LICE INFESTATION IN POULTRY BIRDS IN OVIA NORTH EAST, EDO STATE, NIGERIA.

BY

OLAGBENDE SANDRA YETUNDE

LSC1806185

A THESIS WRITTEN IN THE DEPARTMENT OF ANIMAL AND ENVIRONMENTAL BIOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE (BSc.) IN ENTOMOLOGY, UNIVERSITY OF BENIN, BENIN CITY.

SEPTEMBER 2023

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CERTIFICATION

This is to certify that this study was conducted by Olagbende Sandra Yetunde with matriculation number LSC1806185 under my supervision.

…… …….

Dr. A.O. Omoregie Date

…… ……

Prof. M.O Omogberale Date

…… ……

External Supervisor Date

DEDICATION

This work is dedicated to my ever loving and supportive parents, Mr. and Mrs. Olagbende.

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First of all, I would like to thank the Rock of ages, Omnipotent, Ever-loving and caring God for his immense Love, care, support, protection throughout the duration of this study.

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I pray to meet everyone at the top. More prosperity and blessings.

Love you all.

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ABSTRACT

A segment of the livestock industry, poultry birds include chicken, turkeys, ducks, and quails. Ectoparasite infestations are a common occurrence in poultry farms. These parasites feed on the skin, feathers, and blood of the birds, which results in illnesses and decreased egg production. Chicken lice is one common instance. The Phthipraptera order includes lice. Iguosa and Senior Staff Quarters (SSQ) in Ovia North East of Edo State are where this study was carried out in July 2023. This study was conducted to determine the species composition of lice in Ovia North East, abundance, species composition and mean intensity.The feathers of 101 hens were carefully held horizontally, in the opposite direction of their anatomical alignment, to expose the lice. The chickens were then hand-selected and inspected for lice. The only lice species identified in both farms were *Menacanthus stramineus* and *Menopon gallinae*, with *Menacanthus stramineus* being the only species on Iguosa Farm. 98.02% of both farms had lice, with *M.stramineus* having a frequency of 98.04 and *M.gallinae* having a prevalence of 14.85%. Iguosa had a total of 96.08% lice prevalence, while SSQ had the highest prevalence of 100%. *M.stramineus* was present in both farms, with no significant difference between them ($p>0.1$, $p=0.127$). In order to reduce the prevalence of lice and, especially, to increase poultry output, proper poultry management should be followed. Proper and constant treatment for lice should also be ensured.

CHAPTER ONE

1.0 INTRODUCTION

Poultry farms is a subsector of the livestock industry which contains chickens, turkeys, ducks, quails, peafowls, guinea fowls etc. However, chicken constitute as much as 95% of all poultry kept on the planet (Kalla *et al.,* 2007). Poultry production is unique in that it offers the highest turnover rate and the quickest returns to investment outlay in the livestock enterprises (Tanko *et al.,* 2005). The industry has been described as the fastest means of solving the problem of protein deficiency in Nigeria (Akpabio *et al*).Their production is one of the livestock production with significant contribution to human food (Demeke, 2004).Poultry production is predominant among livestock production in Edo State. People depend on poultry for food and poultry farming serves as an additional occupation to supplement the income of small and marginal farm families (Emokaro *et al.*, 2011).

Poultry plays an important role in the diet and economy of Nigeria It is the primary supplier of eggs and meat and as a source of income and employment to people compared to other domestic animals (Avila, 1985). They are raised with relatively low capital investment and readily available household labour. Scavenging village chickens have cultural, social, nutritional, economic and sanitary functions in human life. For instance, poultry egg contains 74% water, it is a good source of high protein and it is often used by nutritionist as a standard reference for evaluating other protein foods. One egg supplies 11% of the recommended daily protein intake for adults. The fat of egg is readily digestible and is made up of both saturated and unsaturated fatty acids. Poultry eggs are low in calories but contains many vitamins. They are used in various food industries, confectionery and for producing cosmetics and vaccines. One poultry egg

weighing 55g/day meets the 50% of protein requirements of a child up to 5 years of age (Ponapa, 1982). Poultry farms many problems and one of the threatening one is ectoparasites invasion.

Ectoparasites are critters that live primarily on the outside of the animal. They feed on feathers, dead skin, blood and causes primary loss of production of both growth and eggs. The ectoparasites causes irritation, interfere with the feed consumption and thus they are associated with emaciation, anaemia and eventually loss of production (Soulsby, 1982). In Nigeria the most important ectoparasites include the tropical fowl mite Bdellonyssus bursa which is important among sitting birds and very young stocks, the fowl tick *Argas persicus*, which not only affects birds deleteriously by direct action but also by being the vector of the deadly diseases spirochaetosis and aegyptianellosis, and the chicken body louse *Menacanthus cornutus* which is especially important among grown birds and under the more confined management systems, in particular deep litter and semi-intensive types (Fabiyi, 1980). The most common ectoparasites in poultry birds are the chicken body louse.

The chicken body louse belongs to the order Phthipraptera and this is further divided into four suborders ; Anoplura (sucking lice) and the Amblycera, Ishocera and Rhynchophthirina (collectively known as biting and chewing lice) (Gary and Lance, 2019). There are at least nine species of chewing lice that infest poultry birds in various parts of the world;

- *Menopon gallinae*
- *Gonoicotes gallinae* (fluff louse)
- *Menacanthus gallinae*
- *Cuclogaster heterographus* (chicken head louse)

- *Lipeurus caponis* (chicken wing louse)
- *Menacanthus stramineus* (chicken body louse).

