

4 **INVESTIGATION OF GASTROINTESTINAL PARASITES OF LOCAL CHICKENS**
5 **(*Gallus domesticus*) IN UGEP, YAKURR LOCAL GOVERNMENT AREA, CROSS**
6 **RIVER STATE, NIGERIA.**
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10 **ABSTRACT**

11 **Background:** Investigation of gastrointestinal parasites of local chicken (*Gallus domesticus*) was
12 conducted in four council wards of Ugep in Yakurr Local Government Area, between October
13 2017 and June 2018.

14 **Aim:** The aim of this study was to investigate the parasitic load of male and female scavenging
15 chickens.

16 **Materials and methods:** Digestive tracts of scavenging chickens were obtained and processed
17 by parasitological means.

18 **Results:** From a total of 320 local scavenging chickens examined 240 (75.0%) were parasitized
19 by helminthes. Out of the 180 male and 140 female chickens examined, 75 (52.8%) and 120
20 (85.7%) were positive for helminth parasite eggs respectively. There was statistical significant
21 difference ($p < 0.05$) in the prevalence of helminth parasites between male and female chicken.
22 A total of 12 helminth parasite species were recovered in this study, comprising of 7 nematodes
23 and 5 cestodes.

24 **Conclusion:** The high prevalence of helminth parasites among local chickens was attributable to
25 lack of periodic deworming and climatic factors. Local breeds are tastier than exotic breeds and
26 people prefer them more than exotic ones during Christmas celebrations. Occasional deworming
27 exercise is advocated to reduce their worm burden and zoonotic infection.

28

29 **Key words:** Gastrointestinal, helminthes, Local chickens, Ugep, Yakurr

30

31 **INTRODUCTION**

32 Poultry refers to all birds of economic value to man, such as chickens, pigeons, ducks, pheasants,
33 quail, guinea fowls and recently ostrich, all of which belong to the zoological class Aves (Atteh,
34 2003). Poultry has been on earth for the past 150 years, dating back to the original wild red
35 jungle fowl (Atteh, 2003). It has been asserted that the red jungle-fowl (*G. g. gallus*) and green
36 jungle-fowl (*G. varius*) are the sole ancestors of the domestic chicken (Hiromi et al., 2010).

37 In Nigeria, every household owns some form of poultry, but majority of the birds are
38 unimproved local types which are kept mainly as scavengers and managed under the open range
39 system (Ogbaje et al., 2012). An average of 5 to 100 birds per household are kept extensively
40 with little financial or labour input (Mukaratirwa et al., 2001). They can thrive under adverse
41 conditions, such as poor management, diseases, lack of feeding and parasites, which might cause
42 low productivity (Ohaeri & Okwum, 2013; Akinwumi et al., 1979). Besides being an important
43 source of income and cheap protein to the village/rural people, the free-range poultry is an
44 integral part of village life and has an important social value (Ikpi and Akinwumi, 1981; Ogbaje
45 et al., 2012; Ohaeri & Okwum, 2013). There has been a lot of emphasis placed on modern
46 poultry production using exotic breeds of chicken in Nigeria (Yoriyo et al., 2008). However,
47 since the inception of commercial poultry in 1956 in Nigeria to bridge the protein deficiency gap,
48 it has been bedeviled by so many problems (Ikpi & Akinwumi, 1981). Helminthiasis was
49 considered to be an important problem of local chicken and helminth parasites have been
50 incriminated as a major cause of ill-health and loss of productivity in different parts of Nigeria
51 (fakae & Paul-Abiade, 2003). Parasitism is one of the major problems which inflict heavy

