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Investigation of Major Gastrointestinal Parasites of Indigenous Chickens in and Around Asella, Oromia, Ethiopia

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Abstract: This study was conducted in and around Asella district of Oromia regional state, Ethiopia, to investigate the presence of gastrointestinal helminthes and Coccidial Oocyst from indigenous backyard chickens. 100 indigenous chickens were purchased, sacrificed and checked for the presence of adult helminthes and coccidial Oocyst. 93% of the examined chickens were infected with gastrointestinal parasites. Mixed infections accounted for 87.1%. This study also indicated that majority of chickens were infested with more than one species of nematodes. Four Nematodes species were identified: *Ascaridia galli* (53%), *Heterakis gallinarum* (27%), *Capillarias* spp. (8%), *Subulura brumbti* (24%) and *Gongylonemainguvicola* (1%). This study did not include species identification of Cestodes parasites andCoccidial parasites. The total prevalence of Cestodes and Coccidial parasites were 54% and 9% respectively. No significant difference ($p>0.05$) was observed in the prevalence of GIT parasites among the different risk factors. gastrointestinal helminthes are an important parasites that cause a serious problem in local chickens, which are found in the study area this study recommended that appropriate control and prevention strategies need to be applied.

Key words: Asella · Ethiopia · Gastrointestinal helminthes · Prevalence

INTRODUCTION

Second to fish rearing Poultry farming is the little worth alternative animal husbandry practice in the animal husbandry sectors. However, most poultry production system in the traditional level has a characteristic of low input, low output and seasonal destruction of a large portion of chickens' population because of disease causing agents like GIT Parasites [1].

Parasitic diseases are always disregarded as they are most of the time without a clear clinical symptom. Among the major disease of chickens' parasitism play a big roleasthey causes heavy economic losses to poultry production in the form of poor feathers, drop egg production, retarded growth, decreased weight gain, intestinal obstruction and diarrhea. A decreased blood picture and oxygen level in the circulation may occur due to stress caused by parasitic infestation [2].

Helmnthiosis is considered as a major problem of indigenous chickens and they are mainly divided into; Nematodes, Cestodes and Trematodes. Both in number of species and the severity of damage they cause, Nematodes cover the most important group of GIT parasites of chickens; the main genera include Ascaridia, Heterakis and Capillaria. Among the cestodes group, Railleitina and Hymenolepis are the two most important genera of gastrointestinal helminthes parasites of chickens [3].

The prevalenceof these helminthes infections may be influenced by many factors, including sex, age and breeds of poultry [4]. Feeding of local chickens from a wide range of food substance (like grains, fruits and insects) which carry infective stages of many parasites, particularly gastrointestinal parasites like Nemathodes, Cestodes, Trematodes and Coccidial species [5]. In the area where a poor or reduce standard poultry husbandry system these parasites are usual [6].

In Ethiopia, a few studies have been conducted with regard to the prevalence of gastrointestinal parasites in different areas [7]. However, these studies were restricted to the prevalence study of GIT helminthes of free range chickens in few areas close to the city. But in the current study there is shortage of data on the prevalence and intensity of internal parasites in free ranging backyard

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chickens even though chickens are main source of income for most rural community. Hence, the present study is designed with the objective of investigating the occurrence of major species/ genera of gastrointestinal (GI) parasites affecting free ranging or indigenous backyard chickens in and around Asella town.

MATERIALS AND METHODS

Study Area: From October 2019 to April 2020 a cross sectional study was conducted in and around Asella district. Asella, a big city of Arsi zone, is under the administration of the Oromyia National Regional state. Asella town is located about 175 km Southeast of Addis Ababa and has an altitude of 2500-4130 meter above sea level (masl). The mean rainfall ranges from 2000 to 4000 mm and ambient temperature varies from 20°C to 30°C annually (2007 prelim).

Study Birds: The population of interest was indigenous backyard chickens and accordingly 100 chickens of different age, sex and body condition were purchased from local open-air markets in and around Asella town and postmortem examination was conducted after euthanasia for the presence of adult GIT helminthes and Coccidial oocyst.

Study Design: Chickens were collected purposively from local open-air markets (found in and around Asella town) and apparently healthy and clinically sick, including both sexes and different age groups are purchased and then transported to Asella veterinary Regional Laboratory, for post mortem examination after the chickens are euthanized and for laboratory examination to identify GIT parasites.

