

A Survey of Ectoparasites Infestation of Domestic and Exotic Turkey Birds in Ugep, Yakurr Local Government Area of Cross River State, Nigeria

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Abstract:- A survey of ectoparasites of domestic and exotic turkeys was carried out in Ugep, Yakurr Local Government Area, to evaluate the infestation level. Out of 91 turkey birds examined for ectoparasites, 67 (73.6%) were infested with ectoparasites. A total of 457 lice were collected from 43 domestic and 48 exotic turkeys. Four species of chewing lice were found and identified as *Degeeriella fulva* 195 (42.7%), *Menacanthus stramineus* 103 (22.5%), *Goniocotes gallinae* 140 (30.6%), and *Strigiphilus* sp nymphs 19 (4.2%). The commonest species of lice frequently encountered was *Degeeriella fulva* female with 42.7% occurrence. There was statistical significant difference ($P < 0.01$) in the infestation rate of male and female lice on turkey birds. The proportion of lice found infesting turkey birds in the study area was 120 (26.3%) males, 318 (69.6%) females and 19 (4.2%) nymphs. The commonest frequently encountered lice was *Degeeriella fulva* female with 42.7% occurrence. There was statistical significant difference ($x^2 = 10$, $df = 2$, $p < 0.01$) in the infestation rate of male and female lice on turkey birds. Turkeys in Yenon farm had the highest infestation of 260 (56.9%). There were overt high infestation symptoms among birds such as constant preening and fallout of feathers. The high infestation of turkeys in the study area was due to poor managerial practices by farmers. For the turkey farming to grow and provide the needed protein from turkeys to consumers, farmers must adhere strictly to managerial specifications outlined for turkey production.

Key words: Survey, Ectoparasites, Infestation, Domestic and Exotic, Turkeys, Ugep, Cross River, Nigeria.

I. INTRODUCTION

Domesticated turkey bird (*Meleagris gallopavo*) is a descendant of wild turkeys comprising six species viz: *Meleagris gallopavo silvestris*, *M. gallopavo Osceola*, *M. gallopavo mexicana*, *M. gallopavo merriami*, *Agriocharis osceota*, and *M. gallopavo* [1]. However, all of the main domesticated turkey varieties today descended from the turkey raised in central Mexico that was subsequently imported into Europe by the Spanish in the 16th century [2]. Domestic turkey is a popular form of poultry and is raised throughout the temperate and tropical parts of the world. The male called Tom is larger than the female referred to as hen, while the chicks may be called Poult or turkeylings [2]. Turkeys were introduced into Nigeria about 100 years ago during the colonial era and large numbers are now found in many parts of the country [3]. Turkeys are large poultry birds, fast

gaining popularity among peasant farmers in Nigeria due to their quick turn over rate, higher food conversion rate and minimum land requirement [4]. Domestic *M. gallopavo* live in symbiotic relationship with human societies [5] as it lives freely and feeds on food waste, different kinds of seeds, fruits, arthropods, amphibians, snails, vegetables and nuts [6], [7]. They are members of the order Galliformes (Chickens, quails, turkey) and family Phasianidae [1], [8]. Turkey occupies an important position next to chickens, ducks, guinea fowl and quail in contributing to the economic and nutritional status of varied populations [9]. It has been reported that turkeys are animal protein sources produced within the fastest possible time [10]. They are reared mainly for meat and its meat is the leanest among other domestic avian birds [11]. Up till now in Nigeria, there is no known discriminatory attitude towards the production and consumption of turkeys. For some Nigerians, poultry meat and eggs are to some extent still considered luxury foods [9]. Turkey meat is less consumed in Ugep compared to western countries, due to lack of awareness of its nutritive value. Turkey is not new to an Ugep man as it is popularly called 'Tolo-Tolo'. However, [12] discovered that the nutritive value of sampled turkey meat has the highest crude fat, fibre and protein content based on the type of diet. However, [4] confirmed that turkey meat contain lower calories and fat, and higher in protein, than other meats. It has been reported that all body parts of turkey are vulnerable to infection due to the eating of contaminated food by eggs and larvae directly or through infected intermediate hosts that may be beetles, snails, crustacians, grasshoppers or earthworms [13]. Ectoparasites and endoparasites parasitizes turkey birds. Parasites affect turkeys by causing discomfort or significant mortalities as in other poultry chickens, thereby reducing their productivity levels [9]. The predilection site for fowl mite is tail feathers, and the fluff at the rear of the keel [14]. Report from [15] shows that ticks, fleas, lice, and mite play an important role in the transmission of certain pathogens which cause heavy economic losses to poultry industry. According to [11], ectoparasites cause weight loss at the rate of 711g per bird and decrease the egg yield at the rate of about 66 eggs per bird in a year. One of the ectoparasites, fowl mite, can cause lowered reproduction, emaciation, anaemia, and ruffled feathers. Aside these, they are also known to transmit parasitic, bacterial and viral diseases like leucocytozoonosis,

