

## ECTOPARASITES ON CHICKENS AT TWO RURAL COMMUNITIES

### ABSTRACT

Poultry keeping in Nigeria encourages ectoparasite infestations on chickens, causing growth retardation, reduced egg-laying, poor feed conversion efficiency, feather loss, lameness, blindness, and reduced market value in affected chickens. A preliminary study of ectoparasites on chickens reared intensively and on free-range at Akwaeze and Ifite-Awka rural communities, respectively, in Anambra southeast Nigeria was done in the rainy season of 2024. The study focused on ectoparasite identification, species prevalence, preferred sites, and noticeable effects on infested chickens. A total of 101 intensively-reared chickens examined comprised 39 broilers, 31 hens, 21 cocks and 10 chicks. Hens were on deep litter while broiler chicks and cocks were on wooden cages. Also, 122 free-range chickens examined comprised 38 cocks, 56 hens and 28 chicks. Head regions, feathers, breast, legs and other external surfaces of chickens were examined visually and physically for ectoparasites and their visible effects. Ectoparasites observed were recovered, photographed for their relative lengths in millimeters, and viewed microscopically for their identification features. Six species of ectoparasites recovered were Wing lice (*Lipeurus caponis*), Shaft lice (*Menapon gallinae*), Body lice (*Menacanthus stramineus*), Chicken mite *Dermanyss gallinae*, Depluming Mite (*Knemidocoptes gallinae*), and Stick-tight flea (*Echidnophaga gallinacae*). Chicken mite, depluming mite and stick-tight flea were observed only on free-range chickens. Overall prevalence of ectoparasites was 61.4% in intensively reared chickens and 68.9% in free-range chickens. Frequency of ectoparasites on preferred sites in intensively-reared chickens were 22.4%, 44.7% and 32.9% for Wing lice, Shaft lice, and Body lice, respectively. Similarly, frequency of ectoparasites on preferred sites among free-range chickens were Wing lice (14.2%), Shaft lice (20.9%), Body lice (27.6%), body mites (10.7%), Feather Depluming mites (7.3%), and Stick-tight fleas on comb (19.3%). Generally, the ectoparasites were more frequently recovered from the wings, followed by the body. The stick-tight flea was observed only on the head while Depluming Mites infested only the wings. Undesirable effects of ectoparasites observed on infested chickens were restlessness, sluggishness, stunting, damaged feathers and feather loss. The study serves to create awareness on the impact of ectoparasite infestations on chickens in the study areas. It also emphasizes the need for better management practices by poultry farmers with regard to sanitation and ectoparasite control to ensure improved poultry production.

**Keywords:** Chickens, management systems, ectoparasites, damaging effects

### INTRODUCTION

Chickens (*Gallus gallus domesticus*) belong to the group of birds called poultry and modern chickens descending from wild jungle fowls native to Southeast Asia (Okeke *et al.*, 2019). Poultry industry provides humans with animal protein in the form of meat and egg, and is important in revenue generation (Agbo & Onah, 2018). Commercial poultry enterprises confine flock in houses either on battery cages or deep litter (Okechukwu and Ikpeze, 2020) while the subsistent sub-sectors keep chickens on free-range

(Nwankwo and Eze, 2020; Odo *et al.*, 2018; Usman *et al.*, 2012). Free-ranging is prevalent in rural areas of many developing countries, including Nigeria due to low input costs and minimal infrastructure requirements (Agu *et al.*, 2021). Free-ranging exposes chickens to various environmental hazards and parasitic infections and infestations (Olajide *et al.*, 2020; Obasi *et al.*, 2020). However chickens reared on free-range are more valued for their organic nature, disease resistance, and adaptation to local environments (Nnamdi & Nwafor, 2020). These chickens are known for their hardiness and adaptability to outdoor conditions, making them well suited for extensive systems (Obi & Eze, 2021). They provide a good yield of eggs and meat, and their ability to forage contributes to their overall productivity.

