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HELMINTHIASIS OF THE DOMESTIC-FOWL (*Gallus gallus domestics*) AND ITS ADVERSE EFFECTS ON SUSTAINABLE POULTRY-MEAT PRODUCTION IN NIGERIA

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ABSTRACT

The prevalence of Helminthiasis and its adverse effects on sustainable profitable poultry-meat production in Port Harcourt and its environs was studied. While the domestic- fowl broilers and layers. The study was conducted between July 2012 and December 2012 when poultry-meat production and demands are on the increase due to various festive activities taking place and conditions that favour helminthiasis are high in Nigeria. Seven hundred and fifty of domestic fowls brought to Raph-veterinary services in Port Harcourt (where one of the authors does locum-practice), from various domestic-fowl production ventures in Port Harcourt and its environs (covering five local government areas in Rivers State, viz; Port Harcourt, Obio-Akpor, Oyigbo, Eleme and Tai). The fowls were examined to determine the cause(s) of death. They were examined post mortem. Out of the number, 500 (66.66%) were pullets and layers while 250 (33.33%) were broilers. Helminthiasis was identified as cause of death in 600 (86%) of examined birds. Of the 600 infected birds, 400 (66.67%) were layers while 200 (33.33%) were broilers. Helminthiasis was identified and reported as the cause of most of the losses. This conclusion was based on the case history taken, external observation of the birds, observations made from the pens on visitating the sources and gastrointestinal tracts of the examined birds. Helminthes were found in 600 (80% of 750 posted/examined) birds, which 200 (26.67% of examined birds and 33.33% of infected) were broilers while 400 (53.33% examined, and 66.67% of infected birds) were layers. These levels of losses which occurred during the six months of study were analyzed for financial implications and effects on the overall profitability of poultry-meat production in the area of study.These deaths due to helminthiasis summed up to loss of N1,200,000 (for layers) and N500,000 (for broilers) of expected monetary income from the sale of these birds had they not died. This study is a reflection of the case across Nigeria and perhaps the tropical world, where the losses maybe higher because helminthiasis has been reported to be ubitiquous by earlier researchers.

INTRODUCTION

Meat-production from the domestic fowl (*Gallus gallus domesticus*) abounds in Port Harcourt and its environs. This meat which comes from four sources, (broilers, cockerels, old/spent-layers and old/spent-

breeding (i.e parentstocks) contributes to more than sixty-percent (60%) of the overall meat consumed in Nigeria, (Ironkwe and Amaehule, 2008). The demand for and production of meat from the domestic fowl exists virtually year=round in Port Harcourt and its environs, but are usually on the increase between July and December every year. This increase in demands and production, usually result from various festive activities (such as wrestling festivities, new-yam festivals, Christmas and New Year festivities, etc). These lead to lots of expected (and real) financial expenses and returns amongst the people and residents in the area.

Unfortunately some (if not lots of) losses have been identified in this present study (by Elenwo and Okafor-Elenwo, 2013) to also occur amongst producers of poultry-meat in the study-area. A total of seven hundred and fifty (750) domestic fowls were examined. Of these, five hundred (500) were layers while two hundred and fifty (250) were broilers. One of causes of losses has been identified to be helminthiasis (worm infestation, its activities and adverse effects) in animals.

Domestic fowls, like other farm-animals, are known to be infected by (or harbor) a number of helminthes in their gastrointestinal tracts (Elenwo, 2002). Helminthes have numerous adverse effects on the birds, ranging from sickness, unthriftiness, poor (or reduced) productive performances and losses and (in many occasions) eventually results in deaths of most of the affected birds, especially were little or no medications were administered on time (Fraser *et al*, 1986, Kekeocha, 1998 and Fraser *et al*, 2008). In a number of cases, some birds with helminthiasis still die even after the administration of some drugs (Fraser, *et al* 2008).

It has been reported by earlier researchers that helminthiasis is somewhat ubitiquous in the tropics. Olaka and Wekhe (1997), Wekhe and Olayinka (1999), Elenwo (2002) and Elenwo (20012) corroborated this.

Despite the several anthelmintic agents available and possible being used, the occurrence and effects of helminthiasis in poultry farms in Nigeria and most tropical countries has remained and even appears to be increasing.

The foregoing has been reported by Bincan (1992) and Elenwo (2000, 2002 and 2012) as being due to development of resistance to many conventional anthelmintics by helminthes.
The emphasis of this study is based on the observed losses in meat-production due to the deaths of broilers and layers (which are would usually have been sold-off as spent layers) to be eaten as meat when they are no longer laying profitability or economically.