The chicken body louse (*Menacanthus stramineus*) is the most common and destructive louse of domestic chickens. The chicken body louse has a worldwide distribution and often reaches pest proportions. Unlike other chicken lice , it is found on the host's skin rather than the feathers and is usually discovered by parting the feathers especially in the vent area of the bird. This louse is most abundant on the sparsely feathered vent, breast and thighs region. However, in heavily infested poultry, it may be found on any part of the body. Adults measure 3-3.5 mm in length. Females lay one or two eggs per day, cementing them in clusters at the bases of feathers, especially around the vent. Eggs typically hatch after 4 -5 days. Each nymphal instar lasts about 3 days and generation time typically is 13- 14 days (Gary *et al.*, 2019).

Menopon gallinae also known as the shaft louse can be identified by their short antennae that is concealed in grooves behind their eyes (Clay, 1969). It stays on the chest, shoulder and back of birds. It may also drain blood from the wound that it creates (Kumar *et al.*, 2017).Adult females can typically glue a few hundred eggs to the shafts of the feather of host birds. Approximately 4 to 7 days after egg deposition, larvae will hatch and develop through several nymphal stages to ultimately emerge as adults. The life cycle of the shaft louse on the host takes place entirely within 3 to 5 weeks. Transmission from one animal to another can occur by direct contact with an animal infested with lice (Nathan *et al.*, 2021).

The chicken body louse feeds on host tissue and blood by gnawing on skin or pinfeathers. Lice cause irritation, feather loss and decrease feather insulation (Gary et.al 2019). This irritation caused by these lice causes violent scratching with beaks by birds and this causes open wounds on the body of the birds. These open wounds are more likely to lead to bacterial or viral infections. The chicken body louse decreases the body weight of birds over extended period of time. Chickens with lice may go off their feed, lose weight, reduce egg laying, experience feather loss and generally look unthrifty (Mohammad, 2021).These lice also causes reduction in egg production causing economic loss. The chicken body louse is species specific and will not readily move between animal species. When louse infestations are high on chickens, lice will occasionally crawl onto human handlers of infested birds, but the lice cannot feed and will not survive on people or in the environment off-host for long.(Gary, Lance 2019).

To prevent the infestation of the chicken body louse in poultry birds, new birds must be throughly examined. In the cases of my infestation, Pyrethrin-based insecticides are commonly available for chemical control of lice in the form of on-animal sprays, pour-ons, or dusts. Always read and follow label instructions. Be aware that multiple applications may be required to control all lice, and some products will not affect eggs. No pyrethrin resistance has been detected to date in lice populations. Diatomaceous earth (DE) can be used to achieve louse control. A safe and effective way to apply diatomaceous earth is to mix it with sand and allow the birds to dustbathe in the mixture. Mix ~6 cups of food grade DE with ~25 lbs (½ bag) washed play sand in a plastic container (swimming pool or concrete mixing bin). It is recommended that a dust mask is worn anytime diatomaceous earth is handled; the fine particles can irritate people, but do not negatively affect chickens. When birds dustbathe in the mixture, the DE gets into the feathers and onto the skin where the lice live, causing the lice to dry out and die. Even if some birds do

not dustbathe, the presence of a portion of the flock dustbathing can help manage overall ectoparasite populations.(Gary *et al.*, 2019).

1.2 AIMS OF STUDY

To study the prevalence, impact and management strategies in poultry birds in Ovia North East region.

1.3 OBJECTIVES OF STUDY

- To ascertain species composition of lice that acts as ectoparasites in poultry farms.
- To ascertain abundance difference of lice species that affected the study area.
- To assess the prevalence and severity of lice infestation in selected poultries in Ovia North East region.
- To calculate the mean intensities of the different species of lice.

CHAPTER TWO

2.0 LITERATURE REVIEW

Poultry health involves monitoring and maintaining the well-being of domesticated birds like chickens, ducks, turkeys. It includes disease prevention, proper nutrition, vaccination, hygiene and providing a suitable environment for the birds to thrive. Regular health checks and prompt action in case of illnesses are essential to ensure the overall health of the poultry flock to prevent the infestation of pests or parasites like lice, mites, ticks on poultry birds.Lice infestation is a common issue in poultry health. Poultry lice are external parasites that can affects chickens, ducks and other birds. Chicken body louse lives in the skin or under the feathers. Poultry lice are not known to transmit any avian pathogens although some wild birds are suspected of transmitting pathogens to their hosts. The presence of lice is usually as a result of poor poultry health. High numbers of lice can cause sleep deprivation in young birds. Lice infestation pose a threat to the profit to be gained from poultry farms.A thorough analysis of the existing literature is necessary to comprehend the dynamics of lice infection in poultry birds. This study of the literature attempts to investigate and summarize the present body of knowledge regarding the infestation of lice in particular poultry farms. This review will shed light on the prevalence, species diversity, and potential management measures of lice infestation in poultry birds by digging into prior research and studies.

In 2013, Audi and Asamu conducted a study on the prevalence of bird lice in four selected farms in Kano metropolis to determine the lice species richness, lice abundance and percent prevalence in the four poultry farms. During the months of February and March 2013, 240 birds were investigated from four poultry farms in Kano, located in the Tofa, Fagge, Brigade, and Gwarzo areas, respectively. The study locations' typical temperature ranged from 260°C to 330°C with a

relative humidity of 60–70%. To enable collections, birds were chosen at random and observed under daylight conditions using a hand lens and dissection forceps. *Menacanthus cornutus* was more common than *Goniodes gigas* (14.5%) in the four poultry farms that were investigated for louse prevalence and mean abundance (P=0.001). The Brigade poultry farm had the greatest frequency of lice, with a 95% prevalence, out of all the farms inspected. The factors that contributed to the prevalence of *Menacanthus cornutus* included the age of the birds, the number of birds per space, and the frequency of litter changes.

