

NISEB 2011088/11305

A study of ecto – and endo parasites of domestic birds in Etsako Municipality, Edo North of Nigeria

E. U. Edosomwan*, E. R. Olumese and E. J. Igetei

Department of Animal and Environmental Biology, University of Benin, Benin City, Edo State, Nigeria

(Received May 2, 2011; Accepted July 1, 2011)

ABSTRACT: Three hundred faecal samples from 300 domestic birds representing 100 from each of the 3 Local Government Areas (LGA's) were examined for helminth parasites, while 18 live domestic birds comprising of 10 fowls (*Gallus domestica*), 4 ducks (*Anas sparsa*), and 4 pigeons (*Columbia livie*) were also investigated for ecto-and helminth parasites in the three (3) Local Government Area in Etsako, Edo state, Nigeria.

Two hundred and thirteen (213) 71% of the 300 faecal samples investigated were found to have parasite eggs. They include: 10 (46.7%) species of nematodes, *Ascaridia galli*, *Syngamus trachae*, *Capillaria annulata*, *Heterakis gallinae*, *Cappillaria longicollis*, *Syngamus bronchialis*, *Amidostomum anseris*, *Subulura brumpti*, *Capillaria retusa* and *Echinuria uncinata*, 4 (8.9%) species of cestodes, *Choanotaenia infundibulum*, *Raillietina species*, *Amoebotaenia sphenooides* and *Davainea proglotthina*.

All 10 live fowls (55.5%) and 2 pigeons (11.1%) were found to be infected with helminth parasites. The parasites include: 8 species of cestodes, *Amoebotrienia cuneata*, *Choanotaenia infundibulum*, *Hymenolepis species*, *Raillietina species*, *Raillietina cesticillus*, *Mesocestoides species*, *Davainea proglottina* and *Raillietina echinobothridia*, which was the only helminth parasite found in pigeon in this study. 2 species of nematode; *Ascaridia galli* and *Strongyloides avium*. 1 species of trematode, *Echinostoma species*.

Ten species of ectoparasites (Mallophaga-lice), were also found on the birds, they include; *Lipeurus caponis* (83.3%), *Columbicola columbae* (38.8%), *Coelutogaster heterographus* (22.2%), *Chelopistes meleagridis* (38.8%), *Gonoides dissimilis* (77.7%), *Gonoides gallinae* (38.8%), *Gonoides hologaster* (16.6), *Menopon gallinae* (27.7%), *Mencanthus stramineus* (66.6%) and *Gonoides gigas* (27.7%).

Keywords: Domestic birds; Ectoparasites; Endoparasites; Etsako Municipality; Nigeria.

Introduction

The rearing of domestic birds is a common preoccupation among the people of Nigeria, especially those living in the rural areas. These birds are reared by house holders, who use their eggs and meat as a source of animal protein and farm manure (Kekeocha 1984; Frantovo, 2000). Their produce like eggs and meat and also sold for economic empowerment. Among the domestic birds reared in Etsako, Edo north of Nigeria are fowl, ducks, Pigeons, Turkey and Geese.

*Author to whom all correspondence should be addressed.

While birds are reared commercially by organised poultry farmers, where adequate care and treatment are given to them, a large number of them are reared under free-ranged management. They are allowed to roam around their surroundings, hunting and scavenging for food for themselves and their young. They only return to their pens to sleep. This practice exposes them to various ecto and endo parasites. These parasites constitute a major factor limiting productivity of the poultry industry by affecting the growth rate of the host (domestic birds), resulting in malfunctioning of organs lead to sub-clinical infections and eventually death (Soulsby 1982, Freitus *et al.*, 2002), especially in the case of infection by very common ecto- and endoparasites, which often occurs when animals are at a high population density (Barnes 1986). This has resulted to huge economic loss and reduced protein available to man. This problem is further complicated, by these birds having limited or no access to clean water and balanced diet.

