Int. j. adv. multidisc. res. stud. 2023; 3(6):712-715

Received: 10-10-2023
Accepted: 20-11-2023

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Parasitological Computation of Free-Range Chickens Vended in Major Markets in Okitipupa Local Government Area of Ondo State

[1] Awosemo OG, [2] Bagbe AS

[1, 2] Department of Biological Sciences, School of Science, Olusegun Agagu University of Science and Technology, Okitipupa, Ondo State, Nigeria

Corresponding Author: **Awosemo OG**

Abstract

Gastrointestinal parasitic infections in chicken production industry are known to be one of the factors responsible for the high mortality rate in poultry farming in Africa. This study aimed to determine the prevalence of gastrointestinal parasites in chickens sold in major markets in Okitipupa, Local Government Area of Ondo State. A cross-sectional study was carried out with 152 feacal samples of free range chickens randomly collected from five major markets in Okitipupa Local Government. The samples were examined for gastrointestinal parasites by examination of feacal samples of birds. Out of 152 chickens examined from five markets, 121 (79.9%) chickens were found to be infected with gastrointestinal parasites. The chickens were found to be commonly infected with *Capillaria* spp (46.1%), *Heterakis gallinarum* (39.5 %) and *Ascaridia galli* (36.9 %).

No trematodes were encountered in this present study. The different market's locations did not have any significant influence on the prevalence of the different gastrointestinal parasites detected. However, chickens from Erinje markets were found to have the highest level (90%) of gastrointestinal parasites, whilst Igbotako market (67.5 %) had the least.

The high prevalence of gastrointestinal helminths observed in these markets have a strong relationship with their mode of feeding and living conditions of the birds. In spite of minimal health care and improper sanitation practices adopted by poultry marketers, there is a need for continuous education on appropriate and preventive method for controlling gastrointestinal parasites in chickens.

Keywords: Gastrointestinal Parasites, Free Range Chickens, Markets

Introduction

The poultry industry occupies an important position in the provision of animal protein (meat and egg) to man and plays an important role in the national economy as a source of revenue (FOA, 2006). Local chicken production is good but constrained by many extrinsic factors like malnutrition, poor management and the absence of biological security, which is very outstanding. Losses to fowls can been attributed to poor/ no housing, and no/low veterinary services. In addition, poor genetic processes due to lack of selection and predation with other animals are effective threats to productivity according to Saidu *et al*. (1994). The chickens are generally raised in a free-range system, scavenging around the compound of households, feeding on the locally available resources like earthworm, household refuse, insects, residue from harvest, animal and human feaces etc (Ajala *et al*., 2007).

Helminthosis was considered to be an important problem of local chicken and helminth parasites have been incriminated as a major cause of ill-health and loss of productivity in different parts of Nigeria (Fakae and Paul-Abiade, 2003). Poultry rared in rural scavenging system face various hindrances among which helminthiasis plays a vital role. Hence, studies conducted in different parts of the world indicated that the proportion of chicken infection with gastrointestinal helminthes is high, therefore helminthes are considered to be an important cause of ill health and reduction in poultry productivity (Ajala *et al*., 2007; Bagbe *et al*., 2022 [4]). Nematodes, Cestodes and trematodes are important parasites of poultry production. These parasites can be found in the intestine or faecal dropping especially when expelled as fresh Specimen (Fakae and Paul-Abiade, 2003). Several species of cestodes (Tapeworm) may live in the intestinal tract of chicken. More than 1,400 tapeworms have been described in domesticated poultry and wild birds, which are common in poultry free range or backyard flocks (Biu and Haddabi, 2005; Olorunsola and Bagbe, 2023 [28]).

Management practices, level of bio-security, availability of intermediate hosts and possibly the game reservoir are key factors for high prevalence of helminthes infection in free range or rural scavenging system of poultry (Abebe *et al*., 1997). In free range /backyard poultry production system, the species of helminthes involved are more or less the same, but different number

were reported by different investigators. The record of 29 species of helminthes reported to occur in scavenging chicken in the morogoro area of Tanzania (Gadzama, 2001) is possibly the highest number recorded in any single study. Okon and Enyechi (1980) reported that the most commonly occurring helminthes species in free-range poultry are *Ascaridia galli* and *Heterakis gallinarum*. The prevalence of *A. galli* and cestodes were within the range of 29-30% of free-range system in Switzerland (Nnadi, 2007). A wide range helminthes species in chicken (*Ascaridia galli, Heterakis gallunarum and Capillaria spp*) were reported by Ruff (1999) in the United States.

