

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.

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

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31 **INTRODUCTION**

32 In Nigeria, every household owns some form of poultry, but majority of the birds are
33 unimproved local types which are kept mainly as scavengers and managed under the open range
34 system (Ogbaje et al., 2012). An average of 5 to 100 birds per household are kept extensively
35 with little financial or labour input (Mukaratirwa et. al., 2001). They can thrive under adverse
36 conditions, such as poor management, diseases, lack of feeding and parasites, which might cause
37 low productivity (Ohaeri & Okwum, 2013). Besides being an important source of income and
38 cheap protein to the village/rural people, the free-range poultry is an integral part of village life
39 and has an important social value (Ogbaje et al., 2012; Ohaeri & Okwum, 2013). There has been
40 a lot of emphasis placed on modern poultry production using exotic breeds of chicken in Nigeria
41 (Yoriyo et. al., 2008). However, since the inception of commercial poultry in 1956 in Nigeria to
42 bridge the protein deficiency gap, it has been bedeviled by so many problems (Athanasius,
43 2017). Helminthiasis was considered to be an important problem of local chicken and helminth
44 parasites have been incriminated as a major cause of ill-health and loss of productivity in
45 different parts of Nigeria (Fakae & Paul-Abiade, 2003). Parasitism is one of the major problems
46 which inflict heavy economic loses to the poultry in the form of retard growth, reduced weight
47 gain, emaciation, decreased egg production, diarrhea, obstruction of intestine, poor feathers,
48 anaemia, paralysis, catarrh, morbidity and mortality (Dube et. al., 2010; Sofi et. al., 2016;).
49 Despite information on helminthiasis of birds in northern and southern parts of Nigeria (Riise et.
50 al., 2004), there is paucity of information on infection of indigenous fowl in Cross River State,
51 especially in Ugep. However, in studies by Ruff (1999), 100% of rural scavenging chickens

52 examined in Cross River Nigeria were positive for one or more helminthes parasites. Various
53 studies have reported a wide range of helminthes distribution worldwide (Sofi et. al., 2016 (40.14
54 %) in Gurez valley of Jammu and Kashmir, India; Ebrahim et. al., 2015 (34.8%) in
55 Khorramabad, West India; Idika et. al., 2016 (96.8%) in Nsukka, Nigeria; Mukaratirwa et. al.,
56 2001 (64.8% and 64.1%) of different species in Zimbzbwe and Adang et. al., 2014 (63.3%) in
57 Gombe, Nigeria. Despite much work on helminthiasis on scavenging chickens in other parts of
58 the world and Nigeria in particular, there is scarce information on helminth infection of local
59 scavenging chickens in Ugep, Yakurr Local Government Area of Cross River State, Nigeria.
60 The aim of this study is to determine the prevalence of helminthes species in male and female
61 local scavenging chickens in Ugep, Cross River State, Nigeria.

62 **2. Materials and methods**

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64 **2.1 The study area.**

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66 This study was conducted in four council wards of Ugep, in Yakurr Local Government Area.

67 Ugep is one of the largest native towns in Eastern Nigeria, and people of all works of life are

68 resident here, and therefore high demand for poultry products. Ugep lies between latitudes 4° and

69 6° north of the equator and longitudes 6° and 8° East of the Greenwich Meridian. The area is in

70 the equatorial rainforest of Nigeria. Subsistence farming is the main occupation of farmers.

71 Household practice local poultry farming with a range of 2 to 40 local scavenge chickens per

72 household.

73 **Sample collection**

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75 Digestive tracts of 320 local scavenging chickens were collected from four council wards of

76 Ugep in Yakurr Local Government Area between October 2017 and June 2018. These digestive

77 tracts were put into labeled plastic vials indicating council ward and sex of the chicken, before

78 transportation to the parasitological laboratory of Cross River University of Technology,
79 Calabar, for processing.

80 **Isolation and identification of parasites.**

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

89 **Data analysis**

90
91 Chi-square test (χ^2) was used to compare infection between male and female chickens and
92 council wards.

93 **Results**

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

96 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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100 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

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

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

117 Prevalence of helminthes in the four council wards revealed that 88 local scavenging chickens in
 118 Ijom ward were infected by ten species of helminthes. In Bikobiko, Ijiman, and Ikpakapit wards
 119 41, 76, and 35 scavenging chickens were parasitized by 7, 6, and 7 species of helminthes
 120 respectively (Table 3).