Ectoparasite infestation on chickens have been reported from different locations in Nigeria by several authors including Okechukwu and Ikpeze (2020), Ahaotu *et al.* (2019), Jamilu *et al.* (2018), and Ola-Fadunsin *et al.* (2018), and, Ectoparasitic infestations, especially lice, fleas, mites and ticks pose important health problem in chickens because such as growth retardation, reduced egg-laying, poor feed conversion efficiency, feather loss, lameness, blindness, restlessness and other detrimental conditions on chickens (Ahaotu *et al.*, 2019; Usman *et al.*, 2012; Sabuni *et al.*, 2011; Ikpeze *et al.*, 2008).

This study focused on the ectoparasites found in intensively reared and free-range chickens in Akwaeze and Ifite-Awka, respectively, in Anambra State, South East Nigeria. Ectoparasites recovered from their preferred sites on those chickens will be identified, and their effects reported. Results from this study will serve to create awareness on the impact of ectoparasite infestations on chickens in the study areas. It also emphasizes the need for better management practices by poultry farmers with regard to ectoparasite control for improved poultry production.

## MATERIALS AND METHODS

Chickens intensively managed in a farm at Akwaeze (Latitude 6.12°N, Longitude 7.04°E,) and those on Free-range at Ifite-Awka (Latitude 6.24°N; Longitude 7.09°E) were studied for ectoparasitism. Indigenous people of Akwaeze and Ifite-Awka rural community in Anambra State, southeast Nigeria are of Ibo ethnic extraction who have same cultural and traditional heritage and practices.

Intensively reared chickens at Akwaeze are usually procured as day-old chicks from a commercial hatchery at Awka. After brooding, the chicks would be transferred to make-shift wooden cages to be reared to maturity as broilers or cocks or kept on deep litter to be reared as laying hens. Free-range chickens reared in Ifite-Awka are usually procured from Eke-Awka Market as chicks, cockerels, pullets, hens or cocks and allowed to scavenge within or outside the compound of the owners. Ectoparasite infestations of chickens are favoured by confinement and overcrowding in intensive system as well as frequent exposure of free-range chickens to unsanitary environment with refuse dumps almost everywhere, making the area suitable for development of ectoparasites. The benefits of the study were explained to owners of the chickens who gave their consent for the study.

A total of 101 intensively-reared chickens examined for ectoparasites comprised 39 broilers, 31 hens, 21 cocks and 10 chicks. The hens were raised on deep litter while the broiler chicks and cocks were raised on wooden cages (Plate 1). The chickens were observed to be overcrowded in cages placed near the bush, thereby encouraging the spread of ectoparasites among the birds. Similarly 122 free-range chickens comprising 38 cocks, 56 hens and 28 chicks usually attracted to feed on ripe tomatoes (Plate

2) would be enclosed, 10 at a time by the owners, to facilitate examination for ectoparasites.



**Plate 1: Intensively managed chickens examined for ectoparasites. [A] Broiler chicks on wooden Cage, [B] Hens on deep litter, and [C] Cocks on wooden Cage**



**Plate 2: Cross-section of Free-range chickens examined for ectoparasites**

The external surfaces of all sampled chickens were inspected for ectoparasites as described by Ikpeze *et al.* (2008). The head, eyelids, combs, necks, feathers, breast, legs and other external surfaces of the chicken were examined visually for ectoparasites and their effects on preferred sites. Ectoparasites observed were recovered, emptied on a filter paper and photographed, with their relative sizes in millimeters. They were also examined under x10 and x40 objective lens, to capture their identification features. Briefly, ectoparasites, mostly lice found on different parts of chickens, were collected using a blunt forceps, and then transferred to a collecting labeled screw-capped jar containing 75% ethanol to which 5 drops of glycerin were added to prevent the specimens from becoming brittle as the alcohol evaporates. The specimens were taken to the Department of Parasitology and Entomology Laboratory, Nnamdi Azikiwe University Awka, and emptied in labeled petri-dishes. Each ectoparasite was mounted on a glass slide stained with lactophenol, viewed under a dissecting microscope for their taxonomic structures used for identification.

