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THE STUDY ON INVESTIGATION OF MAJOR ECTO-PARASITE AFFECTING BACKYARD CHICKEN IN SELECTED DISTRICT OF GUDURU, HORO GUDURU WOLLEGA, OROMIA REGIONAL STATE ,ETHIOPIA

BY

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ABSTRACT

Parasites are the main pathogenic agents, threatening the health of poultry and poultry products they can cause their direct pathogenic actions like irritability, dermatitis, anemia, decreased weight gain, and milk production. The purpose of this study was to investigate the prevalence of external parasite of backyard chicken, and determine the species of external parasites of chicken with their predilection, and investigate the prevalence of ectoparasites of poultry managed under backyard system started from November 2021 to July 2022 in Guduru Woreda and its surroundings. A cross sectional studies were conducted from December 2021 to July 2022 in Guduru district. From384 chickens of different age groups, both sexes and breeds, 231/384 (60.15%) of chickens were infested with species of ectoparasites that mainly grouped into Lice156(40.2%), fleas 62 (16.15%), and mite 13(3.38%). The prevalence of ectoparasites infection was 126(32.8) and 105(27.3 in Urban and Rural respectively, the difference in the prevalence of the parasites between Urban and Rural were not statistically significant (P>0.05). The prevalence of ectoparasites infestation was higher in female 170(44.2%) chickens than males 61(15.815%) and higher in adult 146 (38.02%) than young /Growers chicken 85(22.15%), high in local breeds 189(49.218%) than exotic breed 42(10.937%). Five species of ectoparasites and their attachments site were identified. Thosespecies ’names were menopongallinae(18.498%) was found on the thigh, feather and breast, goniodesgigas(13.02%) was found on skin, wings, and body feather, gonicotesgallinae (9.11%)was found on wings, feather body ,and feather, and a species of flea(Echidnophagagallinacae) 20.6% was found on eye, face, comb and wattle. while a single species of mite (Cnemidocoptes) 3.38% was found on base of feather, tail, and the vent area. When we conclude, ectoparasites was important factors in decreaseof poultry production due to associated with lack of attention with respect to hygienic system, treatment and control practices. Based on the results it could be suggested that, good management, biosecurity and the education of farmers could be a vital measure to control poultry ectoparasites and improve the productivity of the chicken.

Keywords: Backyard poultry, Ectoparasites, Guduru,Prevalence

1. INTRODUCTION

Poultry are domesticated avian species that can be raised for eggs, meat and/or feathers and the term “poultry” covers a wide range of birds, from indigenous and commercial breeds of chickens Indigenous chickens reared under traditional scavenging system play significant role through their contribution to the cultural and social life of rural people (Gebre-Egziabher M .2007).

Poultry can generate income, particularly for rural women who are the principal beneficiaries and supervisors of poultry production. In fact, various scholars and rural development agencies (have recognized the role of indigenous poultry production in improving the nutritional status and income of many small farmers and landowners or landless workers (Van De Weerd*et al*., 2009). In addition, Village fowl play an active role in pest control and are used for traditional ceremonies and festivals (Kelly *et al*. 1994 and Muchadeyi*et al*. 2004). Rural poultry productions are an integral part of a balanced farming system and have a unique position in the rural household economy, supplying high quality protein to the family. In addition to their contribution to high quality animal protein and as a source of easily disposable income for farm house holds, rural poultry integrate very well and in a sustainable way into other farming activities, because they require little in the way of labor and initial investment compare to other farm activities (Tadelle and Ogle, 1996).

In Ethiopia, chickens are the most widespread and almost every rural family owns chickens, which provide a valuable source of family protein and income (Tadelle*et al*., 2003), And the total chicken population in the country is estimated to be 56.5 million with native chicken representing 96.9%, hybrid chicken 0.54% and exotic breeds 2.56% (CSA, 2014).

