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**Ectoparasites of Domestic Pigeon  
(*Columba livia domestica*, Linnaeus) in Zaria, Nigeria**

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**Abstract:** A total of 240 (127 males and 113 females) domestic pigeons (*Columba livia domestica* Linnaeus) purchased from Samaru and Sabon-Gari markets in Zaria, were examined by plumage brushing for ectoparasites. One hundred and seventy-seven (73.8%) of the birds were infested by five species of ectoparasites. The ectoparasites comprised lice: 15 (6.3%) *Menopon gallinae*, 153 (63.8%) *Columbicola columbae* and 26 (10.8%) *Goniodes* sp.; flies: 89 (37.1) *Pseudolynchia canariensis* and 6 (2.5%) of mites (*Dermanyssus gallinae*). Seventy-four (30.8%) of the domestic birds had single infestation, 95 (39.6%) had double infestation and 7 (2.9%) had triple infestation. The difference between single and mixed infestation was not statistically significant ( $p>0.05$ ). The females had a higher prevalence 84 (74.3%) than the males 93 (73.2%). There was however no significant difference ( $p>0.05$ ) in the infestation rates between the sexes. Ectoparasites were removed from the birds through out the year with highest prevalence (95%) in August. *Columbicola columbae* and *Pseudolynchia canariensis* were collected through out the year.

**Key words:** Ectoparasites, prevalence, domestic pigeon, *Columba livia domestica*, Zaria, Nigeria

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## INTRODUCTION

The domestic pigeon (*C. l. domestica*) is kept as pet and reared for food in several countries including Nigeria (Macrae, 1969), it's interaction with man and other domestic and wild birds, portends it as a potential carrier of zoonotic parasites.

It has been reported that ectoparasites affect the health and productivity of birds, initiate 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).

This study was designed to provide information on the prevalence of ectoparasites of domestic pigeon in Zaria, Nigeria.

## MATERIALS AND METHODS

A total 240 domestic pigeons (127 males and 113 females) purchased from Samaru and Sabon-Gari markets in Zaria (11° 03'N, 07° 42'E) from March, 2002 to February, 2003 were examined for ectoparasites. A total of 20 birds were examined each month.

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The plumage of the birds 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 a hand lens for ectoparasites. Attached ectoparasites such as mites, which could not be removed by brushing, were gently dislodged with a pair of forceps and their sites noted.

The ectoparasites were counted and preserved in labelled vials containing 70% alcohol and a drop of glycerine (Soulsby, 1982; Loomis, 1984).

The ectoparasites were identified using standard texts by Soulsby (1982), Faust *et al.* (1962) and Cheesbrough (1990). Confirmatory identification of the ectoparasites was at the Entomology laboratory of the Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria, Nigeria.

The terms, prevalence, intensity and mean intensity were applied as defined by Margolis *et al.* (1982). Chi-square test was employed to determine the association between prevalence, sex and season.

$$\text{Mean intensity} = \frac{\text{Total No. of each ectoparasite species collected}}{\text{Total No. of birds infested by each ectoparasite species}}$$

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where:

O = Observed value

E = Expected value = Row total × Column total/Overall total (using the two by contingency table)

The F-test was used through the Analysis of Variance (ANOVA) for significant test between single and mixed infestations.

All tests were performed using the SPSS® computer soft ware (SPSS, 1999).

## RESULTS

Of the 240 domestic pigeons examined, 177 (73.8%) were infested with ectoparasites.

Five species of ectoparasites were identified, which comprised three species of lice *Menopon gallinae* (6.3%), *Columbicola columbae* (63.8%) and *Goniodes* sp. (10.8%); one species of fly *Pseudolynchia canariensis* (37.1%) and one species of mite *Dermanyssus gallinae* (2.5%).

The ectoparasites were removed from different sites on the body of the birds.

*Menopon gallinae* and *Goniodes* sp. from the head, neck and body, *C. columbae* from quill feathers of the wings and tail, *P. canariensis* from the down and contour feathers of the skin and *Dermanyssus gallinae* from the body and legs (Table 1).

The birds had higher prevalence of double infestation 95 (39.6%) compared with single 74 (30.8%), triple 7 (2.9%) and quadruple 1(0.42), whilst 63 (26.2%) of the birds were uninfested (Table 2). The difference in the prevalence of single and mixed infestations was not significant ( $p > 0.05$ ).

Ninety three (73.2%) of males were infested compared to 84 (74.2%) of females. The male and female birds had five ectoparasite species each (Table 3, 4) and the Chi square test revealed insignificant difference ( $p > 0.05$ ) in the prevalence of infestation between male and female birds.

Ectoparasites were collected through out the year with highest prevalence (95%) in August (Table 5).