## RESULTS

**Ectoparasites found on chickens:** The six species of ectoparasites recovered from chickens studied were identified as Wing lice (*Lipeurus caponis*), Shaft lice *Menapon gallinae*, Body lice (*Menacanthus stramineus*), Chicken mite *Dermanyss gallinae*, Depluming Mite (*Knemidocoptes gallinae*), and Stick-tight flea (*Echidnophaga gallinaceae*). These ectoparasites are shown in Plates 3 to 9 inclusive, as follows:

**Table 1: Ectoparasites recovered from chickens examined**

s/n	Ectoparasites recovered from chickens		Poultry Management system	
	Common name	Species of ectoparasite	Intensive	Free-range
1	Wing Louse	<i>Lipeurus caponis</i>	Present	Present
2	Shaft Louse	<i>Menapon gallinae</i>	Present	Present
3	Body Louse	<i>Menacanthus stramineus</i>	Present	Present
4	Chicken mite	<i>Dermanyss gallinae</i>	Not observed	Present
5	Depluming Mite	<i>Knemidocopte gallinae</i>	Not observed	Present
6	Stick-tight Flea	<i>Echidnophaga gallinacean</i>	Not observed	Present

The six species of ectoparasites identified are presented in the Plates 1 – 9 as follows:

1. Wing lice *Lipeurus caponis* viewed under the microscope with an average length of 2.5mm (Plates 3&4).
2. The shaft lice *Menapon gallinae* recovered from intensively reared chickens; measured between 1.0mm and 1.5mm in length (Plate 5).
3. The Body lice *Menacanthus stramineus* recovered from free-range chickens; measured between 1.5mm and 3.1mm in length (Plate 6)
4. Microscopic view of chicken mite *Dermanyss gallinae* from Free-range chicken (Plate 7).
5. Depluming Mites *Knemidokoptes gallinae* at the base of feathers on the back of free-range chicken (Plate 8).
6. Stick-tight fleas *Echidnophaga gallinacean* on the comb of cock on free-range (Plate 9)



**Plate 3: Microscopic views of Wing lice *Lipeurus caponis* [a, b & c]**

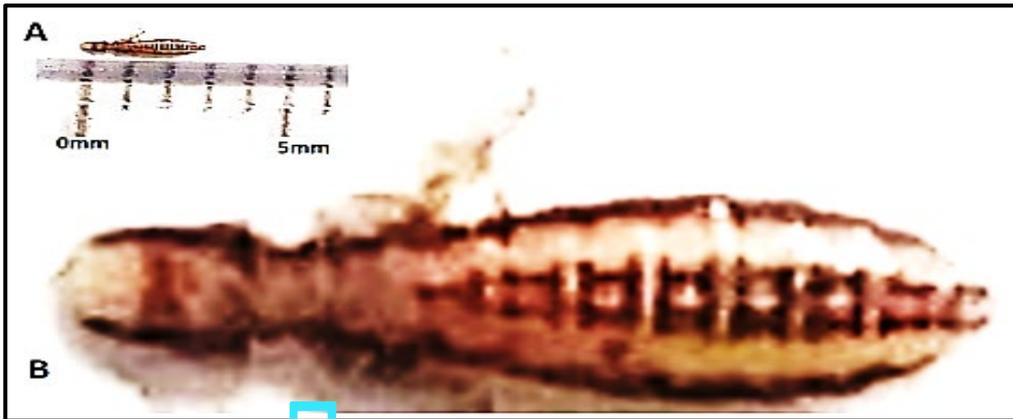


Plate 4: Wing louse *Lipeurus caponis* ( $\approx 2.5\text{mm}$  long) enlarged to show the characteristic slender body and head region.

