

## PRELIMINARY SURVEY OF ECTOPARASITES OF CHICKEN IN AWKA, SOUTH-EASTERN NIGERIA

IKPEZE, Obiora Osegboka., AMAGBA, Immaculata Chioma and ENEANYA, Christine Ifeoma  
Department of Parasitology and Entomology, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria

**Corresponding Author:** Ikpeze, O. O. Department of Parasitology and Entomology, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. Email: [ikpezevet@yahoo.com](mailto:ikpezevet@yahoo.com) Phone: +2348035838255

### ABSTRACT

*A total of 4650 domestic chickens, comprising 1410 cocks (30.3 %), 2550 hens (54.8 %) and 690 chicks (14.8 %), displayed for sales between February and May 2008 at Eke-Awka market in Anambra State, south-eastern Nigeria were systematically examined for ectoparasites. Most of the cocks originated from the North while the hens and chicks were raised on nearby farms in Anambra and Enugu States. Overall, ectoparasites infested about 40.5 % of the chickens examined. The wing louse, *Lipeurus caponis* moderately infested 1935 chickens (41.61 %). The shaft louse, *Menopon gallinae*, extensively infested 2205 (31.90 %), while the fluff louse, *Gonoicotes gallinae*, lightly infested 471 (7.07 %) chickens. The sticktight flea, *Echidnophaga gallinacea*, attacked the head region of 3087 (69.37 %) while the symptoms of scaly leg mite, *Knemidocoptes mutans*, was observed on 1679 (27.70 %) of the birds, respectively. Market survey revealed a depreciation of about 10 to 20 % in the selling prizes of the affected chickens, a positive indication that ectoparasites on chickens are associated with financial losses incurred by operatives of the poultry industry in Nigeria.*

**Keywords:** Ectoparasites, Chickens, *Lipeurus caponis*, *Menopon gallinae*, *Gonoicotes gallinae*, *Echidnophaga gallinacea*

### INTRODUCTION

Poultry Industry, being an important sector of Nigerian livestock production is expected to play a vital role in national development through generation of revenue. About 85 % and 5 % of Nigeria's poultry population estimated at 190 million were reared extensively in rural and urban areas, respectively, while 10 % were managed intensively nation-wide (FAO, 1989). Common ectoparasites of chicken are lice, fleas, ticks and mites which spend their entire life cycles on the host (Saidu *et al.*, 1994). Lice have been reported to be the most common and widely spread ectoparasites of chickens (Benbrook, 1965). In Western Nigeria, *Menacanthus cornuthus*, *M. pallidulus*, *Anyrhodea powellion*, *Menopon gallinae*, *Numidulipenes tropicalis* and *Gonoicotes gallinae* species have been isolated from chicken (Fabiya, 1988).

The adverse effects of lice infestation include irritation, reduced mating potentials in cocks, reduced egg laying in hens, and loss of weight in broilers, pullets and cockerels (Soulsby, 1982). The tropical chicken flea or stick-tight flea (*Echidnophaga gallinacea*) which attaches to the combs, wattles and around the eyelids, induce irritation, restlessness and anaemia by their biting and sucking activities, and affected chickens may become blind when their nictitating membranes are damaged (Soulsby, 1982). It has been severally observed that heavy infestation of the chicken by the soft tick, *Argas persicus* (Fowl tick) caused extensive loss of blood, emaciation, retarded growth, lowered egg production, loss of protective feathers, marked sluggishness, and diarrhea (Adene and Dipeolu, 1975). The common

red chicken mite (*Dermanyssus gallinae*), the northern fowl mite (*Ornithonyssus sylvarium*), the tropical fowl mite (*Ornithonyssus bursa*) and the scaly-leg mite (*Knemidocoptes mutans*) are known to feed constantly on blood and lymph of chickens, thereby causing anaemia, depluming of feathers and scaly legs (Soulsby, 1982).

The present study was conducted to further identify the species of ectoparasites on chickens as well as assess their economic impact. The result will enable the stake holders in the poultry industry fully appreciate the importance of ectoparasites and be motivated to implement feasible control programme in order to reduce the associated economic losses.