Ikepze, Amagba and Eneanya in 2008 conducted a study A total of 4650 domestic chickens, comprising 1410 cocks (30.3 %), 2550 hens (54.8 %) and 690 chicks (14.8 %), dspayed for sales between February and May 2008 at Eke-Awka market in Anambra State, south-eastern Nigeria were systematically examined for ectoparasites.While the hens and chicks were raised on surrounding farms in the States of Anambra and Enugu, the majority of the cocks were from the North. Approximately 40.5% of the chickens inspected had ectoparasite infestations overall. *Lipeurus caponis*, a moderate wing louse infestation, affected 1935 hens (41.61%). While the fluff louse, *Gonoicotes gallinae*, only lightly infested 471 (7.07%) hens, the shaft louse, *Menopon gallinae*, severely infested 2205 (3190%). While the symptoms of the scaly leg mite, *Knemidocoptes mutans*, were seen on 1679 (27.70%) of the birds, the sticktight flea, *Echidnophaga gainacea*, attacked the head region of 3087 (69.37%) of the birds. A market study found that the selling prices of the infected hens had declined by between 10% and 20%. This is evidence that ectoparasites on chickens are linked to the financial losses experienced by Nigerian workers in the poultry sector.

In Jos, Plateau state in Nigeria, a survey of the prevalence and abundance of species of lice infesting the domestic fowls together with the extent of disease associated with them was undertaken between November 1969 and June 1972 was carried out by J.P. Fabiyi. *Menacanthus cornutus, Gonoicotes gallinae, Numidipeurus tropicalis, Amyrsidea poweli, Gonoides Gigas, lipeurus caponis,* and *Cuclogaster occidentalis* were all found to be present in all 400 birds. In backyard flocks and commercial flocks kept semi-intensely or intensely during the hottest part of the year, which occurs in the area of study in the later parts of the dry season, from February to April or May, *Menacanthus cornutus* was primarily to blame, and to a lesser extent *A. poweli, Gonoicotes gallinae,* and *N. tropicalis,* for disease condition and even death in a number of birds.

A study was carried out to determine the ectoparasite infestion in domestic chickens by A.S Mohammed and M.J Mohammad in 2021 in Samarra city in Iraq.To ascertain the pervasiveness of external parasites, they collected (80) samples of chickens from the fields and neighborhood markets, including both sexes. *Menopon gallinae*, a parasite with a prevalence of 43.75%, was identified as the cause of the study's findings. Infection rates were similarly found to be highest in November (70%) and lowest in December (28%), according to the study.The research also revealed sex-related variations in infection rates, with females experiencing the highest rates of infection (50%) and male infections (33.33%), respectively. The highest rate of infection among the examined chickens was found in the local chickens obtained from the local markets, with a rate of 62.5%, while the lowest rate of infection was found in the chickens that live in the fields, with a rate of 31.25%.

One hundred and sixty chickens *(Gallus gallus)* from 31 small private backyard flocks in the Eastern part of the Czech republic were examined for chewing lice (Phthipraptera: Amblycera,

Ishocera) by P. Sychra, P. Harmat and I. Literák. Every bird inspected has at least one species of chewing lice. In total, seven species of chewing lice were found; their prevalences and mean intensities were as follows: *Gonoicotes gallinae* (100 percent; 110 lice), *Menopon gallinae* (88 percent; 50), *Menacanthus stramineus* (48 percent; 17 lice), *Lipeurus caponis* (35 percent; 12 lice), *Menacanthus cornutus* (12%; 9 lice), *Cuclogaster heterographus* (1%; 4 lice), and *Gonoicotes microthoral* (1%; 3 lice) are the most prevalent lice. Ischoneceran species *Gonoicotes gallinae* were severely infested in only two birds from a single flock.

A study was conducted by S. Morariu *et al.,* in 2008 at Caras- Severin county in Romania that describes the abundance of mallophagean lice species in CaraSeverin County.Five families from each of the 30 localities where lice were gathered were examined. Six species of mallophagean lice, including *Menopon gallinae, Menacanthus cornutus, Eomenacanthus stramineus, Goniocotes gallinae, Goniodes gigas,* and *Lipeurus caponis,* were discovered out of a total of 3,381 collected. In CaraSeverin County, the *Goniodes gigas* species was discovered for the first time, however at the lowest prevalence (1.34%). *Menopon gallinae and Goniocotes gallinae* had the highest prevalence, each having 60.33%.

A faunistical study was undertaken to determine the prevalence of ectoparasites of chickens in four areas of Sokoto metropolis, Nigeria, on 160 chickens raised under free-range system by Bala *et al.,* in 2009. Both the skin and plucked feathers were thoroughly searched for the presence of ectoparasites between July and December 2009. The results indicate that all the chickens (100%) harboured ectoparasites. Five lice, two mites, two tick and one flea species were identified with the following prevalences: the shaft louse, *Menopon gallinae* (8.1%), the chicken body louse, *Menacanthus stramineus* (6.9%), then the wing louse, *Lipeurus caponis*

(5.0%), the body and feather louse, *Gonoides gigas* (4.4%) and finally the fluff louse *Gonoicotes gallinae* (3.1%). The two tick species were *Argas persicus* (8.8%) and Ixodid larvae (5.6%). The two mite species were *Cnemidocoptes mutans* (9.4%) and *Cnemidocoptes gallinae* (8.1%). The sticktight flea *Echidnophaga gallinacea* was the only flea species found (10.6%).Ectoparasitism did not correlate with gender, breed, or fur color (P > 0.05), however it did correlate strongly positively (P 0.05) with fur texture. This research has demonstrated that ectoparasites are very common in conventionally raised hens in the studied areas.