Investigations in chickens, ducks and pigeons managed under similar conditions have shown high prevalence of gastrointestinal helminths (Magwisha *et al.*, 2002; Muhairwa *et al.*, 2007), which impairs productivity and health of these birds. However, it is envisaged that an understanding of the parasitic diseases affecting these domestic birds will help in devising measures to improve health, utility and productivity/ yield of these birds in Nigeria which will enhance protein availability to man. Surveys in the past revealed the presence of ecto- and endoparasites as well as haemoparasites (Sol *et al.*, 2000; Adriano and Cordeiro, 2001, Msoffe *et al.*, 2010). Also Freitus *et al.*, (2002), reported a high density of gastrointestinal parasites in captive- breed birds from the state of Pernambuco. According to the author, roundworms, cestodes and protozoans were found to be prevalent. This survey examines to study the ecto – and helminth parasites of domestic birds and their implication on protein availability to the people of Etsako communities, Edo North of Nigeria.

Materials and Methods

Study Location

The study was conducted between August and November 1998 in Etsako, Edo North of Nigeria, comprising of three (3) local government areas namely; Etsako West, Etsako North and Etsako Central Local Government Areas.

SAMPLE SIZE DETERMINATION

Three hundred faecal samples from 300 domestic birds representing 100 from each of the 3 Local Government Areas (LGA's) were examined.

The faecal samples were collected early in the morning from various households, under their pen using a spatula and placed into a plastic container. These samples were analysed using the direct method of Scholten *et al.*, (1982), and that of spontaneous sedimentation of Greve *et al.*, (1978).

In addition to the 300 faecal samples, 18 live domestic birds comprising of 10 fowls, 4 ducks and 4 pigeons were also investigated.

The age of the birds were determined by examining the iris colour and unmolted feathers as described by Sol *et al.*, (2000). After purchasing, the domestic birds were transported in cages to the Parasitology laboratory where they were examined, humanely killed by cervical dislocation and examined for ecto- and helminth parasites.

INVESTIGATION OF PARASITES

ECTOPARASITES INVESTIGATION

The ectoparasites were collected as described by Soulsby (1986), briefly after killing the birds by decapitation, they were immediately placed in a polythene bag and the parasites collected after leaving the birds. The ectoparasites were preserved for identification process in 70% alcohol.

POSTMORTEM AND GASTROINTESTINAL PARASITES INVESTIGATION

GASTRO- INTESTINAL PARASITES

The post-mortem examination was done according to Fowler (1996), after decapitation, the abdominal and thoracic cavity were opened, followed by systemic autopsy examination which include, the oesophagus to the gizzard, the small intestine, duodenum, (jejunum and ileum), the caeca, and the ileocaeco-colic junction to the cloaca. Each section was opened longitudinally and the contents carefully washed through a 100 μM test sieve. The mucosa was scraped to collect the helminthes embedded in the mucosal layer. Finally, the contents were examined under stereomicroscope and all helminth were counted before being fixed in 70% ethanol for further identification, Soulsby, (1986).

IDENTIFICATION OF PARASITES

ECTOPARASITES IDENTIFICATION

The ectoparasites were identified with the aid of tables and keys by Soulsby, (1982).

ENDOPARASITES IDENTIFICATION

HELMINTH PARASITES

Helminthes were cleared in lactophenol and examined for morphology with the light microscope at 10x magnification. All parasites were identified using the helminthological key of Soulsby, (1982).

DATA CAPTURE AND MANAGEMENT

The prevalence of parasites was calculated using the formula ($P=d/n$). P is the prevalence, d is the number of individuals having An infection at a particular point in time and n is the number of individuals in the population at risk in time of every single species was calculated according to Thrustfied, (1995). Chi- square analysis was used to compare prevalence of parasites between the fowls, pigeons and ducks using MS Excel programme.

Results

Three hundred (300) faecal samples and 18 live domestic birds comprising of 10 live fowls (*Gallus domestica*), 4 pigeons (*Columba livie*) and 4 ducks (*Anas sparsa*) were investigated for the presence of ecto and helminth parasites. All ten (10) live fowls and two (2) of the four (4) live pigeons investigated were found to be infected with ecto and helminth-parasites, while non of the 4 live ducks investigated was infected. Table 1.

