Int. J. Pure Appl. Sci. Technol., 20(2) (2014), pp. 58-64

International Journal of Pure and Applied Sciences and Technology

ISSN 2229 - 6107

Available online at ***www.ijopaasat.in***

Research Paper

An Appraisal of Production-Losses in Domestic-Fowl Broilers due to Gastrointestinal Helminthiasis in Parts of Rivers State, Nigeria

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(Received: 18-11-13; Accepted: 17-1-14)

Abstract: *Cases of dead and poorly performing broilers of the genus Gallus gallus domestics Galliformes: were observed and reported (Raph Veterinary Services Clinic in Port Harcourt, Rivers State) at various times. Post mortem examination of these birds was routinely carried out over a period of six months. A total of five hundred birds were examined to as certained the causes of death and/or poor performance. Out of this number, two hundred and fifty-seven (257) birds (i.e. 51.4%) of the posted birds) were found with helminthes in their gastro-intestinal tracts. The productive and nutritional implications of this level of infestation and their adverse effects on profitable commercial broiler-production were analyzed. This evaluation was done bearing in mind the enormity of such deaths and the effects on meat-production and animal-protein availability, and nutrition-needs of human beings in Rivers State, the study area. The losses associated with the loss (death and/or sacrifice) of birds were considered.*

Keywords: Broilers, Meat loss, Helminthes, Implications.

1. Introduction

A substantial level of commercial as well as local poultry production activities are known to exist in Rivers State [1-3]. These activities cut across the state, although this study focused mainly on Port Harcourt and its environs. As it is the case with most (if not all) parts of the world, the domestic fowl

(*Gallus gallus domesticus:* Galliformes) is a known source of valuable animal-protein [4, 2] -ranking over 90% the world-over [5].It has been observed that the average animal protein availability in Nigeria is less than 5g per head per day and that the role of the domestic fowl in bridging this protein deficiency gap cannot be over-emphasized as its production has one of the greatest potentials for fast growth and rapid returns, as proceeds would come from the eggs, manure and meat, eventually [6]

Despite the importance and significance of the domestic fowl production vis-à-vis the economic, nutritional and social importance in the world, Nigeria and the Niger-Delta Region, gastro-intestinal parasites, especially helminthes have been observed, known and reported to be a major barrier to profitable domestic fowl production [7-12, 2, 13, 3].

Research has shown thatgastro-intestinal is responsible for tremendous losses in poultry production in Nigeria and the United State of America respectively, especially in terms of the huge losses in the much needed animal-protein [3,14]. Limited studies have been carried out on commercial farms, which raise mainly exotic birds, on the gastro-intestinal helminthes in different parts of Nigeria by various workers, like [15, 12, 16]. However, little or nothing has been done on the actual or quantified production-losses associated with the presence and activities of gastro-intestinal helminthes of the domestic fowl generally and in Rivers State of Nigeria in particular.

The foregoing and the fact that several farmers in Rivers State have continued to suffer significant losses which could be traced to helminthes-infections of the gastro-intestinal tract; spurred these authors to investigate the infections, the associated deaths and poor production performance (especially meat-production losses) and their related animal-protein losses). Thus, these authors believe that this would make this neglected killers and "poultry-productivity cum animal-protein/nutrition saboteurs" become better recognized by/for what they are and be more drastically and concertedly dealt-with until poultry-production (particularly domestic-fowl-production) becomes adequately beneficial as should be, in River State, the Niger Delta, Nigeria and the entire tropical world.

This paper is therefore devoted to analyzing the productivity and human-nutrition implications of gastro-intestinal helminthiasis in domestic-fowl production. This research/report was stimulated by cases of deaths and poor-performance in domestic-fowl broiler production reported in and observed from some poultry farms in Rivers State in the Niger Delta region of Nigeria. The research report is therefore based on observed frequent cases of death and poorly performing birds (i.e. domestic fowls) whose causes were found (through *post-mortem* examination) to be gastro-intestinal helminthiasis/helminthosis.

2. Materials and Methods

2.1 Study Area

The domestic fowl (*Gallus gallus domesticus:* Galliformes) involved in this study were from poultry farms covering five Local Government Areas in Rivers State, Nigeria. These farms were either visited and/or dead and (sometimes) poor-performing live-birds obtained from the farms by these authors.