A study was carried out in Mzuzu Agricultural Development Division (MZADD) in the northern region of Malawi in 1996/1997 to determine ectoparasite species infesting local chickens and their levels of infestation, in different localities and season by Zumani Banda, a professor of department of Environmental Health, University of Malawi, Zambia.In the southern region in 2009 and 2010, ectoparasite species were also gathered from local hens. The presence of ectoparasites was investigated in a sample of hens from various farmsteads. Levels of ectoparasites and their species were identified. The stick tight flea *Echidnophaga gallinacea*, lice species *Lipeurus caponis, Goniocotes gigas, Goniocotes hologaster, Menacanthus stramineus, Menopon gallinae*, the mite *Dermanyssus gallinae*, the scaly leg mite *Cnemidocoptes mutans* and the tick *Amblyomma variagetum* were found to occur on local chickens at varying levels of infestation in the northern region. The levels of combined *E. gallinacea* and lice infestations were significantly influenced by season (p 0.05)The prevalences of E. gallinacea and Menacanthus stramineus as well as the levels of infestation for Menopon gallinae and E. gallinacea were significantly influenced by location (p 0.05). Season and location had a two-way interaction (p 0.05) on the proportions of *E. gallinacea* and *Menopon gallinae* infestations. In the

southern region, *E. gallinacea, Menacanthus stramineus, Menopon gallinae, G. gigas, G. hologaster*, and a tick species were discovered.

Farid *et al.,* carried out on free-range backyard chickens, domestic pigeons (Columba livia domestica) and turkeys from May 2012 to April 2013 to determine the prevalence and identify the species of ectoparasites in Kermanshah province, west of Iran.One or more parasites were present in 389 (64.83%), 608 (86.85%), and 54 (36%) of the 600 free-range backyard chickens (185 and 415), 700 domestic pigeons (278 and 422), and 150 turkeys (53 and 97) in total, respectively. Eleven ectoparasites species including five of lice (50.16% *Menacanthus stramineus*, 13.66% *Menopon gallinae*, 4.83% *Cuclotogaster heterographus*, 5.16% *Goniocotes gallinae*, 2.33% Goniodes gigas), three of mites (26.33% *Dermanyssus gallinae*, 8.5% *Ornithonyssus bursa*, 7% *Cnemidocoptes mutans*), one of tick (78.66% *Argas persicus*) and two of flea (12.33% *Echidnophaga gallinacea*, 2% Pulexirritans) were found in the backyard chickens.*Columbicola columbae* (61.7%), *M. gallinae* (10.43%), *M. stramineus* (9%), *D. gallinae* (8.28%), *Argas reflexus* (74.14%), and *Pseudolynchia canariensis* (27.7%) were the six parasite species found in the domestic pigeons. *M. gallinae* (14%), *M. stramineus* (8%), *D. gallinae* (12.66%), *C. mutans* (6%), *A. persicus* (24.66%), and *E. gallinacean* (6%), were the ectoparasite species found in turkeys. This study is the first to examine the occurrence and species of ectoparasites in domestic pigeons, turkeys, and free-range backyard poultry in Kermanshah province. The significant prevalence of ectoparasites in domestic pigeons and free-range backyard chickens suggests that parasitic infection is a widespread issue in this region.

Naheed *et al.,*. from the department of Zoology, University of Peshawar, India examined One hundred and six chickens, from 47 houses from November 2002 to February 2003 for chewing or

biting lice infestation at Jand (a Tehsil of district Attock, Punjab). *Menopon gallinae*, *Cuclotogaster heterographus, Goniodes gigas,* and *Goniocotes gallinae* were among the four species of lice discovered. A 51.89% infestation was discovered. The majority of the time, just one species was determined to be infesting chickens, although occasionally more than one species was also discovered. *Menopon gallinae*, which was found in 33 chickens, was the most frequent species. *Cuclotogaster heterographus* was restricted to the head and neck region, while *Menopon gallinae, Goniocotes gallinae, and Goniodes gigas* were distributed across the remainder of the host's body.

In December 2014 to April 2015, Nafyad *et al.,*. from the college of veterinary medicine, Haramaya university, Ethiopia conducted a cross sectional study to determine the prevalence of lice and fleas and identify different species of ectoparasites infesting backyard chickens of Bishoftu town as well as to assess the effect of host related risk factors. 140 backyard hens were randomly chosen for samples, and the study population's age, sex, and breed were simultaneously recorded. Using stereomicroscopy or optical microscopy, lice and fleas were gathered from several body areas, including the shank. A prevalence of 123 (87.86%) was observed overall, and four ectoparasite species belonging to the orders Phthiraptera (lice) and Siphonaptera (flea) were found. Of these, 77 (62.6%), 26 (21.1%), and 20 (16.3%) of the detected species were affected by only lice, only flea species, or both lice and flea species, respectively. *Menacanthus stramineus* (33.57%), *Menopon gallinae* (20.71%), *Cuclotogaster heterographu*s (15%), and one species of flea, *Echidnophaga gallinacean* (32.86%), were found to be among them. Breed was discovered to be substantially correlated with the extent of infestation among the putative predisposing factors evaluated (P=0.004). More foreign breeds (89%) than local ones (82.18%) were found to be prevalent. Age and gender weren't shown to be

substantially correlated with the level of infestation, though (P>0.05). Lice and fleas are very common among backyard hens studied, according to the study's findings.

