



International Journal of Development and Sustainability

Online ISSN: 2168-8662 – www.isdsnet.com/ijds

Volume 2 Number 2 (2013): Pages 1416-1422

ISDS Article ID: IJDS13051506



Special Issue: Development and Sustainability in Africa – Part 2

Common gastrointestinal parasites of local chicken (*Gallus domesticus*) slaughtered in some selected eatery centres in Abakaliki, Ebonyi State: Implication for meat quality

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Abstract

A study on the gastrointestinal helminthes of local chickens slaughtered in some selected popular eating centres in Abakaliki Ebonyi State was conducted. A total of 150 faecal samples from the intestinal tract, lumen and gizzard of already slaughtered chicken were examined using direct smear and sodium chloride floatation methods for the presence of adult worms, segments, ova or eggs of gastrointestinal parasites. Samples of chicken examined were positive with different classes of helminthes parasites namely: nematodes, cestodes and trematodes. The nematode species implicated were, *Ascaridia galli* (48.7%) *Heterakis gallinarum* (28%). The gastrointestinal cestodes discovered were *Choanotaenia infundibulum* (36.7%) and *Raillietina echinobothrida* (20.1%), while the gastrointestinal trematodes isolated is *Prosthogonimus* species. In all the faecal samples examined for sexes, 73 (48.7%) males and 77 (51.3%) females were infected with gastrointestinal helminthes. Mixed infections was 127 (86.6%), while 23 (15.3%) had single infection. The high prevalence of gastrointestinal helminthes as observed in this area has a strong relationship with their mode of feeding and living conditions which will lead to reduced body weight, decreased egg production and deaths thus affecting the meat quality and nutrient content of the chicken.

Keywords: Common, Gastrointestinal, Helminthes, Chicken, *Gallus domesticus*

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Cite this paper as: Uhuo, A.C., Okafor, F.C., Odikamnor, O.O. Onwe, C.S., Abarike, M.C. and Elom, J.N. (2013), "Common gastrointestinal parasites of local chicken (*Gallus domesticus*) slaughtered in some selected eatery centres in Abakaliki, Ebonyi State: Implication for meat quality", *International Journal of Development and Sustainability*, Vol. 2 No. 2, pp. 1416-1422.

1. Introduction

The poultry industry occupies an important position in the provision of animal protein (meat and egg) to man and also 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 be 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 also 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 faeces 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 reared 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). 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).

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). 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) all reported high prevalence of multiple infections in their survey.

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 gallinarum* and *Capillaria spp*) were reported by Ruff (1999) in the United States.

2. Materials and methods

2.1. Study area

The study was conducted in three selected eatery centres in Abakaliki, the capital city of Ebonyi State Southeastern Nigeria. Abakaliki lies at the intersection of Enugu, Afikpo and Ogoja roads. It has an estimated population of 141, 438 according to 2006 census. It has a mean annual rainfall and temperature of 350 mm and 30°C respectively. The inhabitants of Abakaliki include government workers, business men and women, farmers, and students. Houses are close to one another because of the close structural pattern. Almost 80% of fowl's reared in Abakaliki are free range or backyard poultry.

2.2. Sample collection

The three areas where samples were collected include madam guest, crunches and metroview hotel all within in Abakaliki as a result of healthy eating activities. The faecal matters were collected from the rumen of already slaughtered chicken from free-range systems. The chickens scavenge in the surrounding of houses, where they pick up feeds such as insects, earthworms, different larvae, grasses, household wastes and even faeces from other animals. The samples were collected with reference to sex. The faecal sample from the rumen were collected with sterile sample bottles and preserved by the addition of ethanol and stored in refrigeration for sedimentation and microscopy.

2.3. Analysis of sample

The faecal samples were dissolved with few drops of normal saline. Visible adult worms to the unaided eyes were picked up using thumb forceps and placed in a glass petri dish containing physiological saline. The dissolved faecal matter was applied on a slide with the help of sterilized applicator stick. The smooth smears were then made and covered with a cover slip and mounted on the microscope stage. The smears were viewed under objective 10x and 40x respectively for the detection of parasites egg.

2.4. Recovery of adult Worms

Adult worms of gastrointestinal helminth were recovered from the rumen of already slaughtered fowl while the faecal sample collection and washed with distilled water for identification and examination for the parasite species.

2.5. Statistical analysis: Chi square test

The present study revealed relatively high incidence of gastrointestinal helminthes in the local chickens. The whole 150 faecal samples (100%) were found to be infected with different gastrointestinal helminthes.

