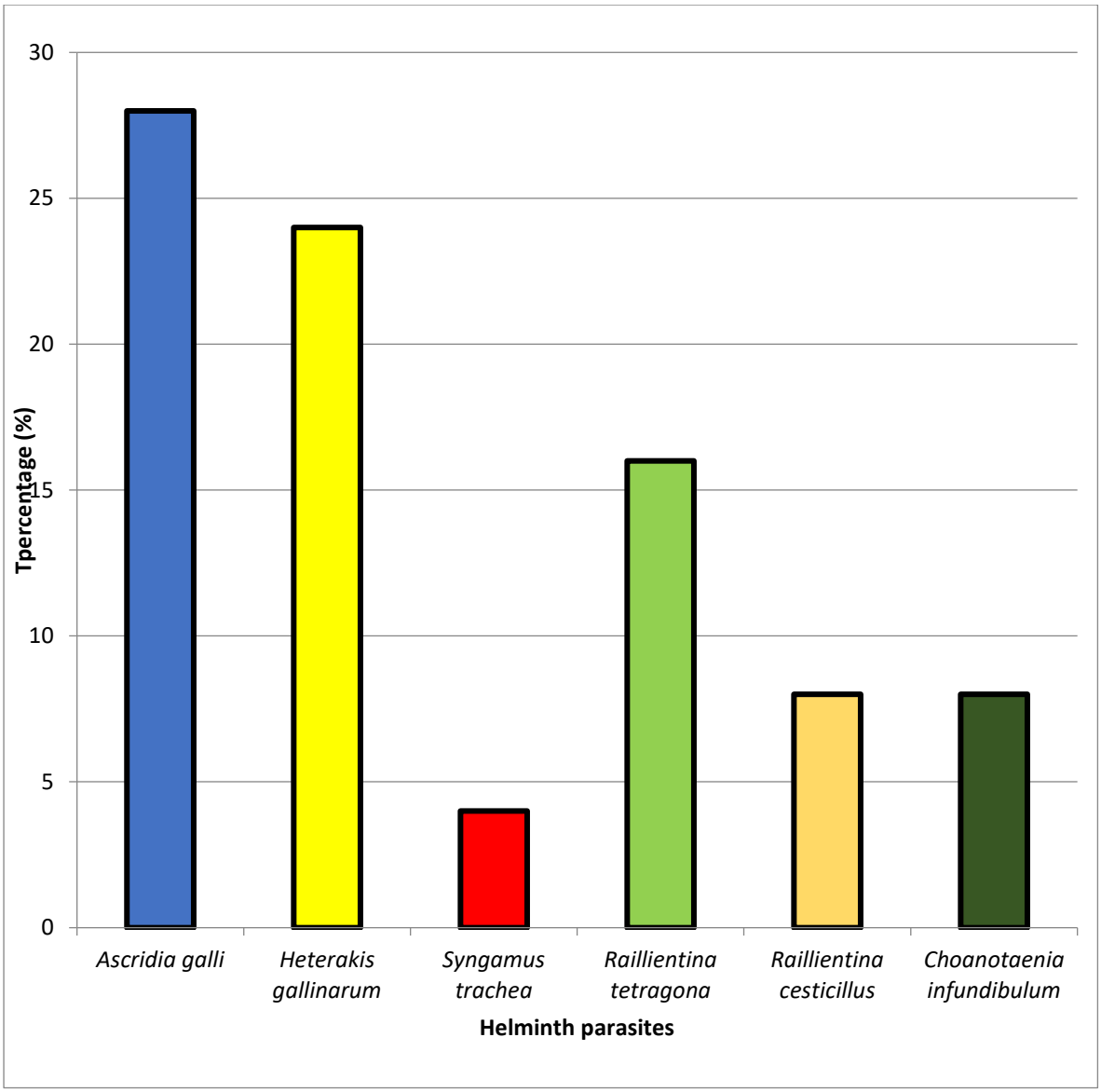


Fig. 1: Graphical representation of overall prevalence of gastrointestinal parasites