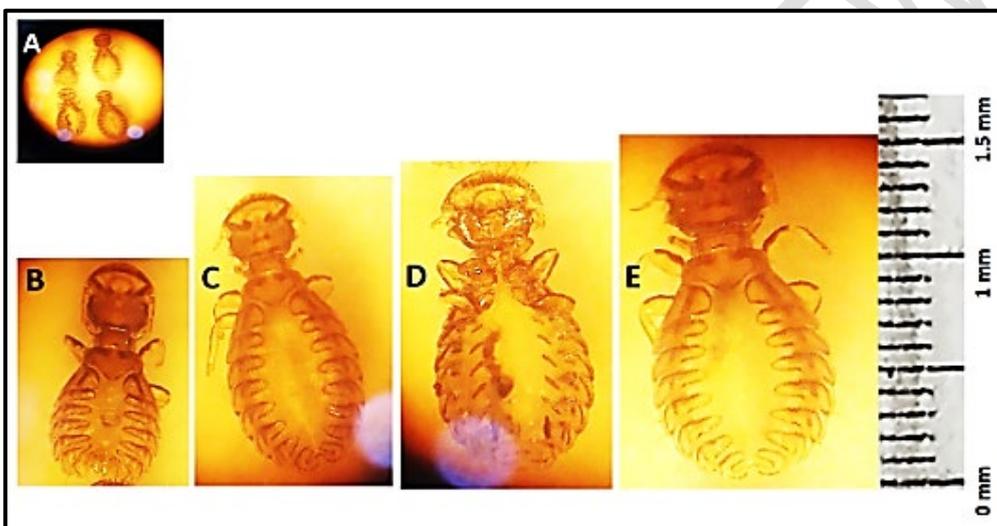


Plate 5: Microscopic view [A] of Shaft lice, *Menapon gallinae*; different sizes enlarged [B, C, D & E] showing characteristic head and body 1mm to 1.5mm

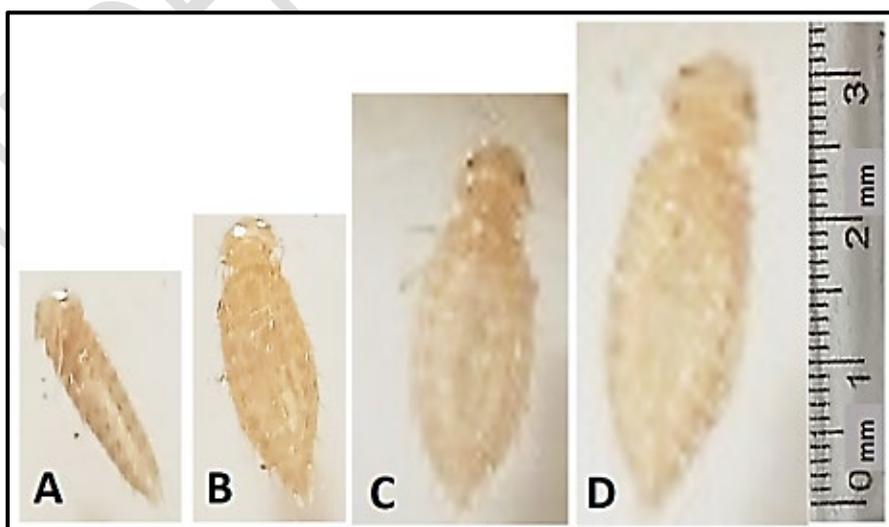
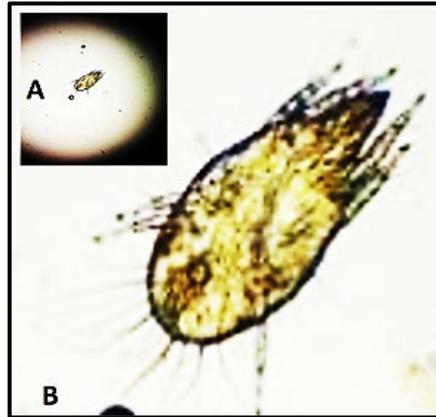


Plate 6: Different sizes of the Body lice, *Menacanthus stramineus* (1.5mm - 3mm in length). Recovered from free-range chickens



**Plate 7: Microscopic view [A] of chicken mite *Dermanyss gallinae* from Free-range chicken, enlarged [B] to show identification features**



**Plate 8: Depluming Mites *Knemidokoptes gallinae* damaging base of feathers on the back of free-range chicken**



**Plate 9: Stick-tight fleas *Echidnophaga gallinacean* on the comb of a cock**

**Prevalence of ectoparasites on chickens:** Overall prevalence of ectoparasites on chickens examined (Table 1) indicates that 61.4% and 68.9% of intensively and extensively reared chickens were respectively infested with different species of ectoparasites.