Aegyptanellosis, Pasteurellosis, Avian encephalomyelitis, Borreliosis and fowl cholera [9]. In Irag [5] reported the presence of four species of biting lice (*Goniocotes gallinae*, *Goniodes gigas*, *Menacanthus stramineus* and *Oxylipurus* sp.) by infection and intensity of 10% and 6.81, 0.4% and 4.72, 2% and 0.54, 2% and 0.09, respectively; and two species of tick (*Arguspersius* and *Haemophysalis* sp. Nymph) by injury and intensity of 2% and 0.54, 0.2% and 0.24, respectively. Also [8] in Malaysia reported six species of ectoparasites; five lice and a mite. The most prevalent ectoparasite was *Menopon gallinae* 45% occurrence. Others were *Lipeurus caponis* and *Megninia cubitalis* with occurrence of 40%, *Menacanthus pallidulus* (35%), *Goniocotes gallinae* (30%) and *Chelopistes meleagridis* (20%). In Sokoto, northeastern Nigeria, [3] recorded 12 species of ectoparasites. These included four louse species: *Lipeurus tropicalis* (78% hitherto unknown from turkeys), *Menacanthus stramineus* (48%), *Goniocotes gallinae* (35%), and *Chelopistes* sp. (33%). Two species of tick were found: *Argus persicus* (50%) and *Hyalomma impressum* (10%). Five parasitic mites were observed: *Bdellonyssus bursa* (45%), *Megninia cubitalis* (32%), *Epidermoptes bilobatus* (20%), *Freyana chanayi* (12%) and *Cnemidocoptes mutan* (10%). Only one flea species *Echidnophaga gallinacea* was found. Tolo-Tolo, as turkey is called by the Ugep people, has been in existence since independence and no study has been carried out on its parasitic infection. With increase in population and high demand for meat consumption especially during Christmas period, a survey was carried out to determine the level of ectoparasites infestation on domestic turkey birds from three wards of Ugep in Yakurr Local Government Area. The outcome of this survey will encourage turkey farmers in this locality to produce high quality turkey birds, for better quality of life to consumers.

II. MATERIALS AND METHODS

Study area.

A survey of ectoparasites infestation on Turkey birds was carried out in three wards of Ugep in Yakurr Local Government Area, Cross River State, Nigeria. Ugep is an agricultural community where indigenes spend most of their time in farming activities. This area lies between latitudes 4o and 6o North of the Equator and longitudes 6o and 8o East of the Greenwich Meridian. Ugep is one of the largest native towns in Eastern Nigeria and has humid weather. The remnants of the equatorial rainforest are found in this area.

Collection of samples

Prior to the collection of samples, local Turkey farmers were looked for and the aim of this study explained to them. These farmers consented to the investigation and were willing to cooperate with us. During collection of samples, three farms in each different ward in Ugep were used and the team was taken into each farm house to examine the birds. Thorough screening on every body part of the bird including the legs, body plumage, under wings, comb, wattle, vent and tail was

carried out in search of lice, ticks, and fleas. Feathers were cut from the lateral and tail parts of some turkey bodies. External parasites were removed manually from the body of the host using forceps and placed in EDT vials. Feathers collected were preserved in 70% ethyl alcohol before transportation to Cross River University of Technology Biology laboratory for processing and identification. A total of 91 domestic and exotic turkeys were sampled and examined from the three farms.

Identification of Parasites

Microscopy examination of feathers was carried out in the Biology laboratory of Cross River University of Technology Calabar to identify the different species of parasites. The ectoparasites were removed unto saline solution and were observed under light microscope. They were identified using morphological keys provided by [16].

Statistical Analysis.

The abundance and infestation rate of domestic and exotic turkey birds were determined by using the chi-square test. The difference in the infestation rate of domestic turkeys was accepted when $P < 0.05$.