Postmortem Examination: Chickens viscera were detached from the mesentery and the GI tracts of 100 chickens were cut into smaller pieces. Starting from esophagus with crop, gizzard with proventriculus and caeca with the remaining intestine were kept in three separate containers. Each piece of important GI tracts was identified and incised longitudinally. The worms were collected from the different intestinal pieces by washing with tap water in different trays and locate in different beakers containing 10% formalin. The parasites then examined under stereomicroscope. The identification of GI helminthes was carried out by using their morphological characters and by their location [8]. Additionally, the intestine was scraped for the examination of Coccidial oocyst under light microscopy.

Data Analysis: After inserting of all collected data in to Micro-Soft Excel sheet 2010 the data was analyzed by SPSS version 20 [9]. Based on the number of infected chickens from the total number of chickens examined for the presence of GIT parasites the total prevalence was calculated as a percent. To assess association of different variables in the study Logistic regression and Pearson's chi-square (X_2) were applied. P-value less than 0.05 were taken as a significant difference and confidence level was held at 95%.

RESULTS

Out of 100 chickens examined for the presence of GIT parasitesthe highest number was covered by nematodes infection, which is 90.3% and the others like Cestodes and *Coccidial* spp. were 54 % and 9% respectively. 87.1 % of these infections were mixed infection. From 100 local breeds of chickens examined for identifying of GIT parasites 93% harbored different species of helminthes *Subulura brumpti* 24%, *Ascaridia galli* 53%, *Gongylonemaingluvicola* 1%. *H. gallinarum* 27% and *Capillaria* spp. 8%, none differentiated Cestodes parasites (54%) and one non differentiated Coccidial oocyct (9%) were identified. Among the other Nemathode speciesrevealed in the study *Ascaridia galli* constitute highest rate of infection.

Table 1: Species/genera of helminthes and protozoa identified during the study in indigenous chickens

Worm species (n=100)	Location of worms in GI tract	No. of infested chickens	(%)
Ascaridia galli	Duodenum and small intestines	53	53
Capillaria spp.	Caecum	8	8
Heterakis gallinarum	Caecum and large intestines	27	27
Subulura brumpti	Caecum and large intestines	24	24
Gongylonemainguvicola	Crop	1	1
Cestode spp.	Small and large intestine	54	54
Emeria spp.	Small intestines	9	9

DISCUSSION

From the examined chickens, 93% were found to be infected with GIT parasites. This finding is lower compared to the reports from Hawassa, Ethiopia (88.5%) Barisal district, Bangladesh (91.88%) and Nairobi County, Kenya (90%) [10]. This result was higher than the report from Eslami *et al.* [11] from Nigeria (20.5%) [12]; but small number of chickens were sampled during the Nigerian study when compared to the current study, which was only 85 chickens.

The present finding could be attributed to the type of production system, as proposed by Magwisha *et al.* [13]. Under this system, most indigenous chickens stay and feed on the superficial layer of the soil by roaming from place to place. Because of contamination of the soil with living organisms including those that serve as anintermediate host for many parasites like helminthes and Coccidial parasites that infest the chickens' GI tract [14, 15].

No Trematode parasite was identified in the current study and was in agreement with the report from Giwa local government, Nigeria and Mbeeresubcounty, Kenya [16, 17]. However, these parasites were reported in Nairobi and Kiambucaunties, Kenya [18]. The present finding is higher than that reported from Giwa, Nigeria 60.5% [16] and Nsukka region 56% [19].

Similar endoparasites have been identified by other studies from different parts of the world namely [18, 19] including Kenya [14, 20-23].

This is when compared to earlier findings of a study conducted in Kakamega where only four nematode species were reported, with *Heterakis gallinarum* being the most prevalent followed by *Ascaridia galli* [24]. Five nematodes species (i.e., *H. gallinarum, S. brumpti, A. galli. G. ingluvicola* and *Capillaria* spp.) were recorded in the current study in and around Asella. *H.gallinarum* and *S. brumpti* were isolated from the caecum and large intestines, although their predilection site is the caecum [25].

In the current study the occurrence of *Ascaridia galli* (53%) and *Heterakis gallinarum* (24%) was different when compared with the findings reported from South East Tigray Ethiopia (35%, 10%), Giwa local government of Nigeria (17%, 20.5) and Gharb Region Morocco (9%, 10%), respectively [16, 26, 27].