In order to determine the prevalence of ectoparasites in indigenous chickens and their associated economic relevance in randomly chosen Local Government Councils and States in Nigeria, Ahaotu et al. undertook a cross-sectional study from June 2016 to August 2017. A total of 1025 native hens were investigated, and 90.7% of them had an ectoparasite infestation of one or more species. In this study, four different ectoparasite genera were found; only 17.0% of all the hens investigated had infestations from only one of the genera, while 73.9% had infestations from two or more different genera. Lice infestation (85.8%) was the most common ectoparasite found, followed in decreasing order by mite (70.4%), flea (27.3%), and tick (6.2%). Ten distinct ectoparasite species, including *Menopon gallinae, Lipeurus caponis, Goniodes gigas, Cnemidocoptes mutans, Dermanyssus gallinae, Epidermoptes species, Laminosioptes cysticola, and Megninia specie*, were identified in the study. *Menopon gallinae*, an *Echidnophaga gallinacean*, and *Argas persicus* were most frequently found (50%) whereas Megninia species (2.7%) were least common.

In three selected poultry farms in Awka and Mgbakwu towns, Awka South and Awka North Local Government Area, Anambra State, between the months of June and August 2017, Omaka's study examined the prevalence of ectoparasites on poultry chicken. The three poultry farms, Aroma, Chidoka, and Polytechnic Mgbakwu, each had 300 chicks that were subjected to the examination. All ectoparasites discovered were collected into specimen bottles and identified using a stereoscopic microscope after being thoroughly examined for presence on the skin and clogged feathers. The findings show that 52.0% of chickens had ectoparasite infestations, with

polytechnic Mgbakwu poultry farm recording the greatest frequency. This was followed by Chidoka poultry farm (38.1%) and Aroma poultry farm (9.7%). The findings revealed that females (53.3%) had a greater infection rate than males (46.6%). *Menacanthus stramineus* (33.3%) followed by *Echinophaga gallinacean* (29.1%) were the two ectoparasite species that were met the most frequently. The chickens range in age from chicks (1 week old) to layers (9 months old). The study also revealed that, at (p>0.05%) significance, the infection of the ectoparasite on the chicken was not dependent on sex but that there were very significant differences in the ages of the chicken at (p0.05%).

Between November 2017 and April 2018, Mohamed et al. effectively determined the biodiversity and prevalence of chewing lice on local chicken (*Gallus gallus* Domesticus, family Phasianidae) at five chosen sites in the Qaser Bin Ghashir region of Libya. 135 samples of chicken were examined in total, and various species of biting lice were discovered infected samples. Asuani has the fewest ectoparasites, according to the results, while samples from Suq AL-kamees were entirely infested by the local fowl, *Menopon gallinae, Menacanthus stramineus, and Lipeurus caponis. Menopon gallinae,* which has a prevalence rate of 69.84% in the study area, is the species that is most prevalent.An analysis of chewing lice prevalence in the Qaser Bin Gasher region of Libya and other nations revealed that Algeria had the highest TAP% (total average prevalence), followed by Libya and the United States.

In Mumbai region of India, Mishra *et al.,* (2016), conducted a study on the prevalence of lice infestation in poultry birds and identification of species of lice in infested birds. The prevalence was 100% on organized farms and 62% on local desi birds. *Lipeurus caponis* (41.30%) was discovered to be the most common species among all the birds examined. The remaining louse

species were *Cuclotogaster heterographus* (40.87%), *Menacanthus spp* (31.74%), *Menopon gallinae* (18.70%), *Goniodes gigas* (4.35%), and *Goniocotes gallinae* (2.61%), in decreasing order of incidence. The lice found in this investigation have a clear regional preference. The three areas with the highest prevalence of lice were the head, wing, and body. On the head and wing areas, respectively, *Cuclotogaster heterographus* and *Lipeurus caponis* were most frequently observed. Similar to this, the body area was where *Menacanthus spp.* and *Menopon gallinae* were most frequently seen. White Leghorn (WLH), Aseel, Giriraj, and Kadaknath are four distinct breeds of birds from the Central Poultry Development Organization (CPDO) operated poultry farm that also displayed statistically significant difference (P0.05) in the prevalence rate of various species of lice.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1. Study Area

This study was conducted in randomly selected poultries in Ovia North East region, Benin City. Nigeria.

Ovia North East region has a tropical Savannah climate and has an area of 2,301km² and a population of 153,849 at the 2006 census with coordinates 6.5047ºN, 5.6037ºE. The main seasons are the rainy and dry season with an average temperature of 28ºC and that temperature is Condusive for lice survival.

3.2 Description of Study Area

This study was carried out in two randomly selected poultries farms in two streets including Iguosa housing estate and Senior Staff Quarters, University of Benin. The poultry farms are privately owned. The poultry farms were chosen based on accessibility and consent was taken from owners before sampling.

The farm in Iguosa had coordinates of 6.448140ºN, 5.602758ºE. It was a backyard farm and had a total of 60 birds aged between 12 months and 18 months. They only had layer birds and the birds are usually treated four times a year for ectoparasites.