52 economic losses to the poultry in the form of retarded growth, reduced weight gain, emaciation,
53 decreased egg production, diarrhea, obstruction of intestine, poor feathers, anaemia, paralysis,
54 catarrh, morbidity and mortality (Dube et. al., 2010; Sofi et. al., 2016; Nair & Nadakal, 1981;
55 Fatihu et. al., 1991). Despite information on helminthiasis of birds in northern and southern parts
56 of Nigeria (Fatihu et. al., 1991; Riise et. al., 2004), there is paucity of information on infection of
57 indigenous fowl in Cross River State, especially in Ugep. However, in studies by Ruff (1999),
58 100% of rural scavenging chickens examined in Cross River Nigeria were positive for one or
59 more helminthes parasites. Various studies have reported a wide range of helminthes distribution
60 worldwide (Sofi et. al., 2016 40.14 % in Gurez valley of Jammu and Kashmir, India; Ebrahim et.
61 al., 2015 34.8% in Khorramabad, West India; Idika et. al., 2016 96.8% in Nsukka, Nigeria;
62 Mukaratirwa et. al., 2001 64.8% and 64.1% of different species in Zimbabwe and Adang et. al.,
63 2014 63.3% in Gombe, Nigeria. The aim of this study is to determine the prevalence of
64 helminthes species in male and female local scavenging chickens in Ugep, Cross River State,
65 Nigeria.

66 **2. Materials and methods**

67 68 **2.1 The study area.**

69
70 This study was conducted in four council wards of Ugep, in Yakurr Local Government Area.
71 Ugep is one of the largest native towns in Eastern Nigeria, and people of all walks of life are
72 resident here, and therefore high demand for poultry products. Ugep lies between latitudes 4° and
73 6° north of the equator and longitudes 6° and 8° East of the Greenwich Meridian. The area is in
74 the equatorial rainforest of Nigeria. Subsistence farming is the main occupation of farmers.
75 Household practice local poultry farming with a range of 2 to 40 local scavenge chickens per
76 household.

77 **Sample collection**

78
79 Digestive tracts of 320 local scavenging chickens were collected from four council wards of
80 Ugep in Yakurr Local Government Area between October 2017 and June 2018. These digestive
81 tracts were put into labeled plastic vials indicating council ward and sex of the chicken, before
82 transportation to the parasitological laboratory of Cross River University of Technology,
83 Calabar, for processing.

84 **Isolation and identification of parasites.**

85
86 The digestive tract of each chicken was separated by ligation into oesophagus, crop,
87 proventriculus, gizzard, small and large intestines and caecum. Each section was slit open in a
88 separate petri dish, and the content washed thoroughly under running tap water over a 200µm
89 sieve. The mucosae surfaces were rubbed between fingers to remove any parasites on the surface
90 (Fatihu et. al., 1991). Examination of samples for eggs of helminthes was based on the floatation
91 technique (Soulsby, 1982). The preparations were examined under the microscope using x10 and
92 x40 magnifications.

93 **Data analysis**

94
95 Chi-square test (χ^2) was used to compare infection between male and female chickens and
96 council wards.

97 **Results**

98 From a total of 320 local scavenging chickens examined 240 (75.0%) were parasitized by
99 helminthes, comprising of nematodes 155 (48.4%) and cestodes 85 (26.6%) ((Table 1).

100 Table 1. Overall prevalence of helminth eggs.

Parasites	Chickens examined	Parasites recovered	% infection
Nematodes	190	155	48.4%

Cestodes	130	85	26.6%
Total	320	240	75.0%

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102

103 Table 2. Prevalence of helminth egg infection according to sex

Sex	Number examined	Number positive	% prevalence
Male	180	95	52.8
Female	140	120	85.7

104

105 Table 2 reveals prevalence of infection of helminthes according to sex. Out of 180 male and 140
 106 female chickens examined, 95(52.8%) males and 120 (85.7%) females were positive for
 107 helminthes parasites. There was statistical significant difference ($p < 0.05$) in the prevalence of
 108 helminthes between male and female scavenging chickens.

