Original Research Article

SOME ECTOPARASITES ON CHICKENS AT TWO RURAL COMMUNITIES IN ANAMBRA STATE, NIGERIA.

ABSTRACT

Chickens are of major cultural and economic importance in rural Nigerian communities, serving as a source of animal protein and household income. However, their productivity is often limited by ectoparasitic infestations that compromise health, welfare, and market value. 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. A total of 122 free-range chickens (38 cocks, 56 hens and 28 chicks) kept on deep litter or wooden cages were examined for ectoparasites across different body regions. All recovered parasites were photographed, measured and microscopically identified based on morphological 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, ectoparasites, Poultry, rural, management systems, Nigeria.

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). Chickens are a vital source of affordable, high-quality animal protein, supplying essential amino acids, vitamins and minerals through their meat and eggs. They contribute significantly to

rural and urban household income by providing a steady cash flow from the sale of live birds, eggs and manure, and they act as a low-cost entry point for women and youth into livestock production. Beyond nutrition and income, chickens hold cultural importance in many societies, serving as gifts, ritual offerings, or symbols of prestige during traditional ceremonies and social gatherings. Their multi-faceted role makes them indispensable to food security, poverty alleviation and cultural identity in many developing regions (Okechukwu and Ikpeze, 2020). Commercial poultry enterprises confines 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*., 2020; 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 (Asfaw *et al*., 2019). 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 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; Asfaw *et al* 2019., Usman *et al.*, 2012; Sabuni *et al*., 2011; Ikpeze *et al*., 2008).

Despite numerous studies across Africa, regional data remain limited in southeastern Nigeria. Generating local epidemiological information is vital for developing targeted parasite control and sanitation programs in rural poultry systems. This study therefore aimed to determine the prevalence and species composition of ectoparasites infesting chickens in Akwaeze and Ifite-Awka communities of Anambra State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Akwaeze (Anaocha Local Government Area) and Ifite-Awka (Awka South Local Government Area), both located in Anambra State, southeastern Nigeria. These rural communities practice predominantly backyard poultry production, with chickens allowed to scavenge freely around homesteads.

Study Animals and Sample Size

A total of 101 intesively reared chickens managed in a farm at Akwaeze (Latitude 6.12°N, Longitude 7.04°E,), and 122 free range chickens (*Gallus gallus domesticus*) at Ifite-Awka (Latitude 6.24°N; Longitude 7.09°E), were randomly selected and examined for ectoparasites. Birds were sourced from households practicing free-range management.

Examination and Collection of Ectoparasites
Chickens were carefully restrained and physically examined for ectoparasites, with attention to the head, neck, vent, wings, and under-feathers where parasites typically cluster. Parasites were gently removed using forceps and preserved in 70% ethanol for laboratory identification.

Identification of Ectoparasites
Parasites were identified using morphological taxonomic keys described by Soulsby (1982), Emerson (1956), Zumpt (1961), and Hopkins & Rothschild (1953). Identification was based on structural features under stereomicroscopy including head and antenna morphology (lice), dorsal shield and gnathosoma (mites), and comb structures and attachment organs (fleas). Species were categorized into lice, mites, and fleas.

Ethical Considerations
The study followed internationally accepted standards for animal welfare. Handling of chickens was done with minimal stress, and oral consent was obtained from owners before examination and sample collection.

Data Analysis
Prevalence was calculated as the proportion of chickens infested with one or more ectoparasites. Descriptive statistics were used to summarize findings, and prevalence between sites was compared using Chi-square analysis ($p < 0.05$).