The poultry farm in Senior Staff Quarters (SSQ) University of Benin had coordinates of 6. 405018ºN, 5.628708ºE. It was also a backyard farm and had a total of 100 layer birds. They were aged between 12: Months and 24 months. The farm had broiler chickens and the cage was about

100 meters away from the cage of the layer chickens. The birds were treated for Ectoparasites and disease 3 times a year.

The chickens were reared in an intensive care i.e they are confined in cages and are not allowed to roam about. The farms were very neat because it was in residential areas and they were easily accessible. They were reared in a battery cage system and each cage had about 4 birds in a cage.

3.3 Sample Collection Sample

In the investigation, 101 chickens in total were checked for the presence of lice. In the month of July, sampling was conducted. One bird from each quadrant of the battery cage was chosen at random. For an average of five minutes, one bird was thoroughly examined for lice samples on its head, combs, neck, feathers, breasts, back, and wings. Hand picking was the technique utilized to gather from the host body. By holding the feathers horizontally in the opposite direction of their anatomical alignment to expose them, samples were taken from the birds.

Once a bird has been checked and sampled, a temporary board marker was used to mark the comb of the birds to avoid picking a bird twice. An average time of six (6) minutes was used to sample a bird.

3.4 Sample Preservation

The lice picked were kept in sample bottles containing a solution of 70% alcohol and 30% glycerol in the ratio of 1:1. The sample bottles were labelled and brought to the lab and stored in room temperature.

3.5 Sample Identification

The specimens collected were taken to the laboratory in Animal and Environmental Biology Department of the University of Benin and they were viewed under the dissecting microscope .To identify the lice species, the following morphological characteristics were taken into account: the body total length, head, thorax and abdomen dimensions (length, width and shape), body color, antennae structure according to Harold *et al.,* (1966) identification keys. The different species of lice are shown in plates 1-4.

3.6 Data Analysis

The prevalence of infestation (%) of the different species of each lice from the each farms was calculated using prevalence (%) as the number of individual host sampled multiplied by 100.

According to Clayton and Drown (2001), the mean intensity (MI) of infestation was determined by dividing the total number of lice identified (Louse species richness) by the total number of birds sampled. The lice abundance was determined using compared T-test. The values were first tested with Shapiro - Will test for normality. The Values were further square root transformed having failed the normality test before subjecting them to compared T-test analysis.

CHAPTER FOUR

4.0 RESULT

4.1 Species Composition

A total number of 101 poultry birds was examined and three hundred and seventeen lice (317) specimens was collected from the two selected poultries in Iguosa and Senior Staff Quarters (SSQ). *Menacanthus stramineus* had a total of 298 (94.57%) while *Menopon gallinae* had a total of 19(5.99%)as shown in Table 4.1.

Table 4. 1: Species Composition of lice ectoparasites in Ovia North East Local Government Area.

Farm	No of infested birds	Species Composition *Menopon gallinae*	Species Composition *Menacanthus stramineus*	Abundance of *Menacanthus stramineus* per bird	Abundance of *Menopon gallinae* per bird	Mean lice abundance
SSQ	50	19(5.99%)	156(89.14%)	3.12	0.38	3.5
Iguosa	51	0	142 (100%)	2.78	-	2.89
Total	101	19(5.99%)	298(94.57%)	5.90	0.38	6.39

4.2 ABUNDANCE OF LICE PARASITES BASED ON THE DIFFERENT POULTRY FARMS.

Menopon gallinae was only found in the farm at Senior Staff Quarters (SSQ). There was no significant difference statistically in the occurrence of *Menacanthus stramineus* in both the farms in Iguosa and SSQ ($t = -1.539$, $DF = 98$, $p = 0.127$). The abundance per bird was calculated by

dividing the total number of lice species by the total number of birds sampled. There was a slight numerical variation, or the number of lice discovered, as shown in Table 1.

4.3 Prevalence of Lice Ectoparasites

The total prevalence of lice species was 98.01%. The prevalence of lice species in both of the study area by percentage shows that lice species was more prevalent in SSQ (100%) compared to Iguosa (96.08%). The prevalence of each species of lice are shown in Table 2. There was no difference in the prevalence of *Menacanthus stramineus* at both locations (X^2= 0.082, DF=, p> 0.05, p= 0.775,).

Table 4. 2: The Prevalences of the different species of lice.

Farm	No of birds infested	No of birds sampled	Prevalence of *Menopon gallinae* %	Prevalence of *Menacanthus stramineus* %
SSQ	50	50	30	100
Iguosa	49	51	0	96.08
Total	99	101	30	98.01

4.4 Mean intensity of lice ectoparasites

The total mean intensity of the lice species for both *Menacanthus stramineus* and *Menopon gallinae* are; 3.00 and 0.635 respectively. There was no significant difference in the *M. stramineus* gotten from both poultry farm. (X^2=0.082, df=1, p>0.5, p=0.775). It was calculated by dividing the total number of lice species by the number of birds infested. The mean intensity for the *M. stramineus* found in Iguosa was 2.89. For SSQ, the mean intensity of *M. stramineus* was 2.84 and 1.27 for *M. gallinae*.