109 In table 3, the number of local scavenging chickens infected, the preferred site of infection and
 110 the council wards are shown. A total of seven (7) species of nematodes and five (5) species of
 111 cestodes were recorded from the various sections of the digestive tracts. Of the 214 local
 112 chickens infected with helminthes, 62 (19,4%) were *Ascaridia galli*, 28 (8.8%) *Heterakis*
 113 *gallinarum*, 11 (3.4%) *Gongylonema congolense*, 25 (7.0%) each for *Tetrameres ameriana* and
 114 *Subulura brumpi*, 24 (7.5%) *Cheilospirura haamulosa*, 14 (4.4%) *Capillaria contorta*, 7 (2.2%)
 115 *Choanotaenia infundulum*, 19 (5.9%) *Raillietina echinobothrida*, 6 (1.9%) *Reillietina tetragonia*,
 116 14 (4.4%) *Hymenoslepis cantaniana* and 5 (1.6%) *Hymenolepis carioca* (Table 3). The most
 117 frequently encountered nematode was *Ascarida galli* in the intestine, while the least was
 118 *Gongylonema congolense* in the crop. Nematodes were prevalent in all sections of the digestive
 119 tract. Cestodes prevalence was restricted to the small intestine and duodenum.

120 Prevalence of helminthes in the four council wards revealed that 88 local scavenging chickens in
 121 Ijom ward were infected by ten species of helminthes. In Bikobiko, Ijiman, and Ikpakapit wards
 122 41, 76, and 35 scavenging chickens were parasitized by 7, 6, and 7 species of helminthes
 123 respectively (Table 3).

124 Table 3. No of scavenging chickens infected and site of helminth recovery according to council
 125 wards

Species	Site of recovery	Council wards				Overall Infection
		Ijom N = 120	Bikobiko N = 65	Ijiman N = 80	Ikpakapit N = 50	
<i>Ascarida galli</i>	Small intestine	22 (18.3)	15 (23.1)	19 (23.8)	6 (12.0)	62 (19.4)
<i>Heterakis gallinarum</i>	Caecum	12 (10.0)	9 (13.8)	0	7 (14.0)	28 (8.8)
<i>Congylostrongylus congolense</i>	Crop	2 (1.7)	4 (6.2)	0	5 (10.0)	11 (3.4)
<i>Tetrameres americana</i>	Proventriculus	10 (8.3)	0	15 (8.8)	0	25 (7.8)
<i>Subulura brumpti</i>	Caecum	9 (7.5)	0	12 (15.0)	4 (8.0)	25 (7.8)
<i>Cheilospirostrongylus hamulosa</i>	Gizzard	5 (4.2)	0	13 (16.3)	6 (12.0)	24 (7.5)
<i>Capillaria contorta</i>	Oesophagus	6 (5.0)	5 (7.7)	0	3 (6.0)	14 (4.4)
Cestodes						
<i>Choanotaenia infundulum</i>	Small intestine	4 (3.3)	3 (4.6)	0	0	7 (2.2)
<i>Reillietina echinobothrida</i>	Small intestine	7 (5.8)	0	12 (15.0)	0	19 (5.9)
<i>Reillietina tetragona</i>	Small intestine	0	2 (3.1)	0	4 (8.0)	6 (1.9)
<i>Hymenolepis cantaniana</i>	Duodenum	11 (9.2)	3 (4.6)	0	0	14 (4.4)
<i>Hymenolepis carioca</i>	Duodenum	0	0	5 (6.3)	0	5 (1.6)
Total number of chickens		88	41	76	35	240
Total species			7	6	7	

126

127 **Discussion**

128 This study revealed that local chicken breed by households in Ugep are heavily parasitized by
129 two classes of helminthes, namely nematodes and cestodes. Similar findings have been reported
130 earlier by different researchers in Africa (Fatihu et. al., 1991; Mukaratirwa and Khumalo, 2010;
131 Idika et. al., 2016; Beruktayet and Marsha, 2016).