III. RESULTS

Of the 91 domestic and exotic turkey birds examined, 67 (73.63%) were infested with adult lice and nymphs. A total of four species of chewing lice, *Degeriella fulva* female, *Menacanthus stramineus* female, *Goniocotes gallinae* female, and *Strigiphilus* sp nymphs were recovered from turkey birds in the study area. Table 1 revealed turkey ectoparasite infestation in the study area. In Ijiman ward, of the 33 birds examined, 18 (54.5%) showed infestation of adult lice and nymphs. In respect to Ketabebe ward, out of 34 birds examined 25 (73.5%) were infested with lice and nymphs. However, in Yenon of the 24 birds examined 11 (45.8%) were infested with lice ectoparasites (Table 1).

It was observed that the infection rate of birds in Yenon (75.0%) was the highest, followed by that of Ketabebe ward (73.5%) and finally that of Ijiman ward (72.7%).

Table 2 illustrates the prevalence of ectoparasites in relation to turkey host in the study area. Out of 18 domestic turkeys examined in Ijiman, 50.0% were infested, and 14 (11.7%) male, 26 (8 2%), female and 3 (15.8%) nymph lice were collected from domestic turkeys. From 15 exotic turkeys examined 100.0% were infected and 19 (15.8%) male, 36 (11.3%) female and 0.0% nymph lice were collected. In Ketabebe ward, of the 16 domestic birds examined, 50.0% were infested and 14 (11.7%) male, 20 (6.3%) female lice and 3 (15.8%) nymph lice were seen. For the exotic 94.4% were infested and 20 (16.7%) male, 36 (11.9%) female and 4 (21.1%) nymph lice identified. In Yenon, of the 9 domestic birds examined, 55.5% were infested and 23 (19.2%) male, 76 (23.9%) female and 4 (21.1%) nymph lice were found infesting turkeys. However, from 15 exotic examined, 86.7%

were infected and 30 (25.0%) male, 112 (38.4%) female and 5 (26.3%) nymph lice were collected. Out of 457 lice collected from 91 domestic and exotic turkeys, 120 (26.3%) male lice, 318 (69.6%) female lice and 19 (4.1%) nymph lice were found parasitizing turkey birds in the study area. There was statistical significant difference ($P < 0.01$) in the infestation rates of male and female lice on turkey birds in the study locations. It was observed that turkeys from Yenon were most infested 260 (56.9%) with adult and nymphs lice than those from Ijiman 98 (21.4%) and Ketabebe 99 (21.7%) (Table 2).

Table 1. Percentage of Turkey Ectoparasites Infestation in the Study Area

Location	No of birds examined	No. of birds infected	Prevalence (%)
Ijiman	33	24	72.7%
Ketabebe	34	25	73.5%
Yenon	24	18	75.0%
Total	91	67	73.6%

Table 2. Prevalence of ectoparasites according to Turkey host

Lice species collected and identified	Location			
	Ijiman	Ketabebe	Yenon	Total
<i>Degeeriella fulva</i>	45 (45.9%)	40 (40.4%)	110 (42.3%)	195 (42.7%)
<i>Menacanthus stramineus</i>	22 (22.4%)	20 (20.2%)	61 (23.5%)	103 (22.5%)
<i>Goniocotes gallinae</i>	28 (28.6%)	32 (32.3%)	80 (30.8%)	140 (30.6%)
<i>Strigiphilus sp. Nymph</i>	3 (3.1%)	7 (7.1%)	9 (3.5%)	19 (4.2%)
Total	98 (21.4%)	99 (21.7%)	260 (56.9%)	457 (100%)

Table 3; Distribution of lice species according to location in the study area

Location	Bird host	No. examined	No. infested (%)	Number of parasites recovered from Turkeys				Grand Total
				Male (%)	Female	Nymph	Total	
Ijiman	Domestic	18	9 (50.0%)	14 (11.7%)	26 (8.2%)	3 (15.8%)	43 (9.4%)	98 (21.4%)
	Exotic	15	15 (100.0%)	19 (15.8%)	36 (11.3%)	0 (0.00)	55 (12.0%)	
Ketabebe	Domestic	16	8 (50.0%)	14 (11.7%)	20 (6.3%)	3 (15.8%)	37 (8.1%)	99 (21.7%)
	Exotic	18	17 (94.4%)	20 (16.7%)	38 (11.9%)	4 (21.1%)	62 (13.6%)	
Yenon	Domestic	9	5 (55.6%)	23 (19.2%)	76 (23.9%)	4 (21.1%)	103 (22.5%)	260 (56.9%)
	Exotic	15	13 (86.7%)	30 (25.0%)	122 (38.4%)	5 (26.3%)	157 (34.4%)	
Total		91	67 (73.6%)	120 (26.3%)	318 (69.6%)	19 (4.2%)	457 (100%)	

The four lice species collected and identified in this study area are *Degeeriella fulvas*, *Goniocotes gallinae* and *Strigiphilus sp. nymph* (Table 3). The most frequently encountered adult lice species were *Degeeriella fulva* female 195 (42.7%), followed by *Goniocotes gallinae* 140 (30.6%), *Menacanthus stramineus* female 103 (22.5%) and *Strigiphilus sp* nymphs 19 (4.2%). Although *Strigiphilus sp* nymphs were seen in the

three study locations, they were not as numerous as *Degeeriella fulva* lice. Plate 1-4 shows the identified lice species in the study area. The abundance of these lice according to the investigated location is depicted in Fig.1.