The most dominant chicken types reared in Ethiopia are local ecotypes, which show a large variation in body position, plumage color, comb type and productivity (Halima, 2007). However, the economic contribution of the sector is not still proportional to the huge chicken numbers, attributed to the presence of many productions, reproduction and infrastructural constraints (Aberra, 2000 and Halima, 2007).This is due to production of indigenous chicken in rural Ethiopia has been challenged with several constraints, among others,

disease,predation.(TesfaheywetZeryehun*et al*., 2009).Lack of feed, housing and poor management, Parasitism due to gastrointestinal helminthes and ectoparasite constitutes among the major causes that decrease productivity of chickens, but neglected as they are rarely lethal (Hagos A and Eshetu Y (2004).,HundumaDinka*et al*., (2010)).The majority (99%) of these chickens had maintained under traditional system) which is often described as a low input/low output system. The low productivity is mainly caused by diseases, suboptimal management and lacks of supplementary feed (McAinsh&Muchadeyi*et al*., 2004).with little or no inputs for housing, feeding or health care, however Rural chicken in Ethiopia represents a significant part of the national economy in general and the rural economy in particular and contributes 98.5 and 99.2% of the national egg and chicken meat production respectively (Fisseha*et al*., 2010).)

The prevalence of most parasitic diseases in poultry seems to have been reduced in commercial poultry production, due to improvement in management (TesfaheywetZeryehun*et al*., 2012), although in rural scavenging poultry a number of parasites are widely distributed (Bagust, 1999; HagosAshenafi and EshetuYimer, 2004; HundumaDinka*et al*., 2010), strongly suggesting that traditional backyard poultry husbandry exposes chickens to many types of parasites.

External parasites of poultry are very common in the tropical environment of the world since this climatic condition create conducive environment for the development of the parasites. Poor standards of poultry husbandry are also contributing factor for the abundance of the parasites (Fraol, *et al*., 2014). In most rural areas, high prevalence of external parasite infestations in back yard chickens pose a great challenge in poultry industry since majority of external parasites are associated with poor hygiene of chicken house and lack of appropriate hygiene of chicken house and lack of appropriate parasites control measures (Mungube, and E.O., 2008).

Traditional backyard poultry husbandry exposes parasitic infections and its diseases which are economically important and a threat to public health (Sambo*et al*., 2015. Hence, most of the studies conducted in the different parts of Ethiopia have indicated that the proportion of chickens affected by both external and gastro intestinal parasites is high (Awoke, 1987, Eshetu and Tilahun, 2000).

Parasitic infestations are ubiquitous and infection load results in clinical disease. Ecto parasites had regarded as a basic cause of retardation in growth, lowered vitality and poor condition of

birds. They can affect bird health directly by causing irritation, discomfort, tissue damage, blood loss, toxicosis, allergies and dermatitis, which in turn reduce quality and quantities of meat and egg production. In addition, they act as mechanical or biological vectors transmitting numbers of pathogens (Mir *et al*., 1993).

There are several types of arthropods that constitute the major ectoparasites of poultry primarily lice, bugs, fleas, mites and ticks. The degree and types of infestation had influenced by the production method. They live on or in the skin and feathers. They had been characterized by possession of externally segmented bodies, jointed appendages, and chitinous exoskeleton (Calneck, 1997). In current study, there is huge of poultry farm and product of poultry. However, there is little attention on study of ectoparasite of backyard chicken. In addition, there were no recently studies conducted on external parasites of back yard in current study. Therefore, the objectives of this study were:-

To investigate the prevalence of external parasite in backyard chicken.

To determine the species of external parasites of chicken with their predilection sites

2. LITERATURE REVIEW

2.1. General Chicken Management in Ethiopia

Village chicken production in Ethiopia is generally characterized by little or no inputs for housing, feeding (scavenging is the only source of diet) and health care with minimal level of bio-security, high off take rates and high level of mortality. As such, it does not involve investment beyond the cost of the foundation stock, a few handfuls of local grains and possibly simple night shades, mostly night time in the family dwellings. Mostly, indigenous chickens are kept although some hybrids and exotic breeds may be kept under this system (Dawit*et al*., 2008).