### MATERIALS AND METHODS

**Area of Study:** Eke-Awka market, the study area, is the busiest daily market in Awka, the capital of Anambra State, south-eastern Nigeria. Poultry-line in the market receives indigenous cocks from northern states of the country, as well as exotic broilers, spent hens, pullets and cockerels raised on different farms in Enugu and Anambra States. The chickens are displayed for sale in expanded metal cages which have provisions for feed and water. Buyers examined the chickens, handling them to assess their weights during the bargain. Poultry-line remains a bee-hive of activities as hoteliers, operators of restaurants and housewives haggle over the prizes of chickens on daily basis. This study was carried out between February and May 2008.

**Sample Population of Chickens:** Each poultry cage contains between 5 to 10 adult chickens (cocks,

**Table 1: Ectoparasites on chickens at Awka, Anambra State, south-eastern Nigeria**

Chickens	Sample examined		Chickens infested with different ectoparasites (as percentages of examined)									
			Wing louse <i>L. caponis</i>		Shaft louse <i>M. gallinae</i>		Fluff louse <i>G. gallinae</i>		Sticktight flea <i>E. gallinacea</i>		Scaly leg mite <i>K. mutans</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cocks	1410	30.32	96	6.8	294	20.8	84	6.0	963	68.3	551	39.1
Hens	2550	54.84	1242	48.7	1911	74.9	387	15.2	1590	62.4	1128	44.0
Chicks	690	14.84	597	86.5	0	0.0	0	0.0	534	77.4	0	0.0

broilers and spent hens) and 15 to 20 chicks (pullets and cockerels). Five birds were taken at random from each cage in a row and examined for ectoparasites. The head, combs, eyelids, wattles, neck, feathers, breast, back, wings, shafts, legs and other external surfaces of the chicken were thoroughly examined. About 4650 chickens were sampled during the study period.

#### Collection and Identification of Ectoparasites:

Several specimen bottles, each containing 75 % alcohol, to which few drops of 5 % glycerine had been added, were labeled with different parts of the chicken as well as the types of chicken examined. Thus ectoparasites from cocks, hens and chicks, as well as from different predilection sites, were properly distinguished from each other. Glycerine was to prevent the specimen from becoming brittle as the alcohol evaporated. The ectoparasites were pulled out of the chickens with either the pin-forceps or blunt forceps; sufficient care being taken to prevent damage to the morphological features needed for subsequent identification of the ectoparasites. Preserved specimen were taken to the Department of Parasitology and Entomology, Nnamdi Azikiwe University, Awka and emptied in well-labeled Petri dishes. Lactophenol was added for clearance and each ectoparasite was examined under the stereoscopic microscope. Entomological Keys (Ikeme, 1976) was used for the identification of the ectoparasites. The predilection sites, antennae, and presence or absence of mandibles, shape and number of bristles aided in the identification of louse species (Ikeme, 1976). Digital photos of typical symptoms of arthropod infestation, together with the incriminating arthropods were taken. Descriptive statistics was done using SPSS Version 11.

## RESULTS

The different types of domestic chickens sold at Eke-Awka market include cocks, spent hens and chicks. A total of 4650 chickens comprising 1410 cocks (30.3 %), 2550 spent hens (54.8 %) and 690 chicks (14.8 %) examined during the study period were observed to be infested to varying degrees by different types of ectoparasites (Table 1). The wing louse, *Lipeurus caponis* affected 1935 chickens comprising 96 cocks (6.8 %), 1242 hens (48.7 %) and 597 chicks (86.5 %). The shaft louse, *Menopon gallinae* was identified from 2205 chickens (31.90 %), made up of 294 cocks (20.8 %) and 1911 hens (74.9 %). The fluff louse, *Gonoicotes gallinae* infested 471 adult chickens composed of 84 cocks (6 %) and 387 hens (15.2 %).