Table 1. Incidence of Gastrointestinal Parasites Based on Sex

Sex	Number examine	No infected	Percentage of infection
Male	73	73	48.7%
Female	77	77	51.3%
Total	150	150	100%

The table above shows the sex of the fowls and numbers infected including the total percentage of infection by gastrointestinal helminthes. However, there is no significant difference between the sexes, ($X^2 = 0$; $df = 1$; $\alpha = 0.05$). This table above shows the different species of helminthes found in the examined fowls and location. However, there is no significant difference of infection between the locations. ($X_6^3 = 7.945$; $df = 6$; $\alpha = 0.05$). There is also, no significant difference of species between the sexes ($X_6^3 = 2.134$; $df = 3$; $\alpha = 0.05$)

3. Discussion

The study revealed a high prevalence of gastrointestinal parasites in local chickens sampled in three different places in Abakaliki. A total of 150 faecal samples with different gastrointestinal helminthes were implicated. The high incidence of infection agrees with the reports of Okon and Enyechi (1980) and Abebe et al. (1997), but not consistent with the reports of Gadzama (2001) who reported prevalence of (91%) in Borno State of Nigeria. The high incidence of gastrointestinal helminthes in the present study might be as a result of continuous exposure of chickens to the free range conditions which facilitated infections as it may be attributed that 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 helminthes parasites that infest poultry and other animals so reported by Abebe et al. (1997) and Gadzama

(2001). The entire samples examined were infected with different classes of helminthes, nematodes, cestodes and trematodes. A total of five helminthes species were recorded in this work. Of these, 2 were nematodes, 2 were cestodes and 1 trematode. The nematode species were *Ascaridia galli* (48.7%) and *Heterakis gallinarum* (28%). The cestode species include *Choanotaenia infundibulum* (36.7%) and *Raillietina echinobothrida* (20.19%). The trematode specie is only *Prosthogonimus* (10.7%). The rate of infection by *Ascaridia galli* was highest among samples collected from different locations, followed by *Choanotaenia infundibulum*. *Prosthogonimus* specie was found to be the least frequently occurred parasite in the study. These variations could be due to differences in local environmental conditions, which support larval development and facilitate transmission.

Table 2. The incidence of gastrointestinal parasites based on location

	Species of helminthes	No of chickens infected			Sex		Total no infected	% of infection
		Madam guest	Crunches eateries	Metroview hotel	M	F		
1	<i>Ascaridia galli</i>	30	19	24	32	41	73	48.7%
2	<i>Heterakis gallinarum</i>	15	14	13	19	23	42	28%
3	<i>Choanotaenia infundibulum</i>	12	18	25	26	29	55	26.7%
4	<i>Raillietina echinobothrida</i>	8	9	14	17	14	31	20.1%
5	<i>Prosthogonimus species</i>	5	7	4	6	10	16	10.7%

Due to high prevalence, damages to this animal cannot be underscored. Thus, *Ascaridia galli* causes stunted growth, low productivity, irritation and inflammation of the mucosa thus interfering with the absorption of food. *Heterakis gallinarum* (28%) was the second most prevalent nematode parasites encountered in this study. This agrees with Nnadi (2007) who ascribed little pathology to be caused by this caecal worms. It can also act as a carrier of *Histomonas meleagridis* in turkeys and chickens. Parasitic cestodes in poultry are known to cause retarded growth, enteritis, diarrhoea and hemorrhages. Heavy infections may cause death of young birds apart from the loss of egg production in laying chickens. The high prevalence of *Choanotaenia infundibulum*, (36.7%) can be attributed to the wide spread and easy accessibility of intermediate hosts (beetle, house flies) to the local scavenging chickens. The chief effect of this tapeworm, even in heavy infestation, is to retard the growth rate of its host. *Raillietina echinobothrida*

(20.0%) was the second prevalent cestode encountered in this study. *R. echinobothrida* induces the formation of nodules in the intestinal wall, which can lead to confusion with lesions of avian tuberculosis (Saif et al., 2003).

There was no significant difference between the male and female local chicken sampled. This implies that the infection is not significant among male and female fowls. Cases of mixed and single infections were recorded in most samples from the different studied area. The present study clearly indicated that local chickens kept under poor and low input management systems, in the 3 different places were exposed to a wide variety of gastrointestinal helminthes, which could be associated with their indiscriminate scavenging behaviours. This agrees with Abebe et al. (1997) and Ruff (1999) who states that unprotected chicken are more prone to disease acquisition and that the damage inflicted by these parasites in view of the economic importance of rural poultry production is very high thus suggesting that prevention and control measures with better management system should be put in place to forestall such cases.

4. Conclusion

The present study has indeed proved that helminthiasis is prevalent in local chickens, this could be traced with warm environmental condition which create and support the eggs and early stage of development and hence increase survival and transmission of these parasites which was supported by the period of the research though not captured. The entire samples examined were positive with different classes of helminthes such as nematodes, cestodes and trematode implicated; the number of female fowls infected by this gastrointestinal helminthes is greater than male fowls. This work strongly suggests that backyard and free range poultry is susceptible to high risk of helminthes infection and therefore have high economic impact in the poultry production. Appropriate control strategies needs to be devised and proper deworming programme should always be conducted by poultry farmers.

5. Recommendation

In this study, the majority of faecal matters are contained with five different species of helminthes parasites. The impact of these helminthes on local fowls should not be underestimated. Eggs and meat should be boiled properly and the entire intestine properly disposed to avoid transmission of these helminthes diseases to man. It is therefore absolutely necessary that prevention and control measures with better management system be introduced and public awareness scheme be introduced into our communities.

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