Based on the research that was conducted in Nigeria and Morocco the mean intensity of GIT parasites in backyard chickens did not differ significantly between male and female chickens [28, 29]; however, that was the case with the finding of Kyalo[17] in Kenya. Mixed GI helminthes and coccidia (*Eimeria* spp.) infestations were common and this may be the cause extremeproduction losses among adult chickens and early chick mortality in young chicks [30].

CONCLUSION AND RECOMMENDATION

Majority of the chickens examined had GIT parasites with 87.1% affected with mixed infections indicating that GIT parasites are widely distributed in local chickens in and around Assela, Arsi Zone. This study could serve as baseline data source for the zonal livestock development department for future control and prevention strategies of endoparasites using deworming programs for the local chickens. Further study is required using adequate and representative sample to indicate the clear picture of the occurrence of GIT parasites in indigenous chickens in the study areas. Appropriate control and prevention measures should be put in place.

REFERENCES

1. Sayyed, R., W. Bhatti, S. Ali, M. Pardehi and M. Phulan, 2000. Incidence of nematode parasites in commercial layers in swat. Pakistan Veterinary Journal, 20(2): 107-108.
2. Dube, S., J. Mbanga, C. Dude and I. Zind, 2010. A Study of scavenging poultry gastrointestinal and ecto- parasites in rural areas of Matebelel and Province, Zimbabwe. International Journal of Poultry Sciences, 9: 911-915.
3. Matur, B., N. Dawam and Y. Malann, 2010. Gastrointestinal Helmith Parasites of Local and Exotic Chickens Slaughtered in Gwagwalada, Abuja (FCT), Nigeria. New York Journal of Science, 3(5): 96-99.
4. Jegede, O., S. Obeta, I. Asadu, D. Olayemi and M. Opara, 2015. Gastrointestinal parasitism in local and exotic breeds of chickens reared in Gwagwalada Guinea Savannah zone of Nigeria. Department of Parasitology and Entomology, Faculty of Veterinary Medicine, University of Abuja, Nigeria. SokotoJournal of Veterinary Sciences, 13(3).
5. Frantovo, D., 2002. Some parasitic nematodes of birds (ayes) in The Czech Republic. Acta Societatis Zoologicae Bohemicae, 66(1): 13-28.