**Frequency of ectoparasites on preferred sites:** Frequency of ectoparasites on preferred sites among intensively-reared chickens is shown in Table 3. Wing lice, Shaft lice, and Body lice accounted for 22.4%, 44.7% and 32.9% of all lice infestations, respectively. Similarly, frequency of ectoparasites on preferred sites among free-range chickens is shown in Table 4. Contribution to all infestations were Wing lice (14.2%), Shaft lice (20.9%), Body lice (27.6%), chicken mites (10.7%), Depluming mites (7.3%), and Stick-tight fleas (19.3%). Generally, ectoparasites were more frequently recovered from the wings, followed by the body. The stick-tight flea was observed only on the head while Depluming Mites infested only the wings.

**Effects of ectoparasites on preferred sites:** Undesirable effects of ectoparasites observed on infested chickens during the study included restlessness due to irritation, sluggishness, stunting, feather damage and feather loss.

**Table 2: Overall prevalence of ectoparasites on chickens examined**

Chicken types	Intensive system			Extensive system		
	Examined (No.)	Infested (No.)	(%)	Examined (no.)	Infested (No.)	(%)
Chicks	10	2	20.0	28	10	35.7
Broilers	39	26	66.7	NA	NA	NA
Cocks	21	16	76.2	38	26	68.4
Hens	31	18	58.1	56	48	85.7
<b>Total</b>	<b>101</b>	<b>62</b>	<b>61.4</b>	<b>122</b>	<b>84</b>	<b>68.9</b>

NA: Not applicable

**Table 3: Frequency of ectoparasites on preferred sites on intensively-reared chickens**

Sites	Frequency (f) of ectoparasites on preferred sites			Total (f)	(f) %
	Wing louse	Shaft louse	Body louse		
Comb	0	0	0	0	0.0
Wattle	0	0	0	0	0.0
Eyelids	0	0	0	0	0.0
Wings	20	18	8	46	27.05
Body	10	26	42	78	45.9
Shaft	8	32	6	46	27.05
Total (f)	38	76	56	170	100
(f)%	(22.4)	(44.7)	(32.9)		

**Table 4: Frequency of ectoparasites on preferred sites on free-range chickens**

Sites	Frequency (f) of ectoparasites on preferred sites						Total (f)	(f) %
	Wing louse	Shaft louse	Body louse	Chicken mite	Depluming Mites	Stick-tight fleas		
Comb	0	0	0	0	0	46	46	9.3
Wattle	0	0	0	0	0	32	32	6.5
Eye-lids	0	0	0	0	0	17	17	3.4
Wings	52	45	88	12	36	0	233	47.3
Body	10	26	42	32	0	0	110	22.3
Shaft	8	32	6	9	0	0	55	11.2
<b>Total</b>	<b>70</b>	<b>103</b>	<b>136</b>	<b>53</b>	<b>36</b>	<b>95</b>	<b>493</b>	<b>100</b>
<b>(%)</b>	<b>(14.2)</b>	<b>(20.9)</b>	<b>(27.6)</b>	<b>(10.7)</b>	<b>(7.3)</b>	<b>(19.3)</b>		

## DISCUSSION

The wide range of ectoparasite species found among chickens in this study area have been frequently reported from other regions of Nigeria, probably due to the fact that the species are highly adapted to hot and humid environment in Nigeria (Fabiya, 2008). Presence of these ectoparasites may also result from inability of some farmers to implement parasite control measure and the occurrence of poor hygiene in chicken houses (Mungube *et al.*, 2015). The predominance of lice can be attributed to their direct mode of transmission through close contact among chickens because we observed that caged birds were overcrowded while free-range chickens were often housed together at night, facilitating the spread of lice. Bala *et al.* (2011) had reported that chickens packed in same cage in large number than the space can contain enabled ectoparasite to move freely from one chicken to the other at ease. Mite infestations were rare in this study, perhaps due to the habit of mites feeding on host's blood during the night and hiding in the environment during the day (Okeke *et al.*, 2019). Low mite infestations in free-range systems may be possibly due to the chickens' grooming behaviours – 'sand bathing' – which can help reduce mite loads have also been reported.