Further information was obtained from case histories on the birds and the farms accordingly. Domestic-fowls of different ages were posted, table-sized (8-12 weeks old) birds were involved in this study. The birds comprised of broilers, most of which (about 95%) were being raised on deep-litter, while 5% were raised on wooden-cages.

2.2 External Examination of the Birds

The case-histories of the birds and farms were usually taken [17, 3]. The birds were externally examined and observations noted. The external examinations and observations were made with

unaided- eyes, touching and palpation, watching the attitudes, demeanor and general external appearances of the birds. Some of the farms were visited to examine/observe the poultry pens, the litters, cages and droppings of the remaining birds, etc.

2.3 Dissection and Internal Examination of the Birds

The birds were then systematically opened-up (i.e. dissected) with the aids of sharp metal-knives and scissors, hands protected with disposable surgical-gloves. The dissected sections with their contents were first examined with unaided eyes. Further examinations were carried-out with optical hand-lens and followed by the use of light-microscope, for characteristic/typical lesions and/or cause(s) of the deaths.

The alimentary tract of the birds were usually removed from the body cavity, the various parts (esophagus, crop, gizzard, intestine, caecum and rectum) were ligated separately, to prevent the transfer of the helminthes from one site to the other; separately opened and their contents washed into various containers under running water. The volume of each was made up to two (2) liters, thoroughly mixed, the duplicate 200ml transferred to suitably labeled containers and preserved in 10%-formalin. The crop-mucosa were scraped-off and digested in a pepsin hydrochloric acid (HCL) mixture at 37% for six (6) hours.

Digests were made up to volumes of 2 liters with cold water and again 200ml of the sample duplicates taken. The intestinal contents were taken and treated as for the crops but without scraping and digesting the intestinal-mucosae. The contents of the caeca were passed through a coarse mash sieve (2-3mm apparatus) for any parasites present to be collected for preservation. 8.2mls iodine solution was added to each 200ml sample above to make parasites' identification and collection easier (if present). After thoroughly mixing, 4mls of each suspension were separately and at various times transferred to petri-dish for parasites' identification. The worms seen were isolated and preserved in 10%-formalin after washing in saline. The larger worms were clearly seen without the microscope while the smaller and thinner ones were examined and better seen with microscope.

The high mortality rate observed in the birds (up to 41.4% of the birds (500) involved in this study caused these authors some serious concern, which led to the authors' decision to evaluate the effects of these deaths and the associated implications in meat-production, the expected animal-protein availability and human-nutrition. These were used to evaluate the general productivity of broiler-production in Rivers State, the study area, in the Niger-delta region of Nigeria. The loss of such other valuables as the manure that should have come from the birds had they not died or adversely been affected by the helminthes and their associated activities were analyzed.

3. Results and Discussion

The effects of helminthes infection on broiler domestic-fowl production were studied from two major points and the results are as shown below:

3.1 Analyses of 257 Birds Lost due to (or associated with) Helminthiasis in the Farms Examined here:

- Total no. of dead-birds examined post-mortem = 500
- No of domestic fowls lost (dead) due to helminthiasis/helminthosis = 464.

3.2 Meat-Losses due to Death of Broilers:

The death of a broiler brings about meat-loss. This is because broilers are basically reared for fowl-meat for human-consumption and well-being health wise. As such the losses of broilers constitute a

huge loss in meat-production and the much-needed animal-protein. The world Health Organization (WHO) recommended a minimum of 11g of animal-protein per person per day. The minimum carcass-weight of a domestic-fowl broiler is 2kg. The loss of 207 broiler-birds obviously implies that the meat-loss will amount to 257 x 2kg = 514kg. This is equivalent to 5,140,000g of animal-protein which could have been enough to meet-up with the quantity required by 376,363 persons in one day.

Although the losses involved birds of different ages between two (2) weeks and twelve (12) weeks old, the losses taken into consideration in this study were those broilers that were lost (dead or sacrificed) at table-size (i.e. 8-12 weeks old).

