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# Ectoparasites of the Laughing Dove *Streptopelia senegalensis* (Linnaeus, 1766) (Aves: Columbidae) in Zaria, Nigeria

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**Abstract**

A survey of ectoparasites of the Laughing Dove *(Streptopelia senegalensis* Linnaeus, 1766) was carried out in Zaria, Nigeria, to determine the prevalence, intensity and mean intensity of infestation.

A total of 382 (231 males and 151 females) doves trapped from different locations in Zaria, Nigeria, were examined through plumage brushing. Eighty-eight (23.0%) of the birds were infested by the following six species of ectoparasites: lice – 32 (8.4%) *Menopon gallinae* Linnaeus, 1758, 37 (9.7%) *Columbicola columbae* Linnaeus, 1758, and 18(4.7%) *Goniodes* sp.; flies – 19 (5.0%) *Pseudolynchia canariensis* Macquart, 1840; ticks – 12 (3.1%) *Argas persicus* Oken, 1818; and mite: 1 (0.23%) *Dermanyssus gallinae* (Degeer, 1778). The frequency of single infestations (59 – 15.4%), was higher than that of double (27 – 7.1%) and triple (2 – 0.52%) infestations, though the difference was not statistically significant *($p > 0.05$)*. The males had a higher prevalence (55 – 23.8%) than the females (33 – 21.9%). However, this difference was also not significant *($p > 0.05$)*. Ectoparasites were collected from the birds through out the year, with highest prevalence (60.0%) in November. The difference between the prevalence of ectoparasites in the wet (23.5%) and the dry seasons (22.6%) was also not significant *($p > 0.05$)*. The implications and significance of the results are discussed.

**Keywords:** lice, flies, ticks, mites, prevalence

## Introduction

The Laughing Dove is a small sub-saharan dove that has a black-spotted reddish fore neck, which distinguishes it from all other doves (Serle et al., 1992). This species is semi-tamed and is abundant in villages and towns, spending much of its time on the ground, feeding on fallen seeds (Elgood, 1982). It is mainly, but not entirely restricted to villages and surrounding farmlands. The habits of the Laughing Dove and its dependence on man's activities for food (Elgood, 1982) predisposes it as a wildlife that is easily trapped and killed. Its wide acceptability as a cheap substitute to other animal-protein sources perhaps explains why the Laughing Dove is highly noticeable even at "suya" or barbecue spots in Zaria and other urban centers in northern Nigeria (Oniye et al., 2000).

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It has been reported that ectoparasites affect the health and productivity of birds, leading them to spend much time preening rather than involved in other essential life activities (De Vaney, 1979; Clayton et al., 1999).

This study was designed to provide information on the types and prevalence of ectoparasites of the Laughing Dove in Zaria, Nigeria.

## Materials and methods

A total 382 Laughing Doves (231males and 151 females) trapped from different locations in Zaria (11?03' N; 07?42' E) from March, 2002 to February, 2004 were examined for ectoparasites. The number of birds examined each month varied between 20 and 30 based on availability.

The plumage of each 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.

**Table 1 -** Prevalence, predilection site and mean intensity of ectoparasites of *Streptopelia senegalensis* in Zaria, Nigeria (n=382) (♂=231, ♀=151).