Both *M. gallinae* and *G. gallinae* were apparently absent from young chicks. Typical symptoms of feather-loss due to *M. gallinae* infection, and egg knits of *M. gallinae* on feather are shown in Figures 1c & d respectively, while digital photographs of *G. gallinacea*, *M. gallinae*, and *L. caponis* from affected chickens are shown in Figures 2a, b and c respectively.

The sticktight flea, *Echidnophaga gallinacea*, attacked 3087 chickens, made up of 693 cocks (68.3 %), 1590 hens (62.4 %) and 534 chicks (77.4 %). The distribution of the sticktight flea was mainly on the head region of affected chickens, especially on the wattles, combs and around the eyelids. Sticktight flea infestation of the head of chicken is shown in Figures 1a, while the digital photograph of *E. gallinacea* from an affected chicken is presented in Figure 2d.

Scaly leg mite, *Knemidocoptes mutans*, infection were evident on the legs of 1679 (27.70 %) adult chickens comprising 551 cocks (39.1 %) and 1128 hens (44 %). Lesions of scaly leg appeared to be restricted to adult chickens (Figure 1b), an indication of the progressive nature of the infection.

The predilection sites and relative intensity of infestation of ectoparasites on infested chickens is presented on Table 2. Lice were mostly found beneath and on the wings, on body surfaces and feather shafts of affected chickens. *Lipeurus caponis* moderately infested the wings and body surfaces of affected birds. Concentrations of *M. gallinae* were mostly on the shafts than beneath the wings and body surfaces, while *G. gallinae* lightly infested body surfaces and wing feathers. *E. gallinacea* were found mainly on the head of affected chickens; the wattles, eyelids and combs being heavily infested. Very few of the affected chickens were blind due to damaged nictitating membranes. Overt symptoms of *K. mutans* infestation were on the legs of affected cocks and spent hens. Young chicks that may have been infested with *K. mutans* were yet to show symptoms of scaly legs, which require time to develop (Urguhart *et al.*, 1988).

## DISCUSSION

The different types of chickens namely, cocks, spent hens, and chicks on sale in Eke-Awka market is an indication that poultry production is an important sector of livestock industry in Nigeria, and may play a vital role in national development through generation of revenue at individual and cooperative levels. However, the incidence of ectoparasites appears to limit full realization of this goal.

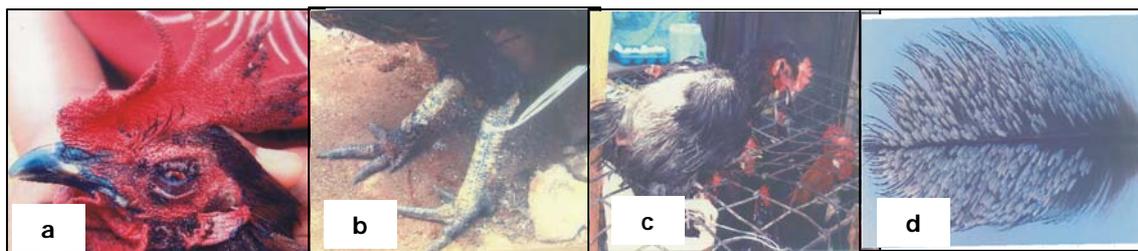


Figure 1: Sites of ectoparasites infestation in birds from Awka, Anambra State, Nigeria. a: *Echidnophaga gallinacea*-infested comb, wattle and eyelids of a cock. b: Scaly-leg due to *Knemidocoptes mutans*. c: Feather-loss due to *Menopon gallinae*, and d: Egg knits of *Menopon gallinae* on wing feather.



Figure 2: Species of ectoparasites infesting chicken from Awka, Anambra State, Nigeria. a: *Goniocotes gallinae* (= 3mm long), b: *Menopon gallinae* (= 3mm long). c: *Lipeurus caponis* (= 4mm long) and d: *Echidnophaga gallinacea* (=1.2mm long).