Ecto-Parasite Investigation

All of the 10 examined fowls, comprising of 55.50% of the total (18) live birds examined were found to be infected with ecto-parasites, 2 of the 4 pigeons comprising of 11.10% of the total (18) live birds investigated were also infected, while none of the ducks was infected, (Table 1). 10 species of lice were found on the body of the birds namely; *Lipeurus caponis*, *Columbicola columbae*, *Coclitogaster heterographus*, *Chelopistes meleagridae*, *Gonoides dissimilis*, *Gonoides gigas*, *Menopon gallinae*, *Goniocores hologaster*, *Goniocotes gallinae* and *Mencanthus stramineus*. This is shown in table 2 below.

ENDO-PARASITE INVESTIGATION

This study demonstrated a total of 22 species of endoparasites in the 318 samples examined, (300 faecal samples and 18 live domestic birds). They include; 9 species of cestodes, 11 species of nematodes, 2 species of trematodes and some unsporulated oocysts. (Table 3). Two hundred and twenty-two (222) 74% of the 300 faecal samples collected and examined were infected with Sixteen (16) species of endoparasites were found. They comprise of 10 species of nematodes, 4 species of cestodes, 1 species of trematode and some unsporulated oocysts. (Table 3 and 4).

All of the 10 examined fowls, comprising of 55.50% of the total (18) live birds examined were found to be infected with gastro-intestinal parasites, 2 of the 4 examined pigeons comprising of 11.10% of the total (18) live birds examined were also infected with gastro-intestinal parasites, while none of the ducks examined was infected. (Table 1).

Table 1: Prevalence of endoparasites in three hundred and eighteen samples examined in the three major Local Government Areas

Endoparasites	No. of parasites encountered in the study area	Overall prevalence of parasites encountered
CESTODES		
<i>Raillietina species</i>	97	30.50
<i>Raillietina cesticallies</i>	7	2.20
<i>Raillietina echinobothridae</i>	50	15.72
<i>Hymenolepus species</i>	30	9.43
<i>Davainea proglotinha</i>	14	4.40
<i>Choanothaenia infundabulum</i>	31	9.75
<i>Mesocestodes species</i>	10	3.14
<i>Amoebataenis cuneata</i>	25	7.86
<i>Amoebataenis sphenoides</i>	2	0.63
Total	266	83.65
NEMATODES		
<i>Ascaridia gilli</i>	9	2.83
<i>Strongyloidea avium</i>	27	8.49
<i>Heterakis gallinae</i>	58	18.24
<i>Synganus trachea</i>	4	1.26
<i>Capillaria annulata</i>	6	1.89
<i>Capillaria longicollis</i>	4	1.26
<i>Capillaria retusa</i>	6	1.89
<i>Syngamus bronchialis</i>	4	1.26
<i>Anidostomum anseries</i>	5	1.57
<i>Subularia brumpti</i>	3	0.94
<i>Echinurua uncinata</i>	1	0.31
Total	127	39.94
TREMATODES		
<i>Ornithobilharzia pricei</i>	4	1.26
<i>Echinostoma species</i>	4	1.26
Total	8	2.52
PROTOZOANS		
Unsporulated oocyst	100	31.45

Eleven (11) species of endoparasites were discovered in the 18 live domestic birds, comprising of 8 species of cestodes, 2 species of nematodes and 1 species of trematode. 7 of the 8 cestode species were found in fowls namely; *Amoebotaenia cuneata*, *Choanotaenia infundibulum*, *hymenolepis species*, *Raillietina species*, *Davainea proglottina*, *Raillietina cesticillus*, *Mesocestiodes species*, while 1 cestode species, *Raillietina echinobothrida* was the only endoparasite found in ducks. The 2 species of nematodes, namely; *Ascaridia galli* and *Strongyloides avium*, and the only trematode species *Echinostoma species* were found in the live domestic fowls. This is summarized in Table 3 below.