Table 4. 3Mean intensity of lice species in both farms

Farm	Mean intensity of *Menacanthus stramineus*	Mean intensity of *Menopon gallinae*
SSQ	3.12	1.27
Iguosa	2.89	-
Total	3.00	0.635

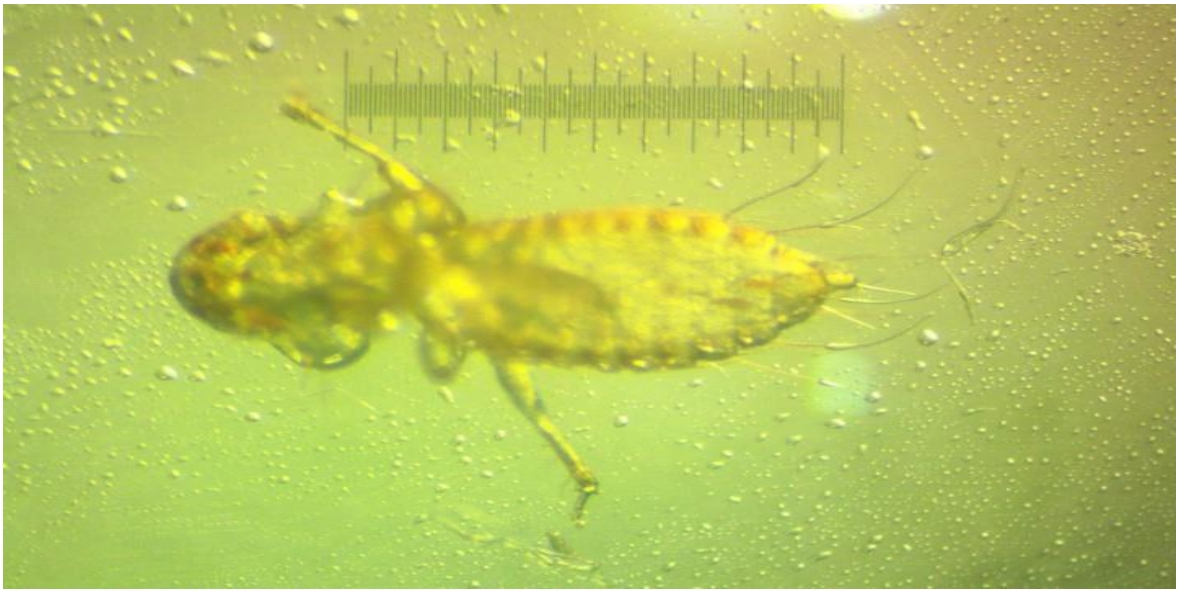

Plate 4. 1: Female *Menopon gallinae*

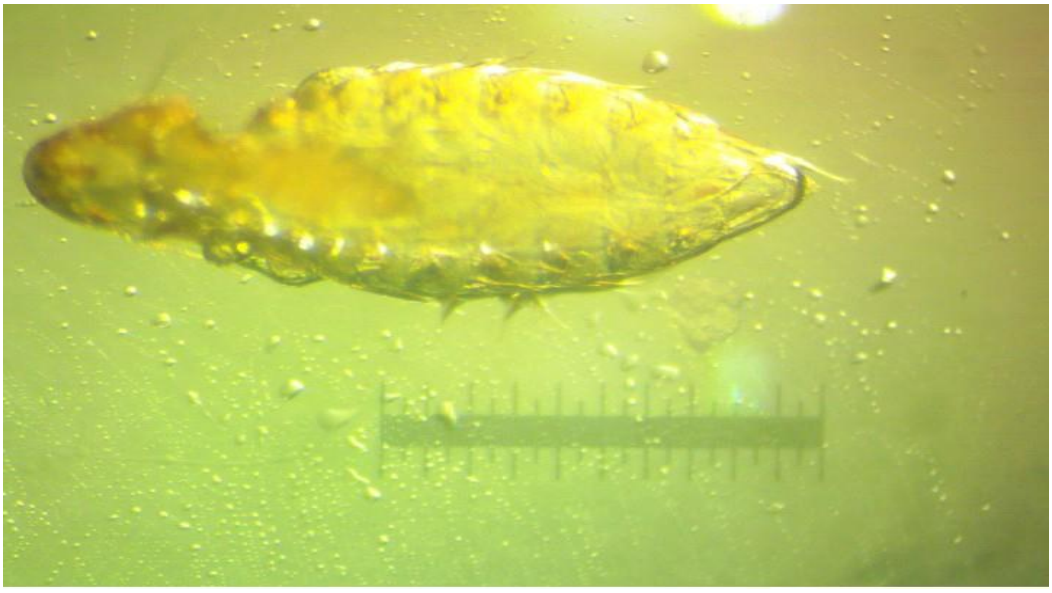

Plate 4. 2: Male *Menopon gallinae*

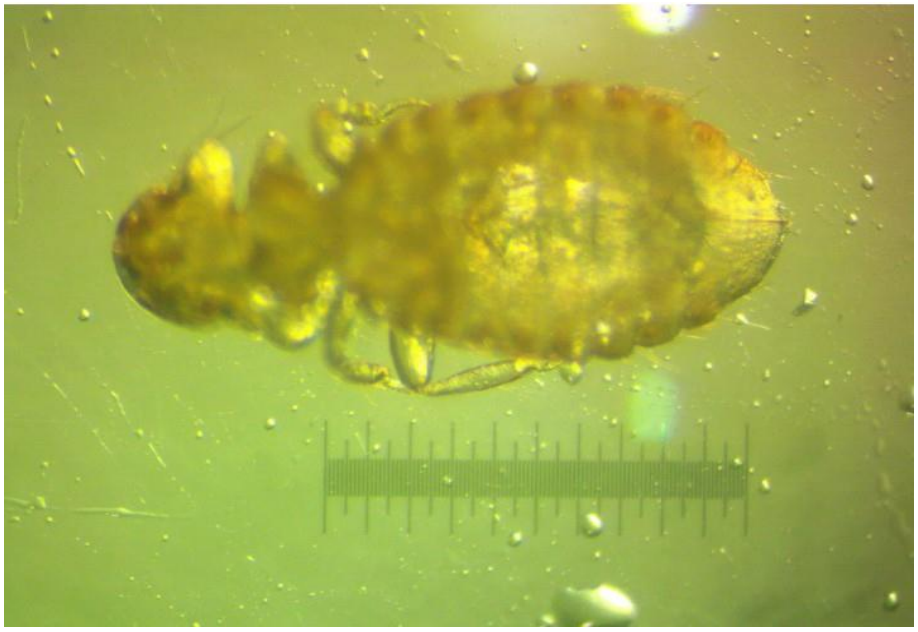

Plate 4. 3: Male *Menacanthus stramineus*

Plate 4. 4: Female *Menacanthus stramineus*

CHAPTER FIVE

Discussion

Menacanthus stramineus and *Menopon gallinae* were the only two species of lice species gotten from this study. These two species are some of the most common lice species found in poultry farms around the world. Some studies had similar results like a study conducted Niger state, Nigeria by Okaema in 1988, Zumani (2011) in Malawi, Zambia, Bala *et al.,* (2011), in Sokoto, Nigeria, Opeyemi *et al.,* (2021), Ilorin, Nigeria, Sychra (2007), Czech Republic, Maher (2019), Libya, Nafyad (2015), Ethiopia. *Menacanthus stramineus* is the most common and destructive louse of domestic chickens (Gary,2019).

The total prevalence of lice species gotten from this study was 98.02%. This prevalence is very high and studies have had similar results over the years in different parts of the world. In a study conducted by Sychra *et al.,* in Czech Republic had a total prevalence of 100%. Omaka's(2021) study in Akwa, Nigeria yielded a prevalence of 52%. In Libya, Mohamed *et al.,* had a prevalence of 70%. Also, in a study conducted by Nafyad (2015) had a lice prevalence of 69.28%. Moriariu (2018) the conducted a study in Romania and had a prevalence of 45.42%. High prevalence is usually caused by dirty environment and is easily transmitted to other birds if there is a louse positive bird in the farm. Birds in the selected poultries were in close contact with each other and this caused the high prevalence. The high percentage prevalence observed in this study, may be a result of poor management system where the chickens are being jam-packed in the same cage which may enable one ectoparasite to move freely from one chicken to the other with ease.

Menopon gallinae had a low prevalence of 19%. It was only found in the poultry farms at Senior Staff Quarters (SSQ). *M.gallinae* usually thrives in hot and humid areas and temperature (Fabiyi ,1980). Nafyad *et al.,* (2015) research in Ethiopia also showed a high low prevalence of

M.gallinae compared to *Menacanthus stramineus*. However, the study by Bala *et al.*, (2011) in Sokoto , *M. gallinae* had a low prevalence of 8.1% and this proves Fabiyi (1980) right in his report that *M. gallinae* thrives in hot and humid areas because the weather conditions in Sokoto is usually hot and dry. In contrast, in Czech Republic, Sychra *et al.*, (2007) recorded a high prevalence of *M. gallinae* (88%) compared to *Menacanthus stramineus* (48%).The weather conditions during the time of this study was mostly humid and cold and this might have contributed to the low prevalence of *M. gallinae.*