| Parasite | Site of recovery | Number of Columbids infested | Prevalence (%) | Total number of ectoparasites recovered(%) | Mean intensity ±SE | Range |
|---|---|---|---|---|---|---|
| **Lice** | | | | | | |
| *Menopon gallinae* | ♂ and ♀ Body, head and neck | 32<br>♂ 19<br>♀ 13 | 8.4<br>♂ 5.0<br>♀ 3.4 | 136(20.4)<br>♂ 82(21.6)<br>♀ 54(18.7) | 4.3±0.37<br>♂4.3±0.40<br>♀4.2±0.04 | 1-10<br>(♂,♀) |
| *Columbicola columbae* | Quill feathers of wings and tail | 37<br>♂21<br>♀16 | 9.7<br>♂ 5.4<br>♀ 4.2 | 307(46.0)<br>♂ 186(49.1)<br>♀ 121(41.9) | 8.3±0.77<br>♂8.9±0.82<br>♀7.6±1.47 | 2-25<br>(♂,♀) |
| *Goniodes* sp. | Body, head and neck | 18<br>♂9<br>♀9 | 4.7<br>♂ 2.5<br>♀ 2.5 | 121(18.1)<br>♂ 49(12.9)<br>♀ 72(24.9) | 6.7±1.07<br>♂5.5±1.03<br>♀8.0±1.43 | 1-15<br>(♂,♀) |
| **Fly** | | | | | | |
| *Pseudolynchia canariensis* | Down and Contour feathers of body | 19<br>♂12<br>♀ 7 | 5.0<br>♂3.1<br>♀1.8 | 46(6.9)<br>♂ 26(6.9)<br>♀ 20(6.9) | 2.4±0.18<br>♂2.2±0.11<br>♀2.9±0.41 | 1-5<br>(♂,♀) |
| **Tick** | | | | | | |
| *Argas persicus* | Wing web and thigh | 12<br>♂ 8<br>♀ 4 | 3.1<br>♂ 2.1<br>♀ 1.0 | 57(8.5)<br>♂ 35(9.2)<br>♀ 22(7.6) | 4.8±0.77<br>♂4.4±0.71<br>♀5.5±1.19 | 1-10<br>(♂,♀) |
| **Mite** | | | | | | |
| *Dermanyssus gallinae* | Legs | 1<br>♂ 1<br>♀ 0 | 0.26<br>♂ 0.43<br>♀ 0.00 | 1(0.15)<br>♂ 1(0.26)<br>♀ 0(0.00) | 1.0±0.00<br>♂1.0±0.00<br>♀0.0±0.00 | 1-1<br>(♂,♀) |
| **Total** | Plumage | 88<br>♂ 55<br>♀ 33 | 23.0<br>♂ 23.8<br>♀ 21.9 | 668(100.0)<br>♂ 379(56.3)<br>♀ 289(43.7) | 7.6±0.36<br>♂6.9±0.90<br>♀8.8±0.85 | 1-35<br>(♂,♀) |

The ectoparasites were prepared for identification by relaxing and dehydrating them in 70% alcohol (Beck and Davis, 1981) and later mounting them on a microscopy slide under a dissecting microscope, and a light microscope. After mounted, the ectoparasites were counted and preserved in labeled vials containing 70% alcohol (methanol) and a drop of glycerine (Soulsby, 1982; Loomis, 1984).

The ectoparasites were identified using standard texts by Faust *et al*. (1962), Soulsby (1982) 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 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 association between prevalence, sex, and season.

## Results

Of the 382 Laughing Doves examined, 88 (23.0%) were infested with ectoparasites. Six species of ectoparasites were identified, comprising three species of lice: *(Menopon gallinae* Linnaeus, 1758 – 8.4%; *Columbicola columbae*

**Table 2 -** Prevalence of negative, single and mixed ectoparasite infestations on *Streptopelia senegalensis* in Zaria, Nigeria.

| Infestation type | Parasites | Frequency of occurrence | |
|---|---|---|---|
| | | Total | % |
| **None** | | **294** | **77.0** |
| **Single infestation** | *Menopon gallinae* | 18 | |
| | *Columbicola columbae* | 13 | |
| | *Pseudolynchia canariensis* | 12 | |
| | *Goniodes* sp. | 04 | |
| | *Argas persicus* | 12 | |
| | | **59** | **15.4** |
| **Double infestation** | *Menopon gallinae* + *Columbicola columbae* | 08 | |
| | *Menopon gallinae* + *Pseudolynchia canariensis* | 05 | |
| | *Columbicola columbae* + *Pseudolynchia canariensis* | | |
| | *Columbicola columbae* + *Goniodes* sp. | 01 | |
| | | 13 | |
| | | **27** | **7.1** |
| **Triple infestation** | *M. gallinae* + *C. columbae* + *P. canariensis* | 01 | |
| | *M. gallinae* + *C. columbae* + *D. gallinae* | 01 | |
| | | **02** | **0.52** |
| **Total** | | **88** | **23.0** |

Linnaeus, 1758 – 9.7%; and *Goniodes* sp. – 5.0%), one species of fly *(Pseudolynchia canariensis* Macquart, 1840 – 4.5%), one species of tick *(Argas persicus* Oken, 1818 – 3.3%), and one species of mite *(Dermanyssus gallinae* (Degeer, 1778) – 0.23%).

A total of 668 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; *A. persicus* from the wing web and thigh; and *D. gallinae* from the body and legs. Data concerning prevalence, mean intensity and sites of infestation are presented in Tab. 1.

The infestations separated by species and types are indicated in Tab. 2. The birds had higher prevalence of single infestations (15.4%) compared with double (7.1%) and triple (0.52%) infestations, whilst 77.0% of the birds were uninfested (Tab. 2). The difference in the prevalence of single and mixed infestations was not significant *($p > 0.05$)*.

Fifty-five (23.8%) males were infested, compared to 33 (21.9%) females. The male birds hosted six ectoparasite species while the female birds hosted five ectoparasite species. However, the Chi-square test revealed that the difference in the prevalence of infestation between male and female birds was insignificant *($p > 0.05$)*.