Table 2: Positive coprological samples from examined domestic birds

NEMATODES	DOMESTIC BIRDS		
	Fowls	Pigeons	Ducks
<i>Ascaridia galli</i>	+	-	-
<i>Syngamus trachea</i>	+	-	-
<i>Heterakis gallinae</i>	+	+	-
<i>Capillaria annulata</i>	+	-	-
<i>Capillaria longicollis</i>	+	-	-
<i>Capillaria retusa</i>	+	-	+
<i>Syngamus bronchialis</i>	+	-	-
<i>Amidostomum anseris</i>	+	-	+
<i>Subularia brumpti</i>	+	-	-
<i>Echinuria uncinata</i>	+	-	-
CESTODES			
<i>Choanotaenia infundibulum</i>	+	-	-
<i>Raillietina species</i>	+	-	-
<i>Amoebataenia sphenoides</i>	+	-	-
<i>Davainea proglottina</i>	+	-	-
TREMATODES			
<i>Ornithobilharzia pricei</i>	+	-	-
<i>Unsporulated oocyst</i>	+	-	-

Table 3: Prevalence of ecto and endoparasites in live birds examined

Domestic birds	No. of birds examined	No of birds infected with ectoparasites	Prevalence 100%	No of birds infected with endoparasites	Prevalence
Domestic fowls	10	10	55.5%	10	55.5%
Duck	4	-	-	-	-
Pigeon	4	2	11.1%	2	11.1%
Total	18	12	66.67%	12	66.67%

Table 4: Species of ectoparasites and the prevalence of infected live birds examined in Etsako Municipality

Domestic birds	Fowls		Pigeons		Ducks		Overall prevalence	
	n(10)	%	n(4)	%	n(4)	%	n (18)	%
Species of ectoparasites								
<i>Lipeurus caponis</i>	10	55.5	5	27.2	-	-	15	18.33
<i>Gonoides gigas</i>	2	11.1	3	16.6	-	-	4	27.7
<i>Gonoides dissimilis</i>	10	55.5	4	22.2	-	-	14	77.7
<i>Columbicola columbae</i>	2	11.1	5	27.7	-	-	7	38.8
<i>Coclutogaster interographus</i>	3	16.7	1	5.5	-	-	4	22.2
<i>Chelopistes meleagridis</i>	5	27.7	2	11.1	-	-	7	38.8
<i>Gonoicotes gallinae</i>	5	27.7	2	11.1	-	-	7	38.8
<i>Gonoicotes hologaster</i>	2	11.7	1	5.5	-	-	3	16.6
<i>Menopon gallinae</i>	5	27.7	-	-	-	-	5	27.7
<i>Mencanthus stramineus</i>	12	60.6	-	-	-	-	12	60.6

Discussion

ECTO-PARASITES

Ten (10) species of lice belonging to the order Mallophaga, the superfamily Ischnocern and Amblycern were found in domestic fowls and pigeons. None was found in ducks. *Liperus caponis*, *Gonoides dissimilis* and

Mecanthus stramineus has the highest prevalence of 83.3%, 77.7% and 66.6% respectively, while *Gonoicotes hologaster* and *Coclitogaster heterographus* has the lowest prevalence of 16.6% and 22.2 % respectively. The parasites were found in fowls and pigeons.

All of the ten species of ectoparasites were found in the ten fowls examined, while 8 of the parasite species were found on pigeons. This shows a high prevalence of ectoparasites in Etsako, Nigeria. This is attributed to the fact that these birds are reared in free-range whereby they scavenge for food daily on sand, dump-sites and dust particles where these lice are commonly found, yet little or no form of body treatment is given to them. This finding corresponds with that of Trees and Beesly, (1987), who reported *Mecanthus stramineus* and *Liparus caponis* as common lice found in domestic fowls.