Menacanthus stramineus had a very high prevalence in both farms and statistically, there was no significant difference in the occurrence of *M. stramineus* in both farms since the farms had similar temperatures and weather conditions $p>0.1$. *Menacanthus stramineus* thrive in moderate to high ambient temperature and humidity which is one of the indicators of rainy season. This is essential for the hatching of eggs and larval development. Omaka (2021) recorded a high prevalence of *M.stramineus* in various poultry farms compared to the prevalence of *Menopon gallinae* .

The high prevalence of lice in the selected poultry farms shows poor poultry management which in turn affects egg and meat production and also the health of chickens. Although chicken lice don't transmit any known avain diseases, they can cause itching and continuous itching with beaks causes wounds on their bodies and this can be the main cause of infection directly. However, some of the importance of most ectoparasites (lice, ticks,fleas *e.t.c.)* transcends the direct impact on poultry production. Apart from irritations, depression, uneasiness and annoyance they cause on chicken, they are also vectors of some poultry diseases which directly limits the protein available to man through lowered productivity and mortalities.

Conclusion

In conclusion, the findings of our study on lice infestation in poultry birds in Ovia North East have revealed a highly concerning scenario. With a staggering prevalence rate of 98.02 percent for *Menacanthus stramineus* and 14.95 percent for *Menopon gallinae*, the extent of infestation poses significant challenges to the poultry industry, animal welfare, and overall food security in the region. The dominance of *Menacanthus stramineus* in the infested poultry population underscores the urgent need for targeted interventions. This species, known for its adverse impact on poultry health and productivity, demands immediate attention. While *Menopon gallinae* is less prevalent, it cannot be overlooked, as it contributes to the overall burden of lice infestation in the poultry flock. To address this critical issue effectively, a multifaceted approach is imperative. This should include improved management practices, enhanced biosecurity measures, and the implementation of veterinary interventions tailored to combat *Menacanthus stramineus* and *Menopon gallinae.*

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