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 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-caped 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 gallinacae*). 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	*Lipereus caponis*	Present	Present
2	Shaft Louse	*Menapon gallinae*	Present	Present
3	Body Louse	*Menacanthus stramineus*	Present	Present
4	Chicken mite	*Dermanyss gallinae*	Not observed	Present
5	Depluming Mite	*Knemidocopte gallinae*	Not observed	Present
6	Stick-tight Flea	*Echidnophaga gallinacean*	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)

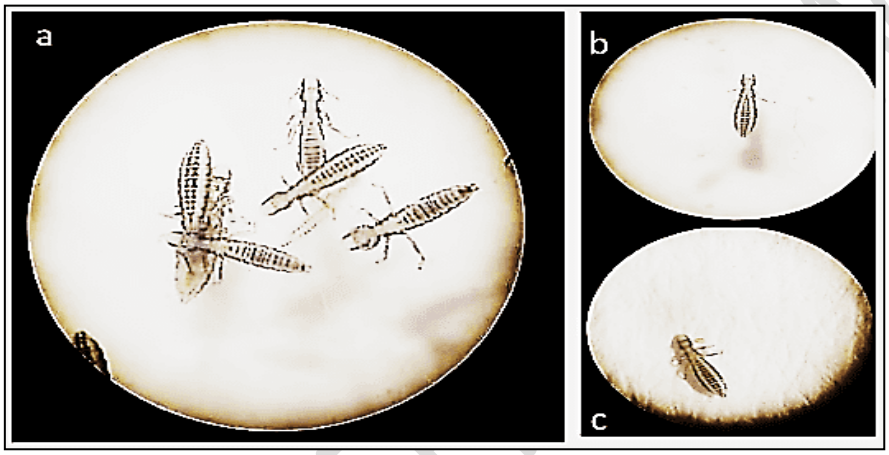

Plate 3: Microscopic views of Wing lice *Lipeurus caponis* [a, b & c]

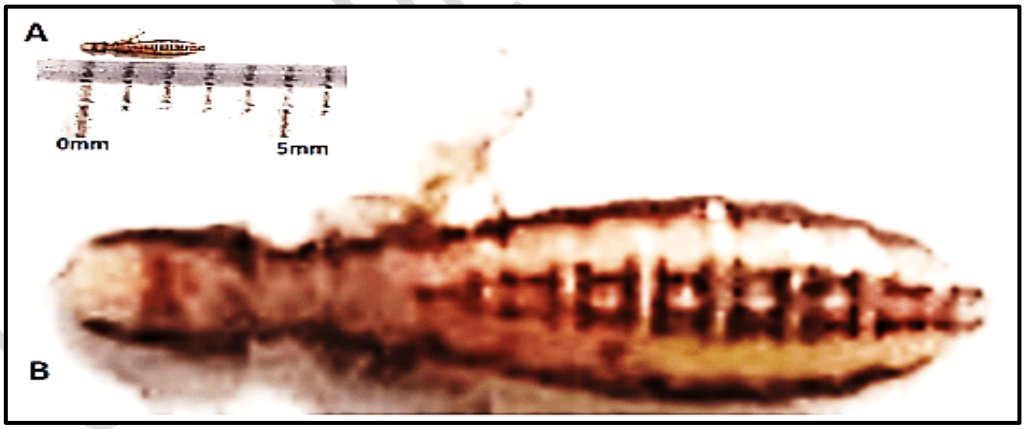

Plate 4: Wing lice *Lipeurus caponis* (≡ 2.5mm long) enlarged to show the characteristic slender body and head region.