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

Species	Site of recovery	Site of recovery				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>Cheilospirura 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	

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124 **Discussion**

125 This study revealed that local chicken breed by households in Ugep are heavily parasitized by
 126 two classes of helminthes, namely nematodes and cestodes. Similar findings have been reported

127 earlier by different researchers in Africa (Mukaratirwa and Khumalo, 2010; Idika et. al., 2016;
128 Beruktayet and Marsha, 2016). The overall prevalence of helminthes infection (75.0%) recorded
129 in this study is in agreement with 76.1% reported by Ogbaje et.al., (2012) in Markurdi Township,
130 Benue State, Nigeria. The reported 75.0% prevalence of helminth infection in this study revealed
131 a relative decrease from previously observed prevalence of 100% by Ruff (1999) and 96.8% by
132 Idiki et. al., (2016). The decrease prevalence is attributable to the level of proper management
133 information to most local chicken breeders as earlier reported by Ogbaje et. al., (2012). Domestic
134 chickens have indiscriminate scavenging behavior of seeking food from diverse diets containing
135 infective stages of helminth parasites, which predisposes them to parasitic infections (Yoriyo et
136 al., 2008; Ogbaje et al., 2012). This gives a clue for the high prevalence rate observed in free-
137 range chickens in this study. The result is in consonance with previous reported work (Abubakar
138 and Garba, 2000, and Luka and Ndams, 2007). From this study, nematodes have a higher
139 prevalence rate of 48.4% with *Ascaridia galli* having a very reasonable prevalence of 19.4
140 compared with cestodes having a prevalence of 26.6%. This finding buttress the report of several
141 studies (Berhanu et. al., (2010), Beruktayet and Marsha (2016), Ohaeri and Okwum (2013) and
142 Yoriyo et. a., (2008), who agreed that nematodes are always higher in prevalence than cestodes.
143 They reasoned that nematodes do not require intermediate hosts and thus transmitted directly
144 from the soil, while cestodes transmission is dependent on the availability of intermediate hosts.
145 *Ascaridia galli* showed the highest infection rate in this study. This high rate of infection may be
146 due to moist environmental factors around the study area which has enhanced larval
147 development and subsequent transmission (Audu et. al., 2004). This study reported a higher
148 prevalence rate of helminthes infection in female scavenging chickens (85.7%) than males
149 (52.8%). Explanation to this difference in infection could be that because female chickens

150 dissipates much energy during egg production and incubation, it induces their voracious and
151 indiscriminate feeding habit on diverse diets containing infective stages of the parasites. But
152 male chickens are selective and therefore less infected than females. This observation is in line
153 with the report of Matur et. al., (2010) and Uhuo et. al., (2013), but in sharp contrast with that of
154 Yoriyo et. al., (2008). Nematode parasites were found in all the sections of the digestive tracts,
155 with *Ascaridia galli* frequently encountered in the small intestine. This finding is in agreement
156 with the report of (Ohaeri and Okwum (2013). The small intestine and duodenum harboured all
157 the cestodes encountered in this study. The reason for their occupation of these sections of the
158 digestive tracts is to acquire the available food nutrients here. This observation conforms to
159 Ohaeri and Okwum (2013) who posited that it was to complement their physiological osmotic
160 feeding nature where there is optimum concentration of saline and glucose. The overall
161 prevalence of helminth parasites of scavenging chickens showed a significant statistical
162 difference ($p < 0.001$) between council wards. This could be due to variation in climatic factors
163 such as soil moisture and humidity in the council wards, which facilitate development and
164 subsequent transmission. This finding is similar to several studies Audu et. al., 2004; Ohaeri and
165 Okwum, 2013).

166 **CONCLUSION**

167 In conclusion, this study revealed that local chickens breed from the four council wards of Ugep
168 are heavily parasitized by two classes of helminth parasites, namely nematodes and cestodes. A
169 total of twelve (12) helminth parasites were recovered during the study, that is, seven nematodes
170 and five cestodes. The high prevalence of helminth parasites in the study area is not unconnected
171 with climatic factors and lack of occasional deworming. Periodic deworming of local
172 scavenging chickens to reduce their worm burden is highly recommended for profitable rearing.

173 **Conflict of interest.**

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

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