Table 1: Prevalence and predilection sites of ectoparasites of *Columba livia domestica* in Zaria, Nigeria

Parasite	Site of recovery	No. of columbids infested	Prevalence (%)	Total No. of ectoparasites (%)	Mean intensity±SE	Range
<b>Lice</b>						
<i>Menopon gallinae</i>	Body, head and neck	15	6.3	83 (2.50)	5.5±0.48	1-34
<i>Columbicola columbae</i>	Quill feathers of wings and tail	153	63.8	2743 (82.90)	17.9±0.78	2-52
<i>Goniodes</i> sp.	Body, head and neck	26	10.8	149 (4.50)	5.7±0.72	1-9
<b>Flies</b>						
<i>Pseudolynchia canariensis</i>	Down and contour feathers of body	89	37.1	326 (9.80)	3.6±0.18	1-9
<b>Mites</b>						
<i>Dermanyssus gallinae</i>	Legs and body	06	2.5	09 (0.27)	1.5±0.23	1-2

Table 2: Frequency distribution of single and mixed ectoparasite infestations on *Columba livia domestica* in Zaria, Nigeria

Infestation type	Parasite	Frequency of occurrence	
		Total	(%)
None		63	26.20
Single	<i>Menopon gallinae</i>	02	
	<i>Columbicola columbae</i>	51	
	<i>Pseudolynchia canariensis</i>	20	
	<i>Dermanyssus gallinae</i>	01	
	Sub-total	74	30.80
Double	<i>Menopon gallinae</i> + <i>Columbicola columbae</i>	07	
	<i>Menopon gallinae</i> + <i>Pseudolynchia canariensis</i>	01	
	<i>Columbicola columbae</i> + <i>Pseudolynchia canariensis</i>	62	
	<i>Columbicola columbae</i> + <i>Goniodes</i> sp.	23	
	<i>Columbicola columbae</i> + <i>Dermanyssus gallinae</i>	02	
Sub-total		95	39.60
Triple	<i>M. gallinae</i> + <i>C. columbae</i> + <i>P. canariensis</i>	04	
	<i>M. gallinae</i> + <i>C. columbae</i> + <i>D. gallinae</i>	01	
	<i>C. columbae</i> + <i>P. canariensis</i> + <i>Goniodes</i> sp.	01	
	<i>C. columbae</i> + <i>Goniodes</i> sp. + <i>D. gallinae</i>	01	
Sub-total		07	2.90
Quadruple	Four parasites		
	<i>C. columbae</i> + <i>P. canariensis</i> + <i>Goniodes</i> sp. + <i>D. gallinae</i>	01	0.42
Total		177	73.80

Table 3: Prevalence of ectoparasites on male *Columba livia domestica* in Zaria, Nigeria (n = 127)

Parasite	Site of recovery	No. of birds infested	Prevalence (%)	Total No. of ectoparasites recovered	Mean intensity±SE
<b>Lice</b>					
<i>Menopon gallinae</i>	Body, head and neck	4	3.1	19	4.8±0.48
<i>Columbicola columbae</i>	Quill feathers of wings and tail	85	66.9	1608	18.9±1.01
<i>Goniodes</i> sp.	Body, head and neck	13	10.2	173	5.7±0.92
<b>Flies</b>					
<i>Pseudolynchia canariensis</i>	Down and contour feathers of body	49	38.6	74	3.4±0.25
<b>Mites</b>					
<i>Dermanyssus gallinae</i>	Legs, body	2	1.6	3	1.5±0.51

*Columbicola columbae* and *Pseudolynchia canariensis* were the most prevalent ectoparasites. They were found throughout the year although the highest prevalence of 95 and 60%, respectively occurred in August. The other ectoparasites, *Dermanyssus gallinae*, *Menopon gallinae* and *Goniodes* sp. were found in April, June and July, respectively (Table 5).

Table 4: Prevalence of ectoparasites on female *Columba livia domestica* in Zaria, Nigeria (n = 113)

Parasite	Site of recovery	No. of birds infested	Prevalence (%)	Total No. of ectoparasites recovered	Mean intensity±SE
<b>Lice</b>					
<i>Menopon gallinae</i>	Body, head and neck	11	9.7	64	5.8±0.63
<i>Columbicola columbae</i>	Quill feathers of wings and tail	68	60.2	1135	16.7±1.18
<i>Goniodes</i> sp.	Body, head and neck	13	11.5	75	5.8±1.15
<b>Flies</b>					
<i>Pseudolynchia canariensis</i>	Down and contour feathers of body	40	35.4	153	3.8±0.27
<b>Mites</b>					
<i>Dermanyssus gallinae</i>	Legs, body	4	3.5	6	1.5±0.29

Table 5: Total monthly prevalence of ectoparasites on *Columba livia domestica* in Zaria, Nigeria, from March 2002 to February 2003