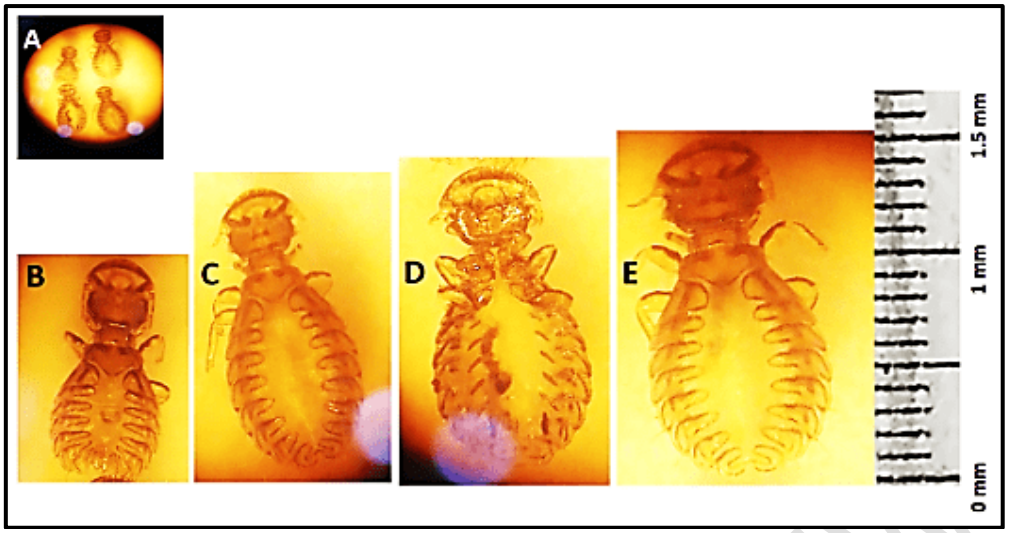

Plate 5: Microscopic view [A] of Shaft lice, *Menapon gallinae;* different sizes enlarged [B, C, D & E] showing characteristic head and body 1mm to 1.5mm

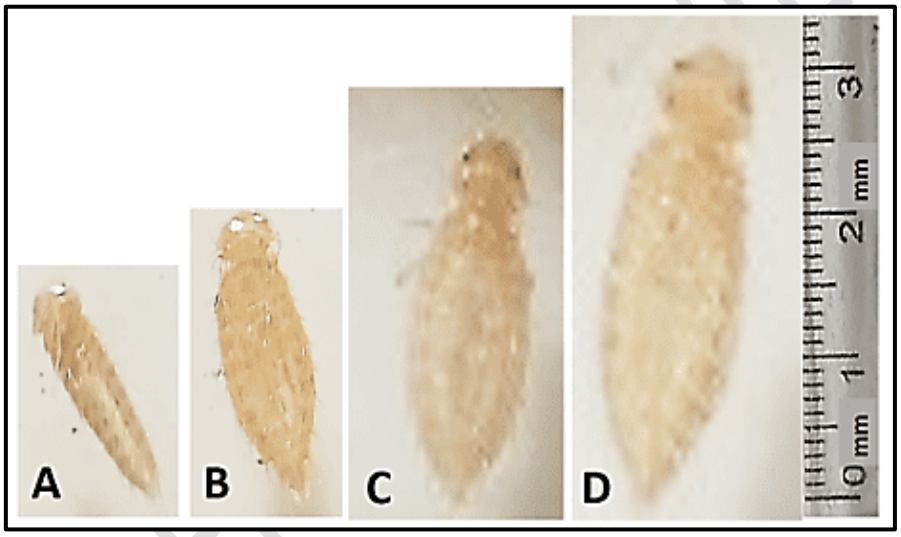

Plate 6: Different sizes of the Body lice, *Menacanthus stramineus* (1.5mm - 3mm in length). Recovered from free-range chickens

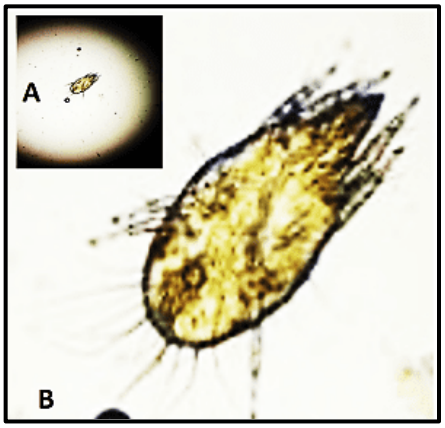

Plate 7: Microscopic view [A] of chicken mite *Dermanyss gallinae* from Free-range chicken, enlarged [B] to show identification features