These parasites are found more frequently in the warm seasons, when the intermediate hosts are abundant. Beetles and houseflies inhabiting poultry houses act as intermediate host for most species of cestodes (Baba and Oveka, 2004). Although the prevalence of parasitic infection has been greatly reduced in the commercial production system, mostly due to improve housing, hygiene and management operations (Yoriyo *et al*., 2008. Olorunsola and Bagbe, 2023 [28]). A large number of helminthes are still widely distributed throughout the world in free –range poultry. In studies by Ruff (1999), 100% of the rural scavenging chicken examined in Cross River Nigeria, was positive for one or more helminthes parasites. In another study, Saidu *et al*. (1994) reported 45% of *Ascaridia galli* and 35% *Heterakis gallinarum* (Yoriyo *et al*., 2008; Okon and Enyechi, 1980; Gadzama, 2001; Bagbe *et al*., 2022 [4]) all reported high prevalence of multiple infections in their survey.

This study aimed at providing an insight into the prevalence pattern of the gastrointestinal parasites of free-range chickens sold at different major markets in Okitipupa Local Government Area of Ondo state, southwestern Nigeria.

Materials and Methods

Study 0050eriod

The study was conducted between April 2020 to July 2021 to identify gastro-intestinal parasites affecting free range chickens and to estimate its prevalence.

Sample Collection and Sample Size

One hundred and fifty-two chickens were tested randomly from five major markets (Okitipupa, Ilutitun, Aye, Igbotako and Erinje). These markets were selected because they have a high turnout activity on market days and during festive seasons in Okitipupa Local Government. The feacal samples collected from the cloaca were transported in an ice chest within one hour to the laboratory for analysis.

Faecal Collection and Analyses

For each of the birds, faecal samples were collected per cloaca where possible or with a spatula for freshly voided faeces. The faecal samples were put into sample bottles and labelled appropriately. The samples were later processed in the laboratory using the salt floatation technique with saturated sodium chloride solution as the floating medium according to Richard (1995). Identification of helminth eggs and coccidian oocysts was done using a standard microscope under ×10 objective magnification. Egg and worm recovery, and identification were done in Biological Sciences laboratory of Olusegun Agagu University of Science and Technology, using the helminthological key by Soulsby, (1982) [37].

Statistical Analysis

Raw data collected were initially managed in the Microsoft office excel® 2010, where simple frequencies and percentages of infection were determined before finally importing the data into Graphad Instat® software for other statistical analyses. The prevalence of the parasites was calculated using percentages. In order to assess the strength of association between helminthiasis and other independent variables such as market locations, chi-square test was employed. The observed prevalence of infection and its 95% Confidence interval were computed and the level of significance was set at $P \leq 0.05$.

Results

Prevalence of Gastrointestinal Parasites in Chickens

Five major markets in Okitipupa were surveyed in this study for gastrointestinal parasites of chickens. A total of 152 chickens was examined and out of the chickens examined, 121 chickens were found to be infected with one or more gastrointestinal parasites (76.6%). Out of the 121chickens infected 57.9% were infected with *Capillaria* spp, this was followed by *Heterakis* spp (49.6%), *Ascaridia* spp (46.3%), *Raillietina* spp (33.9%), *Eimeria* spp (20.7%) and *Choataenia* spp (0.7%) (Table 1).

Prevalence of Gastrointestinal Parasites in Chickens Sampled from Different Markets

In Okitipupa market, out of 52 chickens sampled 44 (84.6%) were found to be infected with gastrointestinal parasites (Table 2). A total of 20 chickens were sampled from Ilutitun market and 15 (75%) were found to be infected with gastrointestinal parasites. In Aye market, 17 (85%) chickens were found to be infected with gastrointestinal parasites. A total of 40 chickens were sampled from Igbotako market and 27 (67.5%) were found to be infected.

Erinje market had an overall prevalence of 90 % as 18 out of 20 chickens sampled were found to be infected with gastrointestinal parasites.