Months	Ectoparasite					Overall monthly prevalence No. of birds infested and prevalence (%)
	<i>Menopon gallinae</i> No. of birds infested and prevalence (%)	<i>Columbicola columbae</i> No. of birds infested and prevalence (%)	<i>Pseudolynchia canariensis</i> No. of birds infested and prevalence (%)	<i>Goniodes</i> sp. No. of birds infested and prevalence (%)	<i>Dermanyssus gallinae</i> No. of birds infested and prevalence (%)	
March	2 (10.0)	12 (60.0)	8 (40.0)	2 (10.0)	0 (0.0)	15 (75.0)
April	4 (20.0)	12 (60.0)	9 (45.0)	1 (5.0)	0 (0.0)	15 (75.0)
May	2 (10.0)	12 (60.0)	10 (50.0)	0 (0.0)	3 (15.0)	16 (80.0)
June	4 (20.0)	12 (60.0)	5 (25.0)	0 (0.0)	0 (0.0)	14 (60.0)
July	1 (5.0)	15 (75.0)	9 (45.0)	0 (0.0)	0 (0.0)	15 (75.0)
August	0 (0.0)	19 (95.0)	12 (60.0)	0 (0.0)	0 (0.0)	19 (95.0)
September	0 (0.0)	16 (80.0)	5 (25.0)	5 (25.0)	0 (0.0)	16 (80.0)
October	0 (0.0)	12 (60.0)	7 (35.0)	4 (20.0)	1 (5.0)	14 (70.0)
November	0 (0.0)	12 (60.0)	5 (25.0)	3 (15.0)	0 (0.0)	15 (75.0)
December	0 (0.0)	12 (60.0)	2 (10.0)	8 (40.0)	1 (5.0)	13 (65.0)
January	0 (0.0)	9 (45.0)	9 (45.0)	3 (15.0)	1 (5.0)	14 (70.0)
February	2 (10.0)	10 (50.0)	8 (40.0)	0 (0.0)	0 (0.0)	11 (55.0)
Total	15 (6.3)	153 (63.8)	89 (37.1)	26 (10.8)	6 (2.5)	177 (73.8)

## DISCUSSION

No studies have been done on ectoparasites of domestic pigeons in Zaria, this study thus provides baseline or preliminary information on the subject.

The overall prevalence (73.8%) of ectoparasites on domestic pigeons in Zaria appears to be high compared to 72.0, 50.0 and 30.0% found in Domestic Pigeons by Senlik *et al.* (2005), Mushi *et al.* (2000) and Petryszak *et al.* (2000), respectively. Five ectoparasite species were collected from domestic pigeons compared to nine by Conti and Forrester (1981), five by Rosciszewska *et al.* (1996), two by Mushi *et al.* (2000), two by Petryszak *et al.* (2000), two by Dove *et al.* (2004), five by Foronda *et al.* (2004) and three by Senlik *et al.* (2005). Diversity of bird ectoparasite assemblages may be related to many factors, which may include home range, behaviour, size and roosting habit of the host. The results of this study confirmed the findings of other studies performed in some parts of the world (Senlik *et al.*, 2005; Mushi *et al.*, 2000; Petryszak *et al.*, 2000).

The high prevalence of double infestation of the pigeons by *Columbicola columbae* and *Pseudolynchia canariensis*, compared with single infestation may be related to the fact that ectoparasites can cohabit without causing any harmful effects on each other. The interaction of two or more ectoparasites on the same host may be said to be a low inter-specific competitive interaction characterized by simultaneous infestations that may not be detrimental to the two species.

The non-statistically significant association between sex and ectoparasite infestation indicates that both males and females are equally exposed to the acquisition 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), who reported no significant difference between male and female pigeons in overall ectoparasite infestation.

The peak infestation month was August which coincides with the peak rainy (cold and wet) season in Zaria with air temperature of 23.30°C, rainfall of 314.3 mm and relative humidity of 70-80%, thus encouraging the suspicion of a favourable association of ectoparasite infestation with the rainy season. The collection of ectoparasites through out the year, gives the impetus for suggesting, amongst others, the need for surveillance and control of the parasites at all times, more so, by the pigeon farmers.

The study concludes that the prevalence of ectoparasites of *C. l. domestica* in Zaria, Nigeria is high. The major ectoparasites comprised lice, flies, ticks and mites, which have been implicated as causative agents of various diseases in other birds. *Columbicola columbae* and *Pseudolynchia canariensis* are the most prevalent ectoparasites of domestic pigeons in Zaria. These ectoparasites portray *C. l. domestica* as either the reservoir or transient hosts. The ectoparasites encountered in this study are considered to be of veterinarian importance, hence, require attention.

The prevalence of these ectoparasites did not vary by host sex. However, the impact of ectoparasite infestations on the well-being of pigeons was not investigated and further studies are needed to determine the effects of ectoparasite infestations on health and productivity of domestic pigeons. The establishment of the types of diseases transmitted by these ectoparasites is desirable. For any effective control programme, domestic pigeons should be treated along side poultry since the pigeons may serve as reservoir or alternative hosts to poultry parasites.

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