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Full Length Research Article

ECTOPARASITES AND INTESTINAL HELMINTHS OF SPECKLED PIGEON (*Columba guinea* HARTLAUB AND FINSCH 1870) IN ZARIA, NIGERIA.

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ABSTRACT
A total of 30 (20 males and 10 females) Speckled Pigeons trapped from the wild in Zaria and its environs, Nigeria, were examined for ectoparasites and intestinal helminths, to determine the prevalence, intensity and mean intensity of infestation and infection. The plumages of the birds were brushed onto a white sheet of paper placed in a tray for the collection of ectoparasites, while the gastrointestinal tracts of the birds were examined for helminths. Eighteen (60.0%) of the birds were infested by three species of ectoparasites. The ectoparasites comprised of lice: 17 (56.7%) *Menopon gallinae* Linnaeus 1758, 18 (60.0%) *Columbicola columbae* Linnaeus 1758 and flies: 9 (30.0%) *Pseudolynchia canariensis* Macquart 1840. Single, double and triple infestations were found in 1(3.3%), 8(26.7%) and 9(30.0%) respectively, though the difference was not significant (P>0.05). The sex-specific infestation rate was 12(60.0%) in males and 6(60.0%) in females. Seventeen (56.7%) birds were infected by helminths represented by four species of cestodes recovered from the gastrointestinal tract. The cestodes were represented by *Raillietina tetragona* Molin, 1858 1(3.3%), *Raillietina cesticillus* Molin, 1858 8(26.7%), *Amoebotaenia cuneata* Linstow, 1872 4(13.3%) and *Hymenolepis carioca* Magalhaes, 1898 4(13.3%). Single infection was the only infection type observed. The sex-specific rate of infection was 11(55.0%) in males and 6(60.0%) in females. This study portrays the Speckled Pigeons as a probable definitive host of some ectoparasites and helminths.

Keywords: Ectoparasites, Gastrointestinal helminths, Prevalence, Speckled Pigeon, *Columba guinea,* Zaria, Nigeria

INTRODUCTION

The Speckled Pigeon is one of the common Columbids in the Zaria area of the Nigerian northern guinea savanna (Fry, 1965). The habit of the Speckled Pigeon and its dependence on human activities for food (Rowan, 1983) predisposes the bird to being easily trapped or killed, as it is widely sold or traded in most Nigerian markets to augment income. It is a species of culinary interest and its very tasty meat (bush meat) and its wide acceptability as a cheap substitute to other animal protein sources, perhaps explains why the demand for the bird is on the increase (Adang, 1999). Although the bird is not an endangered species, over-hunting may pose a threat.

It has been reported that ectoparasites affect the health and productivity of birds, initiates excessive preening which interrupts feeding, as the birds spend much time preening rather than being involved in other essential life activities (De Vaney, 1979; Clayton *et al*., 1999).

Arthropods (insects) and other invertebrates which constitute the diet of Speckled Pigeon (Adang *et al*., 2008a) have been identified by Soulsby (1982) as intermediate hosts of helminths. In heavy infections, helminths are known can cause morbidity and mortality in wild birds (Owen, 1972).

A good knowledge of the parasitology of the bird would aid in the development of possible control measures, which may help in enhancing its survival and complement efforts towards public enlightenment. Except the work of Shotter (1978) on some aspects of parasitology conducted more than 40 years ago, there little or no information is on the ectoparasites and helminths of Speckled Pigeon in the Zaria area of northern Nigeria. This study was therefore designed to determine the species composition and prevalence of ectoparasites and helminths of Speckled Pigeon in the Zaria area of northern Nigeria.

MATERIALS AND METHODS

Area of Study: Zaria, the study area, lies the northern Guinea Savanna zone, within 11º 03'N, 07º 42'E, a region that has a tropical savanna climate with distinct wet (May to October) and dry (November to April) seasons. The mean annual rainfall is about 1,047.08mm (Happold, 1987). The dusty, dry, cold harmattan wind

is observed between November and January. Zaria is characterised by mainly open woodland vegetation (Hore, 1970).

Birds: Thirty (30) Speckled Pigeons *Columba guinea* Hartlaub and Finsch 1870 (20males and 10 females) were trapped from the wild in Zaria between March, 2002 to February, 2004 and taken to the Postgraduate Laboratory of the Department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria. Each bird was placed in a glass jar containing cotton wool soaked with 10ml of chloroform and covered for 4 to 5 mins. The euthanasised birds were then examined for ectoparasites and helminths.

Examination for Ectoparasites: The plumage of the bird was thoroughly brushed onto a white tray for the collection of ectoparasites. The feathers of the head, the neck, under the wings, body, legs and cloaca were raised and thoroughly examined with hand lens for ectoparasites. Attached ectoparasites such as mites and ticks, which could not be removed by brushing, were gently dislodged with a pair of thumb forceps and their sites noted. The ectoparasites were prepared for identification by relaxing and dehydrating them in 70% alcohol (Beck & Davis, 1981) and later mounting them on a microscopic slide under dissecting and light microscopes. The ectoparasites were counted and preserved in labeled vials containing 70% alcohol (Menthanol) and a drop of glycerine (Soulsby, 1982; Loomis, 1984).

The ectoparasites were identified using standard texts (Faust *et al*., 1962, Soulsby, 1982, Cheesbrough, 1990).

Examination of Gastrointestinal Tract (GIT) for Helminths: The GIT of each bird was cut out and the various sections ligated, then severed and placed in saline solution in petri dishes for 20 mins to facilitate detachment of any attached worms. The sectioned GIT were slit open longitudinally and examined under a dissecting microscope for helminths. The horny layer of the gizzard was peeled off to expose embedded parasites.

Parasitic nodules were teased gently to dislodge embedded parasites. Helminths found were detached gently with a pair of forceps. All the helminths isolated were treated with a few drops of hot lacto-phenol for rapid clearance of the internal organs (Raymond, 1943). Temporary mounts of the helminths were examined by microscopy at magnifications of 400 and 1000 and identified using texts (Cheng, 1973, Soulsby, 1982, Ruff, 1984, Ruprah *et al.,* 1986). The helminths were counted and preserved in labeled universal bottles containing 5% formalin.

Confirmatory identification of the ectoparasites and helminths was at the Entomology and Helminthology Laboratories of the Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria, Nigeria. The voucher specimens were deposited in the Biological Sciences laboratory, Department of Biological Sciences, Gombe State University, Gombe, Nigeria.

The terms prevalence, intensity and mean intensity were applied as defined by Margolis *et al.,* (1982). Chi-square test was employed to determine possible association between parasite prevalence and the sexes. All tests were performed using the SPSS computer software (SPSS, 1999).

RESULTS

Ectoparasites: Out of the 30 birds examined, 18(60.0%) were infested with 3 species of ectoparasites. Of these, 2 species were lice (*Menopon gallinae* Linnaeus 1758, 17(56.7%) and *Columbicola columbae* Linnaeus 1758, 18(60.0%)) and one species was a fly (*Pseudolynchia canariensis* Macquart 1840 9(30.0%)).

The ectoparasites were removed from different sites on the body of the birds. *M. gallinae* were from the head, neck and body, *C. columbae* from quill feathers of the wings and tail, and *P. canariensis* from the down and contour feathers of the skin (Table 1).

TABLE 1. PREVALENCE, PREDILECTION SITE AND MEAN INTENSITY OF ECTOPARASITES ON *Columba guinea* I N ZARIA, NIGERIA (♂= 20, ♀= 10, N=30)

Parasite	Site of recovery ♂ and ♀	Number of Columbids infested	Prevalence (%)	Total No ectoparasites recovered(%)	Mean intensity ±SE	Range
Lice						
Menopon gallinae	Body, head and neck	17 ♂11 ♀ 6	56.7 ♂55.0 ♀60.0	161(28.6) ♂117(29.0) ♀ 44(27.5)	9.5±2.04 ♂10.6±2.96 ♀ 7.3±2.05	3-34 (♂,♀)
Columbicola columbae	Quill feathers of wings and tail	18 ♂12 ♀ 6	60.0 ♂60.0 ♀60.0	375(66.6) ♂268(66.5) ♀107(66.9)	20.8±2.19 ♂22.3±2.91 ♀17.8± 2.72	9-28 (♂,♀)
Fly						
Pseudolynchia canariensis	Down and Contour feathers of body	9 ♂6 ♀3	30.0 ♂30.0 ♀30.0	27(4.8) ♂18(4.5) ♀ 9(5.6)	3.0±0.67 ♂3.0±1.02 ♀3.0±0.59	2-8 (♂,♀)
Total	Plumage	18 ♂12 ♀ 6	60.0 ♂60.0 ♀60.0	563(100.0) ♂403(71.6) ♀160(28.4)	31.3±1.06 ♂33.6±2.16 ♀26.7±2.04	2-71 (♂,♀)

TABLE 2. PREVALENCE, MEAN INTENSITY AND PREDILECTION SITE OF GASTROINTESTINAL HELMINTHS IN *Columbae guinea* IN ZARIA, NIGERIA (♂= 20, ♀=10, N=30)

Parasite	No birds infected	Prevalence (%)	Total No helminths Recovered (%)	Mean intensity ± SE	Range	Site of recovery
Raillietina tetragona	1 ♂1 ♀0	3.3 ♂5.0 ♀0.0	16 (14.7) ♂16(22.5) ♀ 0(00.0)	6.0±0.00 ♂16.0±0.00 ♀ 0.0±0.00	1-16 (♂,♀)	Ileum
Raillietina cesticillus	8 ♂6 ♀2	26.7 ♂30.0 ♀20.0	40 (36.7) ♂23(32.4) ♀17(44.7)	5.0±2.21 ♂3.8±2.69 ♀8.5±3.54	1-17 (♂,♀)	Ileum
Amoebotaenia cuneata	4 ♂3 ♀1	13.3 ♂15.0 ♀10.0	13 (11.9) ♂10(14.1) ♀ 3(7.9)	3.2±0.94 ♂3.3±1.36 ♀3.0±0.00	2-6 (♂,♀)	Duodenum/ Ileum
Hymenolepis carioca	4 ♂1 ♀3	13.3 ♂ 5.0 ♀ 30.0	40 (36.7) ♂22(31.0) ♀18(47.4)	10.0±4.55 ♂ 22.0± 0.00 ♀ 6.0±6.45	3-22 (♂,♀)	Duodenum
Total	17 ♂11 ♀ 6	56.7 ♂55.0 ♀60.0	109(100.0) ♂ 71(65.1) ♀ 38(34.9)	6.4±1.64 ♂ 6.5±2.39 ♀ 6.3±1.86	1-22 (♂,♀)	Small intestine