In all, the highest prevalence of chicken infected with gastrointestinal parasites was at Erinje market (90 %) and the least prevalence was at Igbotako (67.5%). There was no significant relationship between the different markets and the prevalence of the various gastrointestinal parasites detected ($p < 0.5$).

Table 1: Prevalence of various gastro-intestinal parasite species among the sampled chickens

Parasite species	Number of chickens infected	Prevalence
Ascaridia spp	56	46.3%
Heterakis spp	60	49.6%
Capillaria spp	70	57.9%
Raillietina spp	41	33.9%
Choantaenia spp	1	0.8%
Eimeria spp	25	20.7%

Table 2: Prevalence of gastro-intestinal parasites in sampled chickens from different markets

Market location	Number of Chicken sampled	Number of Chicken infected	Prevalence	P value
Okitipupa	52	44	84.6%	
Ilutitun	20	15	75%	
Aye	20	17	85%	
Igbotako	40	27	67.5%	
Erinje	20	18	90%	
Total	152	121	79.6%	P<0.05

Discussion

This study revealed a wide range of gastrointestinal parasitic infections among chickens in Okitipupa, Ondo state, Nigeria. The results obtained from this study are in line with study reported by Junaidu *et al*. (2014) which reported 81.5% prevalence in scavenging chickens.

Although the findings in this study is lower than those reported by Heyradin *et al*. (2012), which reported a 90.78%. The difference in prevalence could be related to the differences in the management systems, study method, sample size and control practices.

The prevalence of gastrointestinal parasitic infection in the various markets was found to vary. This study revealed that the various markets had insignificant influence on the prevalence of gastrointestinal parasites. The high prevalence of gastrointestinal parasites recorded at these markets may be as a result of constant contact with infective stages of the gastrointestinal parasites and intermediate host of these parasites (Ashenafi and Eshetu, 2004; Bagbe *et al*., 2022 [4]). This may be due to poor waste management, scarcity of feed and poor drainage systems observed at some of the studied sites. Lack of drainage systems can lead to the production of stagnant water in gutters. This stagnant water can and deposits from drainage can carry oocysts, ova of coccidian and helminth (Offiong *et al*., 2013; Bagbe *et al*., 2022 [4]). In addition, in the absence of feed, chickens may be forced to eat different insects, snails, beetles and earthworms that may be intermediate hosts of some nematodes and cestodes (Baba and Oveka, 2004). Furthermore, the housing conditions for the chickens might have contributed to the high prevalence of infection as many of the birds were housed in overcrowded small cages. Overcrowding enables parasitic transmission from one chicken to the other (Bekali *et al*., 2009; Bagbe *et al*., 2022 [4]).

Capillaria spp. was the common nematode detected in this present study, which was found to be higher than the reports from Ethiopia (1.53%) by Ashenafi and Eshetu (2004) and in Southern Nigeria (16.1%) by Nnadi and George (2010) [26]. This discrepancy could be due to individual host resistance and variation in seasonal conditions in different zones (Mwale and Masika, 2010).

Furthermore, this study found no trematodes in the tested chickens in any of the markets, which was in conformity with findings reported by Luka and Ndams (2007). Chicken trematodes require the presence of fresh water snails or dragonflies in their life cycles (Permin and Hansen, 1998) [29]. The lack of lakes and freshwater in the studied areas may have contributed to the absence of trematodes in the tested chickens in Okitipupa.

Conclusion

This study revealed nematodes, cestodes and coccidian are prevalent in chickens in Okitipupa. It aslo revealed that the individual markets had no significant influence on the prevalence of gastrointestinal parasite. The high prevalence of gastrointestinal helminths observed in these markets have a strong relationship with their mode of feeding and living conditions of the birds. In spite of minimal health care and improper sanitation practices adopted by poultry marketers, there is a need for continuous education on appropriate and preventive method for controlling gastrointestinal parasites in chickens. This will help prevent infection from gastrointestinal parasites from affecting the quality and nutritional contents of chickens being sold in Okitipupa.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