This finding also corroborates with that of Mssoffe et al (2009), who reported *M. Stramineus* and *M. gallinae* on pigeons in Morogoro Municipality, Tanzania, though with a low prevalence each of 0.5%, but reported a high prevalence of *Pseudolynchia carariensis* with a prevalence of 61.5% which is not found in this study. This study also recorded *Columbicola columbae* (the slender pigeon louse) and *Goniocotes gallinae* (the fluff louse of chicken and guinea-fowl) which has also been reported by the following authors: Flynn (1973), Tudor, (1991), Soulsby, (1982), Greiner (1994) and James et al., (2000). *C. columbae* and *G. gallinae* both belong to the order Mallophaga (biting lice), suborder ischnocera, family pediculidae.

ENDOPARASITES

This study demonstrated a total of 22 species of endoparasites in the 318 samples examined, (300 faecal samples and 18 domestic birds). They include; 9 species of cestodes, 11 species of nematodes, 2 species of trematodes and some unsporulated oocysts. (Table 3). Eight (8) of the 9 species of cestodes demonstrated were found in the 18 domestic birds, while 10 of the 11 species of nematodes demonstrated were found in the 300 faecal samples examined.

Eleven (11) species of endoparasites were found in the 18 live domestic birds examined (table 3), comprising of 8 species of cestodes, 2 species of nematodes and 1 species of trematode while 16 species were found in 300 faecal samples investigated comprising of 10 species of nematodes, 4 species of cestodes, 1 species of trematode and some unsporulated oocysts.(Table 4)

All the 11 species of endoparasites demonstrated in the 18 live domestic birds were found in all the 10 live domestic fowls investigated, while *Raillietina echinobothridae*, a cestode was the only endoparasite found in live pigeons. All the 16 species of endoparasites demonstrated on faecal samples were found in faeces of domestic fowls investigated, 2 species of nematodes, namely *Capillaria retusa* and *Amidostomum anseri* were the only endoparasites found in the faeces of ducks, while heterakis gallinae, also a nematode was the only endoparasite found in faecal samples of pigeons. (Table 4). The findings revealed a high prevalence of endoparasites in fowls in Etsako Municipalities. The high prevalence in domestic fowls is due to the fact that the fowls are reared in free-range, they undergo various scavenging activities on faeces, debris and waste / refuse dumps. Their digging activities in search for food for themselves and their young and lying on open soil for warmth also expose them to helminth infections.

Unsporulated oocysts, *Raillietina species*, *Heterakis gallinae*, *Raillietina echinobothridae*, *Choanotaenia infundibulum* and *Hymenolepis species*, recorded a high prevalence of 31.45%, 30.50%, 18.24%, 15.72%, 9.75% and 9.43% respectively, while *Echinuria uncinata* recorded the least prevalence of 0.31%. This finding corroborates with those of Marieto-Goncalves (2006), who reported that coccidians were the most common parasite in his analysis of birds. It also agrees with the data given by Freitas et al., (2002), who reported a high prevalence of endoparasites, such as Heterakis spp, Cyst of coccidians, eggs of Ascaridia and capillaria spp in his investigation of faecal samples of wild birds in Brazil. Also, eggs of Ascaridia spp, Strongiloidea spp and capillaria spp has also been reported by Cunha et al., (2008) in his study of wild birds in Brazil.

This finding is in line with Permin et al., (1997), who demonstrated 100% of gastrointestinal helminths, though, no trematode was recorded. Muhairwa et al (2007), also reported gastrointestinal helminths in free range ducks in Morogoro, Tanzania. Three (3) species of cestodes, *Raillietina species*, *Raillietina echinobothridae* and *A. Galli* has been reported by Mssoffe et al., (2009), in nestlings and adult pigeons in Morogoro, Tanzania.

According to Mssoffe et al., (2009), *R. echinobothridae* was shown to be an important cestode parasite of pigeons. Though, this is generally considered to be a relatively harmless parasite, it will be interesting to study the reason of pigeons to be more susceptible to the above parasite compared to ducks and other birds.