LICE ECTOPARASITES IDENTIFIED IN TURKEY BIRDS FROM UGEP



Plate 1. *Degeeriella fulva* females X40

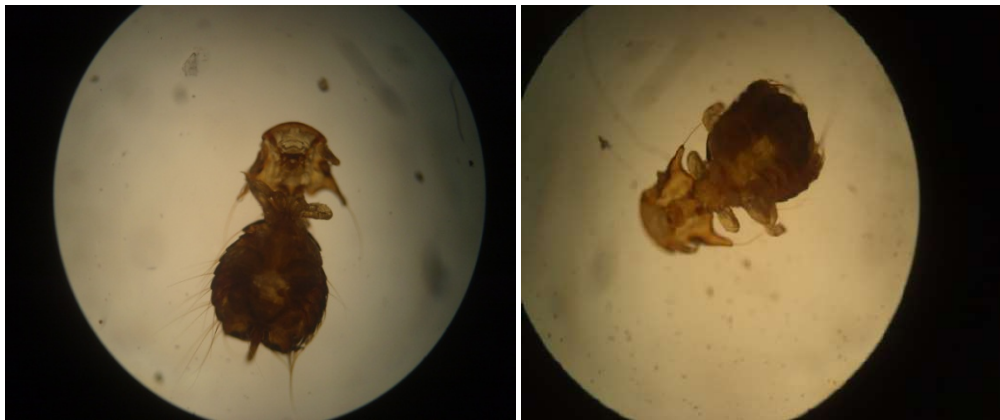


Plate 2. *Menacanthus stramineus* X40

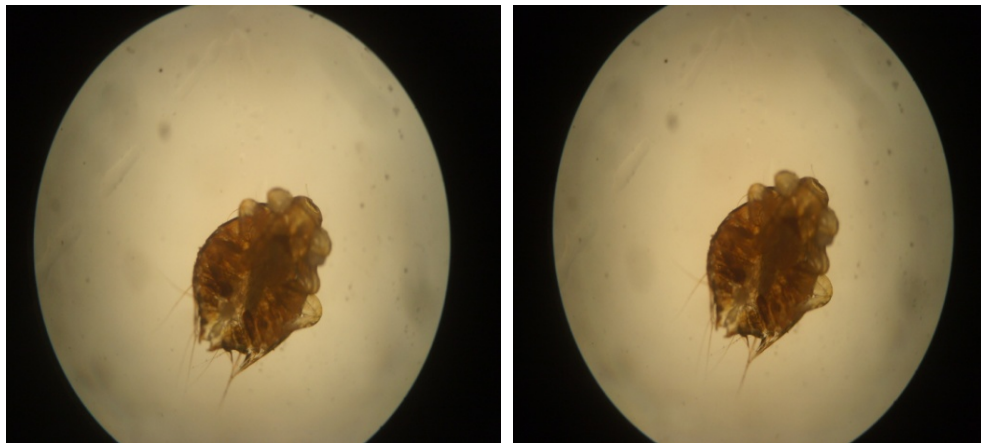


Plate 3. *Goniocotes gallinae* Females x40



Plate 4. *Strigiphilus sp.* nymph x40



Plate 5. Egg knit of *Degeeriella fulva* x40

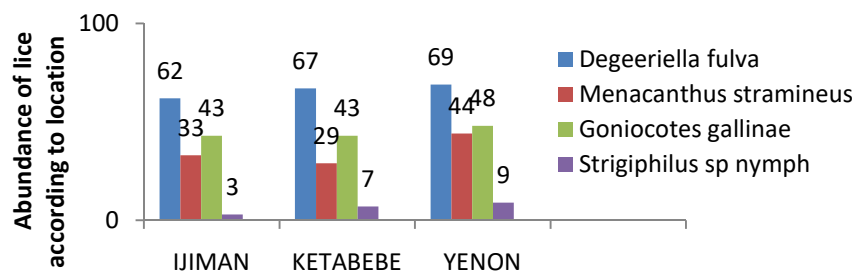


Fig. 1. Distribution of lice in relation to location

IV. DISCUSSION

Turkey meat serves a complimentary role to chicken meat especially during festive seasons in Ugep. This observation is in line with the work of [9] who reported that Turkey occupies an important position next to chicken, duck, guinea fowl and quail in contributing the most evolving sector, which is playing a significant role in augmenting the economic and nutritional status of varied population. This reason has energized people to venture into turkey farming because of its ready financial returns. The aim of this study was to investigate ectoparasites infestation of domestic and exotic turkey birds in Ugep, in order to encourage turkey farmers to provide healthy methods of turkey production. This will enhance the achievement of health benefits associated with consumption of turkey meat. Out of 91 turkey birds examined in the three studied locations in Ugep, 67 (73.6%) were infested with chewing lice and nymphs. This finding is similar to the result of [17], who reported 177 (73.8%) of ectoparasites parasitizing birds in Zaria, Nigeria, but contrast that of [8] who reported 12 (60.0%) infestation rate in Malaysia. In this present study a total of 457 adult and nymph lice were found on 91 turkey birds, comprising of four species of chewing lice namely, *Degeeriella fulva* (42.7%), *Menacanthus stramineus* (22.5%) *Goniocotes gallinae* (30.6%) and *Stigiphilus* sp nymphs (4.2%). This finding is in consonance with the result of [5], who reported four Biting species of lice (*Goniocotes gallinae*, *Goniodes gigas*, *Menacanthus straminus*, and *Oxylipeurus* sp) in Iraq.

The infestation rate of Turkey birds (73.6%) reported in this study is lower than (85.8%) recorded in Taraba State by [18]. In this present investigation, 457 adult lice and nymphs were recovered from 91 domestic and exotic turkeys of which 318 (69.6%) female lice, 120 (26.3%) male lice and 19 (4.2%) nymphs were found infesting turkey birds in the study area. This finding is similar to the work of [17] who reported a higher infestation rate 84 (74.3%) in female birds than in males 93 (73.2%). There was statistical significant difference ($P < 0.01$) in the infestation rates of male and female lice on turkey birds in the study locations. The variation in infestation levels of lice in this study is not unconnected with differences in environmental conditions as earlier reported [19]. According to these researchers, infestation levels of lice can