Table 2: Predilection sites and intensity of ectoparasites on chickens at Awka, south-eastern Nigeria

Ectoparasites		Combs	Wattles	Eye-lids	Wings	Body surfaces	Shafts	Legs
Lice	<i>Lipeurus caponis</i>	-	-	-	++	++	+	-
	<i>Menopon gallinae</i>	-	-	-	++	+	+++	-
	<i>Gonoicotes gallinae</i>	-	-	-	+	+	+	-
Fleas	<i>Echidnophaga gallinacea</i>	+++	+++	+++	-	-	-	-
Mites	<i>Knemidocoptes mutans</i>	-	-	-	-	-	-	+++*

+ = Light (with ≤ 5 ectoparasites), ++ = Moderate (with 6 to 10 ectoparasites), +++ = Heavy (with ≥ 11 ectoparasites)

\* Symptoms of scaly leg

This study showed that about 48.7 % and 86.5 % of chickens infested with the wing louse, *L. caponis*, were hens and growing chicks respectively. Hens also constituted about 74.9 % and 15.2 % of the adult chickens infested by the shaft louse, *M. gallinae* and the fluff louse, *G. gallinae* respectively (Table 1). This finding corroborated earlier reports of *M. gallinae* and *G. gallinae* on chickens in Nigeria (Fabiya, 1988). The effects of lice infestation included feather loss (Figure 1c), reduced egg-laying, weight loss in chicks and broilers and reduced mating in cocks (Soulsby, 1982).

The symptoms of the sticktight flea (*E. gallinacea*) infection were obvious in about 69 % of the chickens examined in the market (Table 1). These fleas buried their fascicles in the hosts' skin and remained in place on the combs, wattles and around the eyelids of affected chickens (Figure 1a) induced irritation, restlessness and anaemia by their biting and sucking activities.

Heavy bleeding was observed as these fleas were being pulled out of the combs, wattles and around the eyelids of infested chickens. Ulcerations of the combs and wattles were evident on severely infected birds. *E. gallinacea* is known to possess a patch of

spinelets on the inner side of its metacoxa and prefers to attach to areas with few feathers, such as the comb, wattles, and around the eyes of the host as we observed in this study. Roberts and Janovy (2000) observed that the infestation caused ulcers, into which the female deposited the eggs. The larvae hatched in the ulcers and then dropped to the ground to develop off the host, as in most other fleas. We also noticed that some cocks with nictitating membrane damaged had gone blind. Wild birds have been implicated in the epizootiology of *E. gallinacea* infestation in Nigeria (Mbaya *et al.*, 2007).

The scaly leg mite *Knemidocoptes mutans* has been reported to burrow into the tissues under the scales of the legs and by its feeding activity leads to thickened, encrusted and unsightly scaly appearance of chicken legs (Urguhart *et al.*, 1988). The mites caused irritation and inflammation, with the result of powdery material formed, the accumulation of which raised the scales on the legs. Scaly leg is highly contagious. Accumulation of the crust may interfere with flexion of the joint and cause lameness. Severe infection may cause arthritis or loss of toes. We observed overt symptoms of scaly leg on about 27.7

% of the chickens examined (Figure 1b). The development of scaly leg may be progressive and age-dependent, since the symptoms were apparently absent from young chicks.

The soft tick *Argas persicus* has been demonstrated from wild birds in Northern Nigeria (Mbaya *et al.*, 2007), but it is quite surprising that ticks were not encountered in this study. On handling, most of the chronically infected chickens appeared underweight, compared with their non-infected counterparts. The annual loss in poultry production, caused by external parasites in the tropical and temperate regions of the world, has been estimated at one billion US dollars (Akinwunmi *et al.*, 1978).

The fact that most cocks sold in Awka market were derived from the northern states of the country is a strong indication that ectoparasites of chickens may be a country-wide problem. This paper therefore calls for a coordinated nation-wide survey of commercial poultry farms to establish the actual socio-economic impact of ectoparasites of chickens. Meanwhile, sanitary management practices involving routine use of proven insecticides and acaricides are essential for on-the-farm control of ectoparasites on chickens, as well as the diseases they vector in Nigeria.

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