Ectoparasites were collected throughout the year, with highest prevalence (60.0%) in November (Tab. 3). The difference in the prevalence of ectoparasite infestations in the wet (23.5%) and the dry seasons (22.6%) was not significant *($p > 0.05$)*.

*Columbicola columbae* and *M. gallinae* were the most prevalent ectoparasites. They were found in eleven and ten months of the year, respectively, with highest prevalence in May (35.0%) and in November (45.0%), respectively. The other ectoparasites, *Goniodes* sp., *P. canariensis*, *A. persicus* and *D. gallinae* were recovered in four, seven, three and one month, respectively (Tab. 3).

## Discussion

No specific studies have been carried out on the ectoparasites of *S. senegalensis* in Zaria, Nigeria. This study, therefore, seems to provide baseline information on the subject for that region.

The ectoparasites encountered in this study are considered to be of medical and veterinary importance and, hence, require

**Table 3 -** Monthly number of infested birds and prevalence of ectoparasites on *Streptopelia senegalensis* in Zaria, Nigeria, from March 2002 to February 2004 (n=382)

| Month | Ectoparasite | | | | | | |
|---|---|---|---|---|---|---|---|
| | *Menopon gallinae* | *Columbicola columbae* | *Pseudolynchia canariensis* | *Gonoides sp.* | *Argas persicus* | *Dermanyssus gallinae* | **Total** |
| | No. of infested birds and prevalence (%) | No. of infested birds and prevalence (%) | No. of infested birds and prevalence (%) | No. of infested birds and prevalence (%) | No. of infested birds and prevalence (% | No. of infested birds and prevalence (%) | No. infested (%) |
| **March** (n=32) | 3 (9.4) | 1 (3.1) | 1 (3.1) | 0 (00.0) | 0 (0.0) | 0 (0.0) | 4(12.5) |
| **April** (n=38) | 6 (15.8) | 1 (2.6) | 0 (0.0) | 0 (0.0) | 0(0.0) | 0(0.0) | 6(15.8) |
| **May** (n=20) | 7 (35.0) | 4 (20.0) | 4 (20.0) | 0 (0.0) | 0(0.0) | 0 (0.0) | 7(35.0) |
| **June** (n=22) | 4 (18.2) | 2 (9.1) | 2 (9.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 4(18.2) |
| **July** (n=42) | 1 (2.4) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 4 (9.5 ) | 0 (0.0) | 5(11.9) |
| **August** (n=42) | 2 (4.8) | 2 (4.8) | 2 (4.8) | 0 (0.0) | 6(14.3) | 0 (0.0) | 12(28.6) |
| **September** (n=30) | 1 (3.3) | 1 (3.3) | 5 (16.7) | 1 (3.3) | 0 (0.0) | 0 (0.0) | 7(23.3) |
| **October** (n=40) | 1 (2.5) | 5 (12.5) | 1 (2.5) | 5 (12.5) | 2 (5.0) | 0 (0.0) | 11(27.5) |
| **November** (n=40) | 2 (5.0) | 18 (45.0) | 4 (10.0) | 11 (27.5) | 0 (0.0) | 1 (2.5) | 24(60.0) |
| **December** (n=40) | 0 (0.0) | 2 (5.0) | 0 (0.0) | 1 (2.5) | 0 (0.0) | 0 (0.0) | 2(5.0) |
| **January** (n=2) | 3 (12.5) | 1 (4.7) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 4(16.7) |
| **February** (n=12) | 2 (16.7) | 0(0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2(16.7) |
| **TOTAL** (n=382) | 32 (8.4) | 37 (9.7) | 19 (5.0) | 18(4.7) | 12 (3.1) | 1 (0.3) | 88(23.0) |

attention. The overall prevalence (23.0%) of ectoparasites on *S. senegalensis* in Zaria, Nigeria appears to be low compared to 73.8%, 72.0%, 50.0%, and 30.0% found in Domestic Pigeons by Mushi *et al*. (2000), Petryszak *et al*. (2000), Senlik *et al*. (2005) and Adang *et al*. (2008), respectively. Six ectoparasite species were collected from the Laughing Doves compared to five by two by Mushi *et al*. (2000), two by Petryszak *et al*. (2000), three by Senlik *et al*. (2005) and Adang *et al*. (2008). Diversity of bird-ectoparasite assemblages may be related to many factors, which may include home range, behavior, size and roosting habits of the host. The Laughing Dove exploits a wide range of ecological niches for feeding, roosting, nesting and territoriality, where they may come in contact with ectoparasites (Goodwin, 1983).