The study is also in line with Yusufu et al., (2004), who reported *R. tetragona* (78.8%), *Hymenolepis species* (12.1%), *Amoebotaenia cuneata* (6.1%) in Quela birds in his study between their feeding habits and gastrointestinal parasites in Borno state, Nigeria.

The absence of parasites in ducks in this study could be attributed to very limited access to free water in the study area, which is a semi-arid area, thereby reducing their exposure to snails which are the carriers of trematodes (Muhamirwa *et al.*, (2007)).

In conclusion, the result of high prevalence of endoparasites in domestic birds in this study reinforce the data reported in Goulart (2005), who stated that Galliformes, as well as other ground-level feeders are more susceptible to constant re-infection by endoparasites. It also suggests that pigeons could be more resistant compared to chickens, while chickens are more susceptible than ducks to helminth infections. This could be verified with further investigations.

References

- Adriano, A. E., Cordeiro, N. S., (2001). Prevalence and Intensity of *Haemoproteus columbae* in three species of Wild Doves from Brazil. 96 (2): 175-178.
- Barnes, H. J., (1986). Parasites. In: Harrison G. H., Harrison, L. R., (Eds): *Clinical Avian Medicine and Surgery*. W. B. Saunders company, Philadelphia, pp. 472-485.
- Cunha, A. L. B., Mendonca, R. A., Oliveira, R. A., Baratella-Evencio, L., Oliveira-Filho, R. M., Simeos, R. S., Simeos, M. J., Eventio-Neto, J., (2008). Prevalence of Endoparasites in Faecal samples of Cracids Bred in Captivity at the parquet Dois Imaos, Recife, Pernambuco, Brazil. *Acta Vet. Brno.* 77: 387-392.
- Frantovo, D. (2000). Some parasitic nematodes (Nematoda) of birds (Aves) in the Czech republic. *Acta Societatis Zoologicae Bohemicae* 66(1):13-28.
- Freitas, M. F. L., Oliveira, J. B., Cavalcanti M. D. B., Leite, A. S., Magalhaes, V. S., Oliveira, R. A. and Evencio-Sobrino, A., (2002): Gastrointestinal parasites of captive wild birds in Pernambuco state, Brazil. *Parasitol Latinoam.* 57: 50-54.
- Greve, J. H., Salka, A. A. and McGehee, E. H., (1978). Bilharziasis in a Nanday conure. *J Am Vet. Med. Assoc.* 172: 1212-1214.
- Kekeocha, C. C. (1984). *Pfizer poultry production handbook*. First Edn. Pfizer Corporation, Nairobi. In association with Macmillan Publishers Limited, London and Basingstoke.
- Magwisha, H. B., Kassuku, A. A., Kyvsgaard, N. C. and Permin, A., (2002). A comparison of the prevalence and burdens of helminth infections in growers and adult free-range chickens. *Trop. Anim. Health Prod.* 34(3): 205-214.
- Muhamirwa, A. P., Msffe, P. L., Ramadhani, S., Mollel, E. L., Mtambo, M. M. A. and Kassuku, A. A., (2007). *Prevalence of gastrointestinal helminthes infections in free-range ducks in Morogoro Municipality, Tanzania*. pp: 1-5.
- Scholtens, R. G., New, J. C. and Johnson, S. (1982). The nature and treatment of giardiasis in parakeets. *J Am Vet. Med. Assoc.* 180: 170-173.
- Sol, D., Javani, R. and Torres, J., (2000). Geographical variations in blood parasites in feral pigeons and the role of vector – Ecography. 23: 307-314.
- Soulsby, E. J. L., (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals*. 6th edn. Bailliere Tindall, London UK. Pp: 99, 101-107.
- Soulsby, E. J. L., (1986). *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th edn. Bailliere tindall, London UK. 805.
- Thrustfield, M., (1995). *Veterinary epidemiology*, 2nd edition, Oxford Blackwell science, London, U.K. pp. 479.