vary according to habitat, the infestation rates in flocks of birds, the infestation of the nest, the general health of the birds and other environmental conditions. The result of this study is also in line with that of [3] who reported that turkeys were consistently more often infested in hot season and the warm wet season than in the cool dry harmattan season, because the high temperature causes rapid multiplication of ectoparasites during these periods. Infestation of lice on flocks is a thing of concern, as they are a constant irritant to the birds, and they can become restless and ill-tempered leading to outbreak of fighting [20]. These lice can be harmful to both domestic and exotic wild hosts as they deteriorate the quality of plumage, provoke small holes on feathers, thus reducing their thermoregulatory capacity and increase feather breakage [19].

This infestation was shown by the much egg knits (Plate 5) seen on the feathers, causing turkey feathers to fall off due to heavy infestation. Similar observation has earlier been reported [8]. The high infestation of turkeys by ectoparasites observed in this investigation could be due to poor managerial practices, because turkey farmers in the three locations bred turkeys together with broiler chickens in crowded pen spaces without good ventilation. Such crowded facility could promote transmission of ectoparasites from one turkey bird to another. Similar finding has been reported by some researchers [20], [21], [22]. It was found that the predilection sites of these ectoparasites were on feathers, vent, and underside of wings. This report is in line with the findings of other researchers [8], [23], [24]. There were overt symptoms of high infestation expressed by turkeys in the study area, such as constant preening, feather ruffling and slight feather damage due to poor management practice. For turkey sector to grow in the study area, farmers should adhere strictly to managerial specifications outlined by researchers [20], [24]. In doing so, all the nutritional benefits of turkey meat will not only be for farmers but also to consumers in the study area and the state at large.

V. CONCLUSION

This investigation has shown that domestic (Tolo-Tolo) and exotic birds are infested with four species of chewing lice, *Degeeriella fulva*, *Menacanthus stramineus*, *Goniocotes gallinae* and *Strigiphilus* sp nymphs. A total of 457 lice were found parasitizing Turkey birds in the study area. Turkey birds exhibited heavy symptoms of infestations due to poor management practices. It is therefore recommended that turkey farmers in the study area should apply the recommended management practices in order to reap the financial and health benefits of turkey farming.

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CONFLICT OF INTEREST

Authors declared no conflict of interest

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