Although some studies have been carried out on the occurrence, prevalence, etc. of helminthiasis in the domestic-fowl in various parts of Nigeria, the tropics and the world at large by such researchers as Tudor (1967), Soulsby (1968); Fabiyi (1972); Baines, (1979); Soulsby (1982); Hodasi (1979); MCNitt (1983); Shah-Fischer and Say (1981); Obanu, *et al* (1984); Oyeka, (1989); Umeche and Eno (1987); etc. none has actually quantified the effects of helminthiasis on sustainable profitable meat-production by the domestic-fowl in Port Harcourt and its envious.

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MATERIALS AND METHODS

This study is based on frequent cases of dead domestic fowls whose causes were found to be or associated with helmintiasis. These birds were examined physically, externally, by palpation and internally by dissection at post mortem.

Sources of the Birds:

The birds involved were from various poultry (i.e domestic-fowl) production centres (including house hold/backyard ones) in Port Harcourt and its environs.

Study Population:

A total of seven hundred and fifty (750) domestic fowls (*Gallus gallusdomesticus* were used for this study.

Study Area:

This study was carried out in Port Harcourt and its adjourning local government areas (Port Harcourt, Obio-Akpor, Oyigbo, Eleme and (Tai) in Rivers State, Nigeria.

Period of Study: The period of study was July 2012 to December (2012).

Methods: Most of the farms from which the birds came were visited to observe the farms' settings/location, farm-records, the remaining birds and other animals (if any) on the farm, the pens, etc. These visits were to further ascertain the diagnoses of the reported deaths and/or poor-performances (in some cases). Most (over 90%) of the farms visited had the birds on deep-litter. Unfortunately, most of them had damp litters or patches of wet areas, especially around the water-troughs (i.e drinkers). A few others (10%) had their birds (layers in cages (some battery and others wooden).

Over 99% of birds involved in this study were already dead before they were brought for examination/diagnoses. However, where live-birds were involved and there was the need to sacrifice them for post mortem, the procedure recommended by Cornell Univesity's School of Veterinary Studies, reported in Smith (1992) and adopted by Elenwo (2012). In the said procedure, the birds were each and variously dissected and their digestive /alimentary canals examined for any presence and/or lesions of agents and/or other possible causes that could be attributable to the reported deaths and/or poor-performances. Some contents of the gastrointestinal tracts of the birds (such as the digestants and feaces) were also collected and examined accordingly, using a standard method used by Olaka (1997) and reported in the work of Elenwo (2002).

RESULTS

Helminthes of various sizes and shapes were found in some of the posted/ examined-birds. The large worms were clearly seen with ordinary (unaided) eyes while the smaller and thinnier ones were examined and better seen under the microscope.

In some cases, some small worms were found sticking their head parts into the intestinal walls, while some others sticking their heads into the walls of the gizzards.

Five hundred (500) birds (66.66%) of seven hundred and fifty (750) were layers while two hundred and fifty (250) birds i.e 33.33%), broilers.(See table 1 below).

Out of seven hundred and fifty domestic fowls examined, six hundred (80%) were found with helminthes in their alimentary tracts.(Table 2).

Four hundred (61.67%) of the infected birds were layers while two hundred (33.33%) were broilers.

Incidentally, no cockerels and parent/breeding stocks were found among the birds examined. The presence or absence of helminthes in them could not be ascertained. This, does not imply that cockerels and breeding/parent stocks do not suffer from hemlinthasis.

Basically, two main helminth-groups were found/identified amongst the worms isolated from the infected birds, namely;

1. Those that were elongate, cylindrical, whitish/milk-coloured, tapering at both ends. These were identified as round worms (i.e nematodes).
2. Those that were larger, longer, flat and tape-like, having one end ending in small knot/knob-like structure and the other end flat and wider. These were identified as tape worms, (the cestode group).

Table 1: Prevalence of Helminthiasis in (750) Examined Fowls:

S/N	No. of BirdsExamined	No. of birdswith helminthiasis	% of birdswith heliminthiasis	% of birds without helminthiasis
1.	750	600	80.0%	20%

Table 2: Types/Bleeds of Birds Examined

S/N	No. of Birds Examined	No. of layers examined	No. of broilers examined	% of layer examined	% of broilers examined
1.	750	500	250	66.66%	33.33%

Table 3: Prevalence of Infection According to Bird Breed/Type

S/N	No. of Birds Infected	No. of Layers Infected	% of Broilers Infected	% of Layers Infected	% of Broilers Infected
1.	600	400	200	66.66%	33.33%

Production-Lossees Associated with Helminthiasis

1. Number of birds lost (dead or sacrificed) – number of birds examined at post mortem dissection
2. Financial losses associated with the production losses caused by helminthiasis: This is given by the values of the broilers at maturity plus the values of the old/spent-layers.

The values were viz;

(a) Broilers were sold for N2,000 each as at December 2012, in Port Harcourt.
Total number of broilers lost = 250
Therefore, the financialloss =N2000 x 250 = N500,000.

(b) Layers sold for ₦1,500 in December 2012 in Port Harcourt .
Total number of layers lost = N500
Therefore, the financial loss =₦1,500 x 500 = ₦750,000.00

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Total losses associated with helminthiasis in the current work = ₦500,000 (from broilers) + ₦750,000 (from layers) = ₦1,200,000.00 (one million, two hundred naira).

DISCUSSION:

This study reveals that out of seven hundred and fifty domestic-fowls that died or were sacrificed to ascertain cause(s) of thier death(s) and/or poor-performance(s), six hundred (600) were found to harbor (or incriminated to have died of) helminthiasis (see table 1). Out of these, four-hundred birds (66.66%) with helminthiasis were layers (egg-producing) domestic-fowls while 200 (33.33%) were broilers. This falls in line with the findings of such earlier researchers as Tudor (1967), Soulsby (1968); Fabiyi (1972); Baines, (1979); Soulsby (1982); Hodasi (1979); MCNitt (1983); Shah-Fischer, *et al* (1981); Obanu, *et al* (1984); Oyeka, (1989); Umeche and Eno (1987). This has also been corroborated by Olaka and Wekhe (1997), Fakae and Nwalusi (2000), Elenwo (2002), Shane (2005), Fraser, *et al* (2008), Mwale and Masika (2011), Elenwo (2012), etc; who reported helminthiasis to be responsible for over 30% of deaths occurring in domestic-fowls in the world, and moreso in the tropics.

However, the loss in present study was taken to include all the birds that were posted in this study as there were no salvages from them. Moreover, from the examinations carried out, helminthiasis was highly incriminated as it contributed directly and/or indirectly to the loss of the birds (either by death or sacrifice).Hencethe reference that these losses were associated with helminthiasis.

The number of layers affected were higher than those of broilers (tables 1-3). This could be due to the fact that the number of layer farms in the area are more than the broiler farms. Moreover, the production of broilers in the study area is mostly seasonal. So, in financial analysis, although the prices of the broilers were higher than those of layers, the eventual financial losses were more with the layers (as they are usually more in number) than the broilers). This also suggests that meat-production losses are more with layers (despite the fact that meat production is only a secondary purpose in layer production) than the broilers.

Be the foregoings as they may, the fact remains that helminthiasis causes a substantial number of poultry-meat losses in the area of study. The sum of one million two hundred thousand naira being lost by the poultry farms in Port Harcourt and its environs is a substantial adverse effect to profitable poultry-meat production in the area of study. Moreover this figure could be more if poultry farms in other parts of the Rivers State are put into consideration, as the current study only looked at cases encountered in one veterinary services centre out of more than ten of such spread across Port Harcourt. Thus study only tried to show a picture of the level of poultry-meat being lost and its associated financial losses in Port Harcourt and its environs.

This high level of losses in poultry-meat and the associated finances can be traced to the ubitiquousness of helminthiasis reported by earlier workers such as Soulsby (1968),

Soulsby (1982), Hodasi, (1979), Fielding, (1985), Gutteridge (1993), Mpoame and Agbede (1995).Olaka and Wekhe (1997), Fakae and Nwalusi (2000), etc. According to these researchers, this ubitiquousness is

traceable to the environmental and management factors such as the high rainfalls and its associated relative humidity, other climatic conditions and poor management-practices prevalent in the tropical countries. Also, Elenwo (2012) reported that many of the poultry-farms in Rivers State were raised on the deep-litter system, which has been corroborated by the observations and findings of the current study following visits of one of the authors of this work, that most of the birds considered in this study were being raised on deep-litter, and that some points in the pens were these birds were raised, particularly atoun the drinkers were wet. These factors, according to Soulsby (1968), Fraiser, *et al*. (2008), and Elenwo (2002 and 2012) are very favourable to the presence and propagation of helminthes, especially those of the gastrointestinal tracts of the domestic-fowl. This is also concurred by the authors of this study.

As reported by earlier researchers that helminthiasis is somewhat ubitiquous in the tropics. Olaka and Wekhe (1997), Wekhe and Olayinka (1999), Elenwo (2002), Permin and Hansen (2005), and Elenwo (2012) corroborated this. According to Elenwo (2002 and 2012), despite the several anthelmintic agents available and being used, the occurrence and effects of helminthiasis in poultry farms in Nigeria and most tropical countries has remained and even appears to be increasing.

In the light of these, the current researchers hereby recommend as follows:

(i) Further research need be carried out find-out what other factors could be responsible for and/or contributing to this ubitiquousness and increase of helminthiasis amongst poultry-farms to aid in proffering sustenable solution(s) to stemming down (if not eliminating) helminthiasis and its adverse effects on poultry-production in the tropics and/or the world at large.

(ii) Closer-monitoring of helminthiasis management-practices on poultry farms.

(iii) New, less-expensive and more-effective drugs should be sought for against helminthiasis.

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