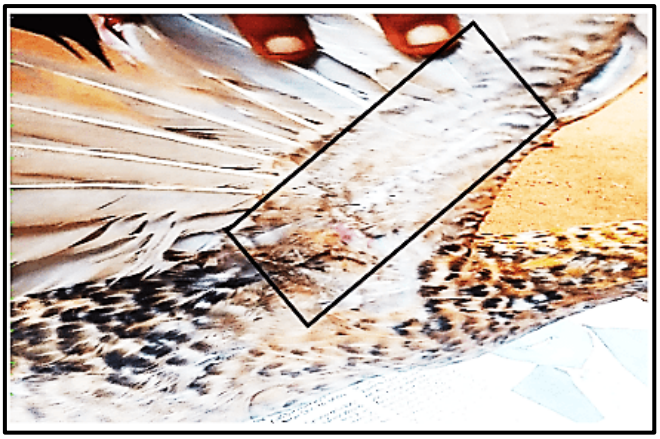

Plate 8: Depluming Mites *Knemidokoptes gallinae* damaging base of feathers on the back of free-range chicken

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		Examined (no.)	Infested	
		(No.)	(%)		(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
Total	**101**	**62**	**61.4**	**122**	**84**	**68.9**

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
Eyelids	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
Total	70	103	136	53	36	95	493	100
(%)	(14.2)	(20.9)	(27.6)	(10.7)	(7.3)	(19.3)		

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 (Fabiyi, 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*., 2008). 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 (Asfaw *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 (Obasi *et al.*, 2020) 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 (Ikpeze *et al*., 2008). 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 to feed on the host's blood during the night and hide in the environment during the day Ikpeze *et al*. (2008). The common red mite (*Dermnayssus 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 (Olawale & Nnamdi, 2020), but hides in cracks and crevices during the day and crawls onto the host at night for a blood meal, Ikpeze *et al*. (2008)., 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, making it difficult to be sampled from chickens in the daytime Nnadi and George (2010).

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 Obasi and Nwafor, (2020). 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.

REFERENCES

Agbo, C. I., & Onah, P. J. (2018). The contribution of chickens to rural livelihoods in Nigeria. *Nigerian Journal of Animal Science*, 50(2), 115-123.

Agu, J. U., Ezeilo, C. M., & Umeh, M. O. (2021). The role of free-range chickens in household food security in rural Nigeria. *Nigerian Journal of Agricultural Sciences*, 47(3), 92-105.

Ahaotu, E., Aturuchi, W., Unagu, A., Uzegbu, H. (2019). Economic Importance and Widespread of Ectoparasites Infestation in Indigenous Chickens (*Gallus gallus domestics*). A study from selected local Government Council and States in Nigeria. *Sustainability Agriculture Food and Environment Research*, 7(2):17-31.

Asfaw, Y., Ameni, G., Medhin, G., Alemayehu, G., & Wieland, B. (2019). Infectious and parasitic diseases of poultry in Ethiopia: a systematic review and meta-analysis. *Poultry science*, 98(12), 6452-6462.

Bala, A.Y., Anka, S.A., Waziri, A, and Shehu, H. (2011). Preliminary survey of Ectoparasites Infesting Chicken (*Gallus domestica*) in four areas of Sokoto Metropolis. *Nigerian Journal of Basic and Applied Sciences.* 19(2):173-180.

Emerson, K. C. (1956). Mallophaga (chewing lice) of chickens. Proceedings of the United States National Museum, 105(3354), 413–423. https://doi.org/10.5479/si.00963801.3354.413

Fabiyi, J.P (2008): Arthropod parasite of domestic fowl in the Jos plateau Nigeria tropical .animal helminth production 12:193-194.

Hopkins, G. H. E., & Rothschild, M. (1953). An illustrated catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Natural History): Vol. I. London: British Museum (Natural History).

Ikpeze, O. O., Amagba, I. C and Eneanya,C . I (2008). Preliminary survey of Ectoparasite of Chickens in Awka, South-Eastern Nigeria. *Animal Research International* 5(2):848-851.

Jamilu, R.Y., Salusi, U.S and Jacinta, N.I. (2018). Prevalence and host related risk factors of ectoparasites on chickens in Dutsinma Local Government area

Katsina State. *FUDMA Journal of Agriculture and Agricultural Technology*, 4(2):200-206.