132 The overall prevalence of helminthes infection (75.0%) recorded in this study is in
133 agreement with 76.1% reported by Ogbaje et.al., (2012) in Markurdi Township, Benue State,
134 Nigeria. The reported 75.0% prevalence of helminth infection in this study revealed a relative
135 decrease from previously observed prevalence of 100% by Ruff (1999), 95.2% by Fatihu et. al.,
136 (1991), 90.0% by Fabiyi (1972) and 96.8% by Idiki et. al., 2016). The decrease prevalence is
137 attributable to the level of proper management information to most local chicken breeders as
138 earlier reported by Ogbaje et. al., (2012). Domestic chickens have indiscriminate scavenging
139 behavior of seeking food from diverse diets containing infective stages of helminth parasites,
140 which predisposes them to parasitic infections (Smyth, 1976). This gives a clue for the high
141 prevalence rate observed in free-range chickens in this study. The result is in consonance with
142 previous reported work (Permin et. al., 1997, Abubakar and Garba, 2000, and Luka and Ndams,
143 2007). From this study, nematodes have a higher prevalence rate of 48.4% with *Ascaridia galli*
144 having a very reasonable prevalence of 19.4 compared with cestodes having a prevalence of
145 26.6%. This finding buttress the report of several studies (Berhanu et. al., (2010), Beruktayet
146 and Marsha (2016), Ohaeri and Okwum (2013) and Yoriyo et. a., (2008), who agreed that
147 nematodes are always higher in prevalence than cestodes. They reasoned that nematodes do not

148 require intermediate hosts and thus transmitted directly from the soil, while cestodes
149 transmission is dependent on the availability of intermediate hosts.

150 *Ascaridia galli* showed the highest infection rate in this study. This high rate of infection may be
151 due to moist environmental factors around the study area which has enhanced larval
152 development and subsequent transmission (Kenndy, 1975; Audu et. al., 2004). This study
153 reported a higher prevalence rate of helminthes infection in female scavenging chickens (85.7%)
154 than males (52.8%). Explanation to this difference in infection could be that because female
155 chickens dissipates much energy during egg production and incubation, it induces their voracious
156 and indiscriminate feeding habit on diverse diets containing infective stages of the parasites. But
157 male chickens are selective and therefore less infected than females. This observation is in line
158 with the report of Matur et. al., (2010) and Uhuo et. al., (2013), but in sharp contrast with that of
159 Yoriyo et. al., (2008). Nematode parasites were found in all the sections of the digestive tracts,
160 with *Ascaridia galli* frequently encountered in the small intestine. This finding is in agreement
161 with the report of Fatihu et. al., (1991) & Ohaeri and Okwum (2013). The small intestine and
162 duodenum harboured all the cestodes encountered in this study. The reason for their occupation
163 of these sections of the digestive tracts is to acquire the available food nutrients here. This
164 observation conforms to Smyth (1976) who posited that it was to complement their physiological
165 osmotic feeding nature. The overall prevalence of helminth parasites of scavenging chickens
166 showed a significant statistical difference ($p < 0.001$) between council wards. This could be due
167 to variation in climatic factors such as soil moisture and humidity in the council wards, which
168 facilitate development and subsequent transmission. This finding is similar to several studies
169 (Buriro et. al., 1992; Kenndy, 1975; Audu et. al., 2004).

170 **CONCLUSION**

171 In conclusion, this study revealed that local chickens breed from the four council wards of Ugep
172 are heavily parasitized by two classes of helminth parasites, namely nematodes and cestodes. A
173 total of twelve (12) helminth parasites were recovered during the study, that is, seven nematodes
174 and five cestodes. It is a thing of worry for the high prevalence of helminth parasites in
175 scavenging chickens in the study area. This is so because, majority of the inhabitants prefer local
176 chickens for their high taste than exotic breeds, during celebrations especially in Christmas.
177 Inhabitants of this area should be mindful of the zoonotic implications of these birds through
178 careful preparation of these chickens for food. The high prevalence of helminth parasites in the
179 study area is not unconnected with climatic factors and lack of occasional deworming. Periodic
180 deworming of local scavenging chickens to reduce their worm burden is highly recommended.

181 **Conflict of interest.**

182 There was no financial or material contribution by any organization for this investigation, and
183 therefore no conflict of interest.

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