TABLE 3. FREQUENCY DISTRIBUTION OF SINGLE AND MIXED ECTOPARASITE INFESTATIONS AND HELMINTH INFECTIONS OF *Columba guinea* IN ZARIA, NIGERIA (N=30)

Infestation/ infection type	No birds examined	Parasite(s)	Frequency of occurrence Total	(%)
		Ectoparasites		
None	30	Nil parasite	12	40.0
Single infection		*Columbicola columbae*	1	3.3
Double infection		*M. gallinae* + *C. columbae*	8	26.7
Triple infection		*M. gallinae* + *C. columbae* + *P. canariensis*	9	30.0
Total			**18**	**60.0**
		Helminths		
None	30	Nil parasite	13	43.3
Single infection		*Raillietina tetragona*	1	
		Raillietina cesticillus	8	
		Amoebotaenia cuneata	4	
		Hymenolepis carioca	4	
Total			**17**	**56.7**

Twelve (40.0%) of the 20 males examined were infested compared to 6(20.0%) of the females (Table 1) but the difference was not significant (P>0.05). Single, double and triple infestations were common (Table 3).

Helminths: Seventeen (56.7%) birds were infected by helminths that showed a predilection for the small intestine. Four species of cestodes were recovered namely *Raillietina tetragona* Molin 1858 1(3.3%), *R. cesticillus* Molin 1858 8(26.7%), *Amoebotaenia curneata* Linstow 1872 4(13.3%) and *Hymenolepis carioca* Magalhaes 1898 4(13.3%) were identified (Table 2).

More male birds 11(36.7%) were infected by helminths than female birds 6(20.0%) (Table 2) but the difference was not significant. Single infection was the only infection type observed (Table 3).

DISCUSSION

The study confirms that *C. guinea* in Zaria, harbours ectoparasites and helminths. Their major ectoparasites are lice and flies which have been implicated as causative agents of various diseases in other birds. The major helminths of *Columba guinea* are cestodes (*Raillietina* and *Hymenolepis* spp.) and may be the cause of helminthiasis in *S. decipiens* in Zaria. These parasites portray *Columba guinea* as either their reservoir or transient host.

Dede & Richards (1998) reported *R. columbiella, R. joyeuxi*, *R cesticillus*, *Retinometra serrata* and *Amoebotaenia cuneata* from four *C. guinea* examined for helminths in the north-east zone of Nigeria. The presence of *R. cesticillus* and *Amoebotaenia cuneata* agree with the findings of this study while *R. joyeuxi*, *R. columbiella* and *Retinometra serrata* were not reported in this study. They identified five species of cestodes with a prevalence of 75.0% as

against four species of cestodes reported in this study with a prevalence of 56.7%.

Earlier studies (Shotter, 1978) reported five parasites species in Speckled Pieons from Ahmadu Bello University Campus, Zaria, North Central State, Nigeria. The parasites were the digenean trematode *Echinostomum revolutum*, the cestodes *Aporina delafondi* and two species of *Raillietina*, and the hippoboscid fly *Pseudolynchia canariensis*. Two species of *Raillietina* and *Pseudolynchia canariensis* were reported in the present study. The cestodes were the most important parasites since 92.0% of the birds examined were infected, confirming the results of the present study.

While shotter (1978) reported 92.0% prevalence, only 56.7% was observed in this study. Male birds had a heavier cestode load than the females. Differences in the number of birds examined and the prevailing environmental conditions and availability of intermediate hosts in the study area may have been responsible for the differences observed.

The presence of these parasites on *C. guinea* may portray it as a natural or transient host. The insignificant association between sex, ectoparasite infestation and helminth infection, indicates that both males and females are equally exposed to the acquisation of ectoparasites and their sex-related physiognomy may not confer any differences in infestation. This result is in agreement with the observations of Senlik *et al*., (2005) and Adang *et al*., (2008b), who did not observe significant difference between male and female pigeons in overall ectoparasite infestation and helminth infections.

The high prevalence of mixed infestations of ectoparasites on the pigeons compared to single infestations connotes that ectoparasites can cohabit on the same host without causing any harmful effects on each other. The prevalence of single infections in the pigeons may suggest a form of competition that kept the other species away (Kennedy, 1975). This may also suggest an innate system strategy of the helminths to avoiding competition.

However, the impact of parasites on the well-being of the doves was not investigated and further studies are needed to determine the effects of the parasites on the health and productivity of the Speckled Pigeons.

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