Mullen, G. R., & O'Connor, B. M. (2002). Mites (Acari). In G. R. Mullen & L. A. Durden (Eds.), Medical and veterinary entomology (pp. 449–516). San Diego, CA: Academic Press. https://doi.org/10.1016/B978-012510451-7/50024-6

Mungube, E.O, Baun, S.M, Tenhagen, B.A, Wamae L,M, Nzioka SM, Muhammed L, Nginyi JM (2008). Prevalence of Parasites of the Local Scavenging Chickens in a Selected Semi-Arid Zone of Eastern Kenya. Tropical Animal Health Production. 40:101-109. https://doi.org/10.1007/s11250-007-9068-3.

Nnadi, P.A and George, S.O. (2010). A cross-sectional survey on parasites of chickens in selected villages in the sub-humid zones of South-Eastern Nigeria. Journal of Parasitology Research, 10(5): 1-6.

Nnaji, F. C., & Okeke, J. O. (2020). Biological control of ectoparasites in poultry systems. *Nigerian Veterinary Journal*, 54(2), 130-138.

Nnamdi, F. C., & Nwafor, A. J. (2020). Organic nature and disease resistance of free-range chickens: A comparative study with commercial broilers in Nigeria. *Nigerian Veterinary Journal*, 51(2), 58-67.

Nwankwo, A. O., & Eze, O. P. (2020a). Impacts of chicken farming systems on poultry welfare and productivity: A case study in Nigeria. *Nigerian Agricultural Review*, 38(1), 48-55.

Nwankwo, A. O., & Eze, O. P. (2020b). Prevalence and impact of ectoparasites on free-range poultry in southeastern Nigeria. *Nigerian Journal of Veterinary Parasitology*, 44(1), 59-68.

Obasi, P. O., Eze, F. A., & Obi, M. N. (2020). Health challenges associated with free-range poultry in the tropics: A review. *Nigerian Journal of Tropical Animal Health*, 54(3), 89-96.

Odo, B. C., Nweke, J. O., & Eze, N. P. (2020). Ectoparasitic infestations in free-range chickens in rural Nigeria: Prevalence and control strategies*. *Nigerian Journal of Poultry Science*, 42(2), 110-118.

Okechukwu, Prisca C and Ikpeze, O.O (2020). Ectoparasites found on Intensively reared chickens at semi urban Emene in South-Eastern Nigeria. The Biomedical Diagnosis, 4(2):92-101 www.thebiomedicaldiagnostics.org.

Olajide, O. A., Iwu, E. O., & Onuoha, R. (2020a). Environmental factors contributing to ectoparasitic infestations in free-range chickens. *Nigerian Journal of Ecology*, 51(2), 85-93.

Olajide, O. A., Iwu, E. O., & Onuoha, R. (2020b). Free-range poultry and ectoparasite infestation: The case of local chickens in southwestern Nigeria. *Nigerian Journal of Veterinary Medicine*, 49(4), 111-120.

Olawale, T. A., & Nnamdi, E. P. (2020). The impact of ectoparasites on rural poultry productivity in Nigeria. *Nigerian Journal of Agricultural Sciences*, 45(4), 101-110.

Ruff, O. Roepstorfi, A., and Permin, A. (2000). Epidemiology of gastrointestinal helminths.of backyard chickens in Denmark. Veterinary Parasitology, 129(3-4), 227-238.

Soulsby, E. J. L. (1982). Helminths, arthropods and protozoa of domesticated animals (7th ed.). London: Baillière Tindall.

Umeh, C. A., Nwachukwu, M. N., and Ononogbo, J. O. (2020). Control strategies for ectoparasites in free-range chickens: A review. *Nigerian Journal of Poultry Research*, 68(1), 120-127.

Usmana, M., Fabiyia, J. P., Mohammeda, A.A., Merab, U.M., Mahmudaa, A., Alayandea, M.O. and Danmaigoro, A. (2012). Ectoparasites and haemoparasites of chickens in Sokoto, northwestern Nigeria. Scientific Journal of Zoology, 1(3), 74-78.

Zumpt, F. (1961). The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian region). Johannesburg: South African Institute for Medical Research.