Overall prevalence of ectoparasites on chickens examined under intensive system in this study, though high, was lower than on free-range chickens (Table 2). Broilers were not encountered among free-range chickens. The fact remains that broilers were seldom kept on free-range because infestation with ectoparasites such as mites and lice can affect their rapid growth and lead to significant health problems. Our result that hens on free-range had highest infestation rate, followed by cocks in intensive management, may be due to the fact that cocks and hens are hardy, and require longer time to mature or lay eggs, respectively. So cocks and hens face the risk of acquiring higher ectoparasite infestation than other groups of chickens.

On the effects of ectoparasites on chickens, the group of Lice reported in this study have the capacity of reproducing quickly and causing large scale outbreaks (Ruff, 2000). They are often found in specific regions of the chicken's body which provide the warmth and protection necessary for lice to thrive and adapt to live within the feathers and plumage of chickens, where they feed on feathers, dead skin cells, or blood, depending on the species (Okeke *et al.*, 2019). Since lice spend their entire life cycle on the host, chickens infested with lice often exhibit signs of restlessness, constant preening, feather pecking, weakened immune system, and more susceptible to other diseases (Olawale & Nnamdi, 2020).

Mites are well-known feed on the host's blood during the night and hide in the environment during the day (Okeke *et al.*, 2019). The common red mite (*Dermanyssus gallinae*) reported in this study is one of the most destructive mites affecting free-range chickens. It is found on domestic fowl throughout the world (Opara *et al.*, 2014) but hides in cracks and crevices during the day and crawls onto the host at night for a blood meal (Okeke *et al.*, 2019) leading to anemia and weakened immune responses (Olawale & Nnamdi, 2020). Depluming mite (*Knemidocoptes gallinae*) reported in this study is known to cause severe itching, leading to feather loss as chickens pull out their own feathers to alleviate discomfort (Nnaji & Okeke, 2020). Mite infestations in free-range chickens are often overlooked due to their small size but can lead to significant health issues such as irritation, feather loss, weight loss, and even death in severe cases (Odo *et al.*, 2020). Red Mite (*Dermanyssus gallinae*) seen in this study has been reported as one of the most destructive mites affecting free-range chickens since it feeds on blood, causing significant blood loss, leading to anemia and even death in severe

cases (Olawale & Nnamdi, 2020). Red mites also hide in the coop during the day and feed at night (Okeke *et al.*, 2019)), making it difficult to be sampled from chickens in the daytime.

The stick-tight flea (*Echidnophaga gallinacae*) reported in this study normally attach to the unfeathered sites such as combs, wattles, nictitating membrane (Ikpeze *et al.*, 2008). Mouthparts of stick-tight fleas embed deeply into the skin of the host to feed for days to weeks thereby inducing irritation, restlessness and anaemia by their sucking activities and, in severe cases, blindness when the nictitating membranes of the host are damaged (Obasi and Nwafor, 2020; Ikpeze *et al.*, 2008).

Infested chickens, especially those with visible signs of feather loss, weight loss, or skin wounds, fetch lower prices in the market because consumers prefer healthy-looking birds (Okeke *et al.*, 2019). As egg production declines due to parasite infestations, farmers experience a direct reduction in income from egg sales. Eggs laid by infested chickens may also be of lower quality, further reducing their marketability and overall farm profitability (Nnaji & Okeke, 2020). Reduced productivity in terms of both egg quantity and quality can lead to long-term financial losses, especially for farmers reliant on egg production as their primary source of income (Olawale and Nnamdi, 2020).

## CONCLUSION

The study serves to create awareness on the impact of ectoparasite infestations on chickens in the study areas. It also emphasizes the need for better management practices by poultry farmers with regard to ectoparasite control for improved poultry production.

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