A broiler at table-size normally weighs at least 2kg dressed carcass-weight. Two hundred and fifty-seven (257) birds at table-size will produce at least 257 x 2 kg of meat= 514 kg

3.3 The Loss of Poultry-Manure by Loss of Broilers:

A mature broiler domestic-fowl is expected/estimated to produce up to 2kg of faeces in one month. Where such a bird is lost (due to death or sacrificed) there will be no more faeces (poultry-droppings) from it. It is known and has been reported that poultry-droppings are useful as manure in crop-production and feed in aquaculture, hence the importance of poultry-droppings as they have become part of the expected and necessary produce/products of poultry-production. In relation to the broilers lost due to helminthiasis in this study, it becomes imperative that loss of 207 layers will result in the loss of manure and/or fish-feed to the tune of 207 times the quantity/volume produceable by one broiler at table-size (i.e. from 8weeks to at least the 12^{th} week of age when a broiler is minimally expected to be alive if it did not die during such expected minimum period, table3.

Although the losses in poultry-production involve birds of different ages, this study concentrated on the losses that occurred in those at table-size. The estimated and associated production-losses here were observed to occur in two ways viz: meat-loss and manure-loss due to death of broilers
From the results above two hundred and seven domestic fowl carcasses found to have been affected by (particularly caused to die and/or found at post-mortem to harbor) gastro-intestinal helminthes, out of a total of five hundred dead domestic-fowls examined. These obviously may not have been the only birds that died due to gastro-intestinal helminthiasis on the farms. They were only the ones that were made available for post-mortem examination, which had helminthes in them.

However, going by earlier research findings/reports, some examination and estimations were drawn from the findings of this research which gave pictures that showed that gastro-intestinal helminthes-infections can and do cause losses in meat-production and poultry-manure. This translate to loss of much-needed animal-protein from meat and loss of manure from the dead-birds (which would have been very useful in agronomy, horticulture and/aquaculture) on the long-run, in the area studied [18]. For example, figures as high as over 370 thousand grams of animal-protein, and over almost five thousand kilograms of poultry-manure, were recorded. as losses associated with direct loss of the broiler domestic-fowls. This could be more, especially where the farmers involved have an average of one thousand domestic fowls each. Helminthiasis in severe form has been noted to retard the growth of growing chickens leading to loss of productivity [19].

These, no doubts, show that gastro-intestinal helminthes are no friends to the poultry farmers and human-beings generally, especially where human-nutrition and profitability of the poultry (domestic-fowl) production ventures are concerned.

4. Conclusion

The meat-production, human-nutrition losses and organic-fertilizer loss caused by (or at least associated with) gastro-intestinal helminthes-infection in domestic-fowls in the tropics generally and in Port Harcourt and its environs (in Rivers State, Nigeria) in particular, cannot be over-emphasized.

As such, it should neither be over-looked, nor wished-away and can also not be over-emphasized either.

This stems from the observed and reported losses (as shown above) associated with the presence of gastro-intestinal helminthes on domestic-fowl farms/production ventures. The presence of these parasites have been described as "ubiquitous" yet not much is being done anymore (or at all) to commensurate the enormity of the damage they are causing/posing to broilers productivity, human nutrition as well as the attribute and (inadvertently) the health of the people in the tropics and particularly Nigerians. This research therefore reveals much that should warrant a re-focus on gastro-intestinal helminthes (in particular) and helminthiasis generally, with the aim of eradicating or (at least) reducing their occurrences and associated damages drastically. The need for further research and necessary action(s) against these parasites has become an emergency and should be treated as such. The need for total eradication is obvious since these parasites cause the poultry farmers, poultry-production and human-nutrition a reasonable/significant ratio or percentage of their productivity, profit and associated benefits.

Tables:

Table (1): Loss of broilers due to helminthiasis

No. of birds examine post-mortem	500 birds
No. of broilers with helminthes	257 birds
%age of birds lost from helminthiasis	51.4%

Table (2): Meat-losses/animal-protein loss due to death of broilers

No. of broilers lost by helminthiasis	257
Weight(kg) of meat lost by helminthiasis	257 x 2kg = 514kg
Weight(g) of meat/animal-protein lost by helminthiasis	5,140,000g
No. of persons denied animal-protein per day by this loss	376,363 persons

Table (3): Manure-loss due to death of broilers

No. of broilers lost by helminthiasis	257
Weight (kg) of manure lost by a broiler per month	2kg
Weight(kg) of manure lost by 207 birds in a year	257 x 2kg x 12= 6,168 kg

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