References

1. Amare A, Netsanet W, Negussie H. Coccidiosis Prevailing in Parent Stocks: A Comparative Study between Growers and Adult Layers in Kombolcha Poultry Breeding and Multiplication Center, Ethiopia. Global Veterinaria. 2012; 8(3):285-291.
2. Anderson RC. Nematode Parasites of Vertebrates. Their Development and transmission, 2nd edition; CAB International, Wallingford, Oxon, UK, 2000, 290-299.
3. Ashour AA. Scanning electron microscopy of *Ascaridia galli* (Schrank, 1788), Freeborn, 1923 and A. columbae (Linstow, 1903). J.E.S. Parasitology. 1994; 24(2):349-355.
4. Bagbe AS, Bagbe A, Arosoye AS, Owolabi DO. Probability of Ticks Infestation in Goats Sold in Okitipupa Main Market, In Southern Part of Ondo State. International Journal of Research and Innovation in Applied Science (IJRIAS). 2022; 7(5). |ISSN 2454-6194.
5. Baker DG. Parasites of Lab. Animals; 2nd edn; Blackwell Publishers, 2008, 236-237.
6. Cheng TC. General Parasitology; 2nd edition. Academic Press, Division of Hardcourt Brace & Company, USA, 1986, 402-416.
7. CSA. Agricultural Sample Survey 2011/12 [2004 E.C.]: Report on Livestock and Livestock Characteristics; Statistical Bulletin 532, Addis Ababa, Ethiopia. 2012; 2.
8. Dalloul RA, Lillehoj HS. Poultry coccidiosis: Recent advancements in control measures and vaccine development. Expert Rev Vaccines. 2006; 5(1):143-163.
9. Gary DB, Richard DM. Intestinal Parasites in Backyard Chicken Flocks: Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville. 2012; 32611:VM76.
10. Griffiths HJ. A Handbook of Veterinary Parasitology: Domestic Animals of North America. University of Minnesota Press, Minneapolis, Minnesota, USA, 1978, 46-47.
11. Hall HTB. The Nematode Parasites of Poultry: Diseases and Parasites in Livestock in the Tropics, 2nd Edition. London Scientific and Technical, Longan Group, UK, 1985, 237-261.
12. Hambridge G. Diseases and Parasites of Poultry. Daya Publishing House, 2011, 148-149.

13. Hunduma D, Regassa C, Fufa D, Endale B, Samson L. Major Constraints and Health Management of Village Poultry Production in Rift Valley of Oromia, Ethiopia. IDOSI Publications. American-Eurasian Journal Agriculture and Environmental Science. 2010; 9(5):529-533.
14. Jacobs RD, Hogsette JA, Butcher JD. Nematode parasites of poultry (and where to find them). The Institute of Food and Agricultural Sciences (IFAS) series PS18, University of Florida, USA, 2003, 1-3.
15. Jordan FTW, Pattison M. Parasitic Diseases: Poultry Diseases; 4th Edition; W.B. Saunders Company Ltd. Printed in Great Britain by the University Press, Cambridge, 1996, 261-289.
16. Kassa B. Standard Veterinary Laboratory Diagnostic Manual: Ethiopian Agricultural Research Organization National Animal Health Research Center; Parasitology. 2005; 3.
17. Katoch R, Anish Yadav R, Godara JK, Khajuria S, Borkataki S, Sodhi S. Prevalence and impact of gastrointestinal helminthes on body weight gain in backyard chickens in subtropical and humid zone of Jammu, India. J Parasit Dis. 2012; 36(1):49-52.
18. Kaufmann H. Parasitic Infections of Domestic Animals: A Diagnostic Manual. Birkhäuser Verlag, Basel, 1996, 353-354.
19. Lalchhandama K. On the structure of Raillietina echinobothrida, the tapeworm of domestic fowl. Science Vision. 2009; 9(4):174-182.
20. Lalchhandama K. On the structure of Ascaridia galli, the roundworm of domestic fowl. Science Vision. 2010; 10(1):20-30.
21. Lalchhandama K, Bishnupada R, Biman KD. Anthelmintic activity of Acacia oxyphylla stem bark against Ascaridia galli. Pharmaceutical Biology. 2009; 47(7):578-583.
22. Leeson S, Summer JD. Internal Parasites: Broiler Breeder Production; 1st edition by Nottingham University Press in 2000, University Books, Guelph, Ontario, Canada, 2009, 104-106.
23. Lorenzoni G. Poultry Diseases Influenced by Gastrointestinal Health, Traditional Treatments and Innovative Solutions. First published 2010, Nottingham University, 2010.
24. Martynova-VanKley A, Syvyk A, Teplova I, Hume M, Nalian A. Rapid Detection of Avian Eimeria Species Using Denaturing Gradient Gel Electrophoresis; Poultry Science. 2008; 87:1707-1713.
25. McDougald LR. Cestodes and trematodes. In YM Saif, AM Fadly, JR Glisson, LR McDougald, LK Nolan, DE Swayne. Diseases of Poultry; 12th edition, Iowa (US), 2011.
26. Nnadi PA, George SO. A Cross-Sectional Survey on Parasites of Chickens in Selected Villages in the Sub humid Zones of South-Eastern Nigeria: Journal of Parasitology Research. 2010; 14(6):18-24.
27. Ohaeri CC, Okwum C. Helminth Parasites of Domestic Fowls in Ikwuano, Abia State Nigeria; Journal of Natural Sciences Research. 2013; 3:p11. (ISSN 2224-3186 (2225-0921)).
28. Olorunsola RA, Bagbe AS. Effects of scent leaf (*ocimum gratissimum*) on intestinal helminths affecting local free-range chickens. International Journal of Research and Innovation in Applied Science (Ijrias) Issn No. 2454-6194. 2023; 8(5). Doi: 10.51584/Ijrias
29. Permin A, Hansen JW. Diagnostic Methods: Epidemiology, Diagnosis and Control of Poultry Parasites. FAO animal health manual, No 4. Food and Agriculture Organization of the United Nations, Rome, Italy, 1998, 33-118.
30. Puttalakshmamma GC, Ananda KJ, Prathiush PR, Mamatha GS, Suguna R. Prevalence of Gastrointestinal parasites of Poultry in and around Banglore; India. Veterinary World. 2008; 1(7):201-202.
31. Radha T, Satyaprema VA, Ramalingam K, Indumathi SP, Venkatesh C. Ultrastructure of polymorphic microtriches in the tegument of Raillietina echinobothrida that infects Gallus domesticus (fowl). Journal of Parasitic Diseases. 2006; 30(2):153-162.
32. Ramadan HH, Znada NYA. Morphology and life history of Ascaridia galli in the domestic fowl that are raised in Jeddah. J.K.A.U. Sci. 1992; 4:87-99.
33. Ruff MD, Calneck BW, Barnes HI, Beard CW, Reid WM, Yonder Jr. HW. Nematodes and Acanthocephalans: Diseases of Poultry; 3rd edition, Ames, Iowa State University Press, 1991, 731-763.
34. Saif M, Fadly M, Glisson R, McDougald R, Nolan K, Swayne E. Diseases of poultry; 12thedition, Blackwell Publishing Professional 2121 State Avenue, Ames, Iowa 50014, USA, 2008, p10671080.
35. Sharma RL, Bhat TK, Hemaprasanth. Anthelmintic activity of ivermectin against experimental Ascaridia galli infection in chickens. Veterinary Parasitology. 1990; 37(3-4):307-314.
36. Simon MS, Emeritus. Enteric Diseases: ASA Handbook on Poultry Diseases, 2nd edition, American Soybean Association, 2005, 133-143.
37. Soulsby EJL. Helminthes, Arthropods, and Protozoa of Domestic Animals, 7th edition, Bailliere, and Tindall, London, 1982, 83-115.
38. Urquhart GM, Armour J, Duncan JL, Dunn AM, Jennings FW. Veterinary Parasitology; 2nd edition, Blackwell Science, 1996, 261-264.
39. Waldenstedt L, Elwinger K, Lunden A, Thebo P, Uggla A. Sporulation of Eimeria maxima oocysts in litter with different moisture content. Poult. Sci. 2001; 80:1412-1415.
40. Williams RB. A Compartmentalized Model for The Estimation of the Cost of Coccidiosis in the World's Chicken Production Industry. International Journal of Parasitology. 1999; 29:1209-1229.
41. Ziela M. A Comparative Study of Gastrointestinal Nematode Infections in Traditional and Commercial Chickens and Effects of Anthelminthic Treatment on Production. International Journal of Poultry Science. 1999; 7(12):67-73.