6. Abebe, W., B. Genete, Dor-Chies, T. Asfaw and B. Kassa, 1997. Comparative studies of external parasites and gastro-intestinal helminthes of chickens kept under different management system in and around Addis Ababa, Ethiopia. Revue. D' Elevage et de MedecineVeterinaire de pays Tropicaux, 148(6): 497-500.
7. Hagos, A., 2000. Survey on identification of major diseases of local chickens in three selected agroclimatic zone in Central Ethiopia, DVM thesis, Faculty of veterinary Medicine, Addis Ababa University.
8. Soulsby, 1982. Helminths, Arthropods and protozoa of domesticated animals, 7th Ed. "Bailliere Tindalland Casell "Ltd. London, pp: 446-645.
9. Statistical package for social sciences (SPSS) version 20
10. Alam, M., M. Khan, M. Mostofa, A. Rahman, A. Trisha and M. Alim, 2014. Prevalence of gastrointestinal helminth infections in indigenous chickens of selected areas of Barisal District, Bangladesh, Bangladesh Journal of Veterinary Medicine, 12(2): 135-139.
11. Eslami, A., S. Rahbari and P. Ghaemi, 2009. Parasitic infections of free-range chickens from Golestan Province, Iran, Iranian Journal of Parasitology, 4(3): 10-14.
12. Afolabi, O., I. Simon-Oke and A. Olasunkanmi, 2016. Intestinal parasites of domestic chicken (Gallus gallusdomesticus) in Akure, Nigeria, Journal of Biomedicine, l(4), article e9771.
13. Magwisha, H., A.A. Permin, N. Kvysgaard and A. Kassuku, 2002. A comparison of the prevalence and burdens of helminth infections in growers and adult free-range chickens Tropical Animal Health and Production, 34: 205-214.
14. Nnadi, P. and S. George, 2010. A cross-sectional survey on parasites of chickens in selected villages in the subhumid zones of south-eastern Nigeria, Parasitology Research of Journal, pp: 1-6.
15. Ashenafi, H. and Y. Eshetu, 2004. Study on gastrointestinal helminths of local chickens in central Ethiopia, Revue de Médecine Vétérinaire, 155(10): 504-507.
16. Chege, H., L. Bebora, N. Maingi, P. Mbuthia, D. Kemboi, P. Nyaga, L. Njagi and J. Githinji, 2015. Studies on seasonal prevalence of ecto and endo-parasites in indigenous chicken of Mbeere Subcounty", Kenya. Livestock Research for Rural Development.Volume 27, from http://www.lrrd.org/lrrd27/6/cheg27113.htm.
17. Junaidu, H., H. Mijinyawa and S. Luka, 2014. Prevalence of gastrointestinal helminth parasites of the domestic fowl (Gallus-gallusdomesticus) slaughtered in Giwa market, Giwa local government, area, Kaduna state, Nigeria, Journal of Natural Sciences Research, 4(19): 120-125.
18. Kyalo, M., 2012. Prevalence, intensity and pathology associated with helminth infections in indigenous chickens in Kiambu and Nairobi counties, Kenya, University of Nairobi, ArchiveThesis and Dissertations-College of Agriculture and Veterinary Sciences (CAVS), Kenya.
19. Idika, I. Ezeh, I. Obi, O.I. Njoku, I. Nwosu and C. Iheagwam, 2016. Gastrointestinal helminth parasites of local chickens from selected communities in Nsukka region of south eastern Nigeria, Journal of Parasitic Diseases, 40(4): 1376-1380.
20. Mukaratirwa, S., C. Hoj, T. Hove, J. Esmann, A. Permin and P. Nansen, 2001. A survey of parasitic nematode infections of chickens in rural Zimbabwe. Onderstepot Journal of Veterinary Research, 68: 183-186.
21. Ohaeri, C. and Okwum, 2013. Helminthic parasites of domestic fowls in Ikwuano, Abia State Nigeria. J. Nat. Sci. Res, 3: 1-5.
22. Permin, A. Nansan, L. Gibbons, F. Frandsen, H. Magwisha, A. Kassuku and P. Bisgaard, 1997. A cross sectional survey of helminths in rural scavenging poultry in Tanzania in relation to season and climate. Journal of Helminthology, 71: 233-240.
23. Poulsen, J., A. Permin, O. Hindsbo, L. Yelifari, P. Nansen and P. Bloch, 2000. Prevalence and distribution of gastro-intestinal helminths and haemoparasites in young scavenging chickens in the upper eastern region of Ghana, Preventive Veterinary Medicine, 45: 237-245.
24. Irungu, L., S. Kisia and R. Kimani, 2004. Helminth parasites in the intestinal tracts of indigenous poultry in parts of Kenya. Journal of South African Veterinary Association, 75: 58-59.
25. Ondawsy, H., M. Obali, S. Simwa, S. Wakhusama and L. Okitoi, 2000. Epidemiology of helminthes in indigenous chicken in western Kenya: Proceedings of the 7th scientific conference, collaborative research for sustainably improved livelihoods. 13th -17th Nov. 2000, pp: 407-412.
26. Norton, R. and M. Ruff, 2003. Nematodes and Acanthocephalans. In: Saif Y, Barnes H, Glisson J , FadlyA , Mc Dougald L and Swayne D (Eds). Diseases of Poultry. 11th edition. Iowa State Press, a Blackwell Publishing Company, Ames, Iowa, 931-961.

27. Molla, W., H. Haile, G. Almaw and W. Temesgen, 2012. Gastrointestinal helminths of local backyard chickens in North Gondar Administrative Zone, Ethiopia, Revue de Médecine Vétérinaire, 163(7): 362- 2012.
28. Mungube, E., L. Wamael, B. Tenhagen, S. Nziokas and S. Bauni, 2008. Prevalence of parasites of local scavenging chickens in a selected semi-arid zone of Eastern Kenya. Trop. Anim. Health Prod., 40: 101-109.
29. Yoriyo, K., S. Adamu, K. Adarg and S. Panda, 2008. Prevalence of gastrointestinal helminthes of free-range chickens and guinea fowls in Bauchi and its Environs. Bull Pure Appl. Sci., 27: 1-6.
30. Hassouni, T. and D. Belghyti, 2006. Distribution of gastrointestinal helminths in chicken farms in the Gharb region, Morocco. Parasitology Research, 99(2): 181-183
31. Nnadi, N. and S. George, 2010. A cross-sectional survey on parasites of chickens in selected villages in the subhumid zones of South-Eastern Nigeria, Journal of Parasitology Research, Article ID 141824, 6.