The high prevalence of single infestations of the doves compared with double and triple infestations suggest a form of competition (Kennedy, 1975) in which resources shared by the ectoparasites determine the establishment of single or mixed infestations. This may also suggest an innate system strategy of the ectoparasites to avoid competition.

The non significant association between sex and ectoparasite infestation indicates that both males and females are equally exposed to the acquisation of ectoparasites and that their sex-related physiognomy do not confer any differences in infestation. This result is in agreement with the observations of Senlik *et al*. (2005) and Adang *et al*. (2008), who reported non significant differences between male and female pigeons in overall ectoparasite infestation.

The collection of ectoparasites throughout the year suggests the need for surveillance and control of the parasites all year long, where possible. The peak infestation month, November, coincides with the early dry season in Zaria, suggesting a favourable association of ectoparasite infestation with the early dry-season conditions in Zaria.

The impact of ectoparasite infestations on the well-being of the doves was not investigated and further studies are needed to determine their effects on the health and productivity of the Laughing Doves. The establishment of the types of diseases transmitted by these ectoparasites is desired. For any effective control programme, Laughing Doves should be prevented from coming close to poultry houses since the doves may serve as reservoirs or alternative hosts to poultry parasites.

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## References

Adang, K. L.; Oniye, S. J.; Ezealor, A.U.; Abdu, P. A. & Ajanusi, O. J. 2008. Ectoparasites of domestic pigeons *(Columba livia domestica* Linnaeus) in Zaria, Nigeria. **Research Journal of Parasitology, 3**: 79-84.

Beck, J. W. and Davies, J. 1981. **Medical parasitology.** St. Louis, C.V. Mosby. pp. 318-337.

Cheesbrough, M. 1990. **Medical Laboratory Manual for Tropical Countries.** Second Ed. Cambridge, Cambridge University. pp. 203

Clayton, D. H.; Lee, P. L. M.; Tompkins, D. M. & Brodie, E.D. 1999. Reciprocal natural selection on host-parasite phenotypes. **American Naturalist, 154**: 261-270.

De Vaney, J. A. 1979. The effects of the northern fowl mite, *Ornithonyssus sylviarum,* on egg production and body weight of caged White Leghorn hens. **Poultry Science, 57**(5): 191-194.

Elgood, J. H. 1982. **Birds of West African Towns and Gardens.** London, Longman. pp.7-8

Faust, E.L., Beaver, C.P. and Jung, C.R. 1962. **Animal Agents and Vectors of Human Diseases.** Philadelphia, Lea & Feboger. 461 p.

Goodwin, D. 1983. **Pigeons and Doves of the World.** 3rd Ed. Ithaca, Cornell University and British Museum of Natural History. pp. 363.

Kennedy, C. R. 1975. **Ecological Aspects of Parasitology.** Amsterdam, North-Holland. pp. 173-189.

Loomis, E. C. 1984. External Parasites. In: Hotstad M.S., Calnek B. W. & Yoder, H.W. Jr. (Eds) **Diseases of Poultry.** 8th Ed. Iowa State University. pp.667-704.

Margolis, L.; Esch, G.W.; Holmes, J. C.; Kuris, A. M. & Schad, G. A. 1982. The use of ecological terms in Parasitology. (Report of an Ad Hoc Committee of the American Society of Parasitology). **Journal of Parasitology, 68**:131-133.

Mushi, F. Z.; Binta, M. G.; Chabo, R. G.; Ndebele, R. & Panzirah, R. 2000. Parasites of domestic pigeons (*C. l. domestica*) in Sebele Garborone, Botswana. **Journal of the South African Veterinary Association, 71**: 249-250.

Oniye, S. J.; Audu, P. A.; Adebote, D. A.; Kwaghe, B. B.; Ajanusi, O. J. & Nfor, M. B. 2000. Survey of helminth parasites of the Laughing Dove, *Streptopelia senegalensis* in Zaria, Nigeria. **African Journal of Natural Sciences, 4**: 65-66.

Petryszak, A.; Rosciszewska, M.; Bonczar, Z. & Pospiech, N. 2000. Analyses of the population structures of Mallophaga infesting urban pigeons. **Wiad Parazytology, 46**: 75-85.

Senlik, B., Gulegen, E. & Akyol, V. 2005. Effects of age, sex and season on the prevalence and intensity of helminth infections in domestic pigeons (*C. livia*) from Bursa Province, Turkey. **Journal of Parasitology, 38**: 121-125.

Serle, W.; Morel, G. J. & Hartwig, W. 1992. **A Field Guide to the Birds of West Africa** London, Collins. pp. 351.

Soulsby, E.J.L. 1982. **Helminths, Arthropods and Protozoa of Domesticated animals.** 7th Ed. London, Longman. pp. 763-777.