Housing

Housing systems in village chicken production system is rudimentary and mostly built with locally available materials. In traditional free range, there is no separate poultry house and the chickens live in family dwelling together with humans (Solomon, 2007).Moges*et al*., (2010) reported that in Bure district, North West Ethiopia, 77.9% of the village chicken owners provide

only night shelter and only 22.1% provided separate poultry house. Another study by (Mengesha*et al*., 2011) in Jamma district, South Wollo reported that 41.3% and 21.2% of chicken owners share the same room and provided separate poultry house, respectively. Also another study done by(Nebiyu*et al*.,2013) in Amarodistrict, southern nation, nationality and people of regional state (SNNPRS) of Ethiopia shows that most (77.5%) of chicken owners constructed a wooden perch for their chickens inside the main house for night shelter , 12.1% of the owners kept their chickens in a separate room which was enclosed in the main house and 10.4% of the households provided a hand woven basket for their chickens especially for newly hatched chicks and the broody hen(TadelleDessie and Ogle B., 2001).

Feeding

Family poultry production in Africa survives by scavenging and generally, no supplements provided except that sometimes, household waste fed to the birds and other circumstances the diet supplemented with grain. Similarly, in Ethiopia the chicken production is characterized by keeping under free range system with some amount of supplementary feeds like frushika, maize, sorghum, food leftover and the major feed sources are believed to be insect worms, seed and plant materials (Mekonnen, 2007).However, the availability of the supplementary feeds was reported during the dry season (November to March) following the grain harvest while the grains/grain by-products were in short supply leading to feed scarcity during the rainy reason (Alemayehu*et al*., 2015)_

Marketing

Poultry products in most developing countries, especially in Africa, are still expensive. The marketing system is generally informal and poorly developed (Alemayehu*et al*., 2015).This can be comfort for transmission of poultry disease, and marketing structure has not well studied in Ethiopia. The market outlets or channels available to producers are diverse at all markets, although their importance differs across markets. The major channels through which producers/farmers sell their chicken in the markets are direct sold to consumers and/or to small retails that take the chicken to large urban centers (Kena*et al*., 2002). Unlike eggs and meat from commercial hybrid birds (derived from imported stock), local consumers generally prefer those from indigenous stocks (Desalew, 2012).

2.2. Poultry disease

Diseases were one of the major bottle necks for village chicken productions in the studied areas. Ectoparasite was most widely distributed among the village chicken in Ethiopia. This was reported in several previous studies which employed different diagnostic methods such as parasitological examination, and molecular methods to confirm the presence of the disease in Ethiopian village chicken productions (Terefe*et al*., 2015).

2.2.1. Major Poultry Ectoparasites

Ectoparasites attack poultry by either sucking blood or feeding on the skin, feathers, or scales on the skin. Continuous external parasites are those that spend all of their adult life on their host. Temporary parasites feed on but do not live on their host. Ectoparasites do not only have direct effects on their host, they may also transmit pathogens by acting as vectors of diseases (Parola*et al*., 2001).

LICE

Lice are small (most between 1 to 6 mm in length), wingless, straw colored insects with a somewhat flattened appearance and a generally elongated abdomen (last body segment) classified as single order (Phthiraptera) or two order [sucking lice] and Mallophaga[chewing/biting lice]). Approximatly there540 valid species of sucking lice were recognized. All poultry lice have chewing mouthparts and feed on dry skin scales, scab tissue, feather parts, and can feed on blood when skin or feather quills are punctured; Marshall,I.K.(2003).

Avian lice, which belong to the suborder Mallophaga, have a life cycle of three (3) weeks and normally feed on feathers or bits of dead skin. Lice may live for several months on the host but remain alive for only one, on week off the host. People and other mammals may harbor avian lice but only temporarily

MITES

The most economically important of external parasites of poultry are mites of the families Dermanyssidae and Macronyssidae (poultry red mite, northern fowl mite, and tropical fowl mite)

and Trombiculidae (turkey chigger). These mites live in tunnels in the epidermis and cause considerable skin thickening Mites are small arachnid (eight-legged arthropod). Most mites are tiny, less than 1 mm (0.04 in) in length, and have a simple, unsegmented body plan. The small size of most species makes them easily overlooked; some species live in water, many live in soil as decomposers others live on plants, sometimes creating galls, while others again are predator or parasites:(Fuente.J 2003). It is parasite of poultry, human, large animals. Most species are harmless to humans, but a few are associated with allergies or may transmit diseases; (Dhooria MS, 2016).

FLEAS

About 1,500 species of blood socking fleas have been reported from birds and mammals (Iwuala&Okpala, 1978). Fleas are known to require blood meals before egg production and are usually found in crevices in floors under carpets, litter or sleeping places of host animals. They can survive for a long time in the cages/ houses of chickens. Flies are usually a source of irritation to chickens. They occur in warm places and multiply in the bodies of dead animals and in the droppings of chickens; (Franzvon.p2016).

Fleas are group of siphonaptera order occasional poultry pest in temperate areas and a major poultry pest in the subtropical and tropical. Although many species of flea require a blood meal before they can copulate, that is not the case with C. gallinae, (F.G.A.M. Smit; 2007). As with other fleas, the life cycle consists of eggs, the larval stages, a pupal stage and an adult stage (Rothschild, 1952). The larvae have chewing jaws and it is only the adult fleas that are capable of biting the host. Under optimal conditions of temperature and humidity, adults can emerge from the cocoon in 23 days. How many generations there are in the year depends on how many boods their host bird rears (Harper.G.H.1992). The fleas usually undergo metamorphosis and overwinter as pre-emergent adults. These are fully formed within the cocoon and emerge when certain stimuli occur; suitable stimuli are vibration, heat, or increased levels of carbon dioxide (Crosby, J.T, (2016). The hosts are infected during the spring, when it is foraging on the ground. John .K, 2009).Fleas like C. gallinae that are found in nests often develop a defined breeding season, which coincides with that of their host.

2.2.2. Species of Ectoparasites in Poultry

Menacanthusstramineus. The most common and economically important louse to both chickens and turkeys the chicken body louse, Menacanthusstramineus. This louse is found in intensive commercial flocks and in small backyard or hobby flocks alike. Adults are 3–3.5 mm long, and eggs are glued to the base of feathers. This species is found primarily on the host's skin in the vent, breast, or thigh areas. Chicken body lice feed on feathers and also blood feed by chewing on pin feathers. Menopongallinae infested with the shaft louse Menopongallinae of Chickens and Lipeuruscaponis (on feather shafts), the chicken wing louse (mainly on the primary wing feathers), the chicken head louse Cuclotogasterheterographus (mainly on the head and neck), the fluff louse Goniocotesgallinae (very small, in the fluff of feathers), the large chicken louse Goniodesgigas louse), the brown chicken louse Goniodesdissimilis, Menacanthuscornutus, the small body louse Uchida pallidula, or Oxylipeurusdentatus. Turkeys may also be infested with the large turkey louse Chelopistesmeleagridis and the slender turkey louse Oxylipeuruspolytrapezius.

The sticktight flea, Echidnophagagallinacea, is an occasional poultry pest in temperate areas and a major poultry pest in the subtropical and tropical New World. These fleas may be common in backyard poultry flocks or areas where birds spend a lot of time outdoors or interface with wildlife. Adult fleas are dark brown and laterally flattened. Adult fleas embed in the skin of their host for days or weeks. On chickens, they prefer to attach to the wattles, comb, or face. Without detaching from the host, females lay their eggs, which fall into the litter or soil. Larvae hatch and live on host blood excreted by adult fleas and organic material in the litter or soil. The larvae develop best in sandy, well-drained litter. Larvae pupate and later emerge as adults, which then search for a host. This whole cycle takes about 1–2 months.

Dermanyssusgallinae, Ornithonyssussylviarum and Argasreflexus are temporary pigeon parasites. Most of the time they hide in the environment, and they come out only for a short time (often during the night) for a pigeon-blood meal. This may lead to restlessness, fatigue, anaemia and even death in nestlings.

2.2.3. Transmission

Ectoparasites can tranismited by contact with infested birds, animals, or inanimate objects. In the integrated poultry industry,ectoparasite are dispersed most frequently on inanimate objects such as egg flats, crates, or coops or by personnel going from house to house or farm to farm() Lice crawl, but they can't jump or fly. Head lice often spread from one person to another by direct head-to-head contact, often within a family or among children who have close contact at school or play. It's less common for head lice to spread without direct contact. But the insects may spread from one person to another through personal items, such as: Hats and scarves, Brushes and combs, Hair accessories, Headphones Pillows, towels and upholstery

2.2.4. Examination

Examination of chicken ectoparasites Chickens were thoroughly examined before being humanely euthanized. Ectoparasites found were processed as described by Hendrix () and () and identified according to their morphological characteristics using entomological keys developed by Taylor *et al*. and Wall and Shearer.

2.2.5. Pathogenesis and Clinical Sign

Clinical sign

Chicken infected by ectoparasites were decrease reproductive potential in males, egg production in females, and weight gain in growing chickens, skin of irritation

2.2.6. Pathogenesis

Ectoparasites that feed on the outside of the body may cause considerable loss to a poultry operation, particularly by lowered egg production. Generally, serious poultry problems are more likely to occur on laying flocks than on broilers.

2.2.7. Control and Prevention

Prevention of ectoparasites introduction to poultry is best because eradication is incredibly difficult. Any acaricidal spray treatments must be applied with sufficient force to penetrate the feathers in the vent area. Resistance to pyrethrins and pyrethroids is widespread, and few other chemical treatments are available for use on birds. Dustboxes with sand and acaricidal materials,

such as inert dusts (eg, diatomaceous earth) or sulfur dust, are very effective for bird self-treatment of mites.

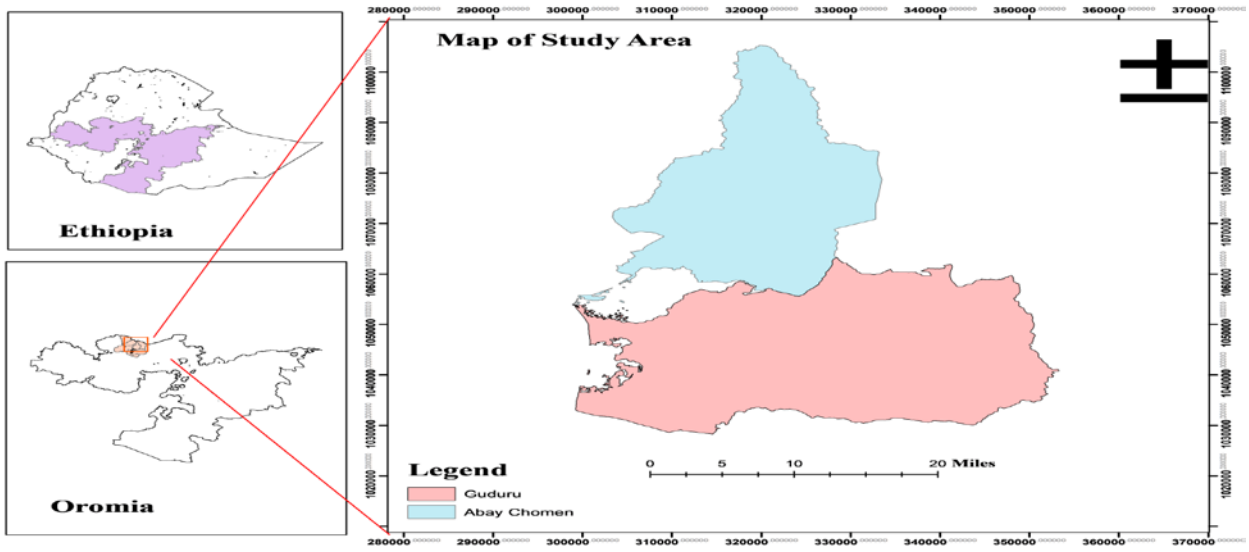
For control, affected birds should be culled or isolated, and houses should be cleaned and sprayed frequently, as recommended for the poultry ectoparasites. Individual birds should be treated with oral or topical ivermectin or moxidectin (0.2 mg/kg), 10% sulphur solution, or 0.5% sodium fluoride. Here are a few management tips on how to keep chickens and their cages/houses clean and inspect birds regularly for mites, ticks or fleas remove droppings regularly, once a day if possible clean, wash and disinfect cages/houses remove dead birds as soon as possible. There were various chemicals available to kill these parasites. It is important to know about these parasites so that the correct chemical can be used. If the parasite lives on and off the chicken, e.g. in cracks and crevices then treat the birds and the environment. Before using any chemical make sure that it is correct for the parasite that you want to kill. Read the instructions carefully. Keep these chemicals out of reach of children, pets and livestock. There were specific methods for the various parasites - Flies can be controlled by using sprays or larvicides. Fly traps and papers can also be used. - Using sprays (e.g. Malasol l %) or dusts (e.g. Carbadust) can control mites, ticks and fleas. When these parasites are seen, all chickens should be treated. Malasol 1% can be used on the birds and in the cages/houses.

3. MATERIALS AND METHODS

3.1. Description of Study Area

The study was conducted from December 2021 to july 2022 in two (2) Urbans which were DilaloBaro, Kombolcha and one (1) rural kebeles that was WaljalachisaSirba of Guduru District, in HoroGuduruWollega Zone, Oromia region state which lacated South West of Ethiopia and 09 032` N ,and 37 0 30`E ,and also 141 km away from Finfinee ,the capital city of Oromia regional state .The altitude of Guduru District is about 1969 above sea level and experiences bimodal patterns of rainfall with the main rainy season extending from June to September with an average rainfall of about 800 mm. The mean annual minimum and maximum temperatures are 12.30C and 27.7 0C, respectively with an overall average of 25.oC (CSA, 2015). The mean relative humidity is 61.3%.

Fig 1. Map of Guduru woreda



Source: Arc GIS

3.2. Description of study population

The 2007 national census reported a total population of human for this woreda of 98,084, of whom 48,848 were men and 49,236 were women; 6,504 or 6.63% of its population were urban dwellers. The majority of the inhabitants were Protestants, with 75.32% reporting that as their religion, while 19.32% observed Ethiopian Orthodox Christianity, and 4% observed traditional beliefs.[4] The two largest ethnic groups reported in Guduru were Oromo (96.17%), and the Amhara (3.71%); all other ethnic groups made up 0.12% of the population. Afan Oromo was spoken as a first language by 97.96%, and 2.01% spoke Amharic; the remaining 0.3% spoke all other primary languages cattle reported.; The district is also endowed with a significant number of domestic animals; 60990 cattle , 17545 sheep, 17877 goats, 19266 equines, and poultry 76430; are 62430 local and 14000 exotic .

3.2. Study Methods

A cross sectional studies were conducted from December 2021 to July 2022 in Guduru district of HoroGuduruWollega Zone, Oromia Regional state. During collection of data to investigate ectoparasite infestation rate from selected peasant association, Individual farmers, the population, and availability of chicken were considered.

3.4. Sample size and Sampling method

3.4.1. Sample size determination

Since there were no recent previous report of ectoparasites prevalence in the study area ,the total number of sample size required for my study was determined using the formula given by Thrusfield (2007) and considering an expected prevalence of 50% with 5% desire absolute precision and 95% confidence interval (Cl). Therefore, the sample size was calculated by the formula:-

$$n = \frac{1.96^2 \times P_{exp}(1-P_{exp})}{d^2}$$

Where, n = required sample size; z=1.962; P_exp = expected prevalence; d = desired absolute precision. Thus, the desire sample size for P_exp = 50%, and this gives a total sample size of three hundred eighty four (384) chicken included in this study

3.4.2. Sampling method

Kebele and peasant association were selected purposively based on easily accessible and densely populated area of back yard chickens. Guduru woreda has 22 PA, of which four (4) Peasant Associations (PAs) and of four kebeles were selected. Those four peasant association (PA), two (2) of Urban and one (1) rural) were systematically taken. From PAs of the district households were selected purposively in which those households having greater than or equal to 2(two) chickens were selected. From households having five chickens, we take all 2(two) chickens for collection of ectoparasites but for those having greater than 2(two) chicken we select only 2(two) chicken by Random sampling approach had employed to select a chicken for the detection and collection of ectoparasites.

3.5. Data collection method

Selected chickens had restrained and observed thoroughly to identify either chicken had parasite or free of parasite gently. Thus, head will examined first and followed by the neck, body sides, back, ventral part of the abdomen; wings and vent area, Then, external parasites were collected from different parts of the body around the eye, comb, wing, feather, skin and vent by using naked eye and hand lenses. Sufficient care was taken to prevent damage of the morphological

features needed for subsequent identification of the ectoparasites. All the collected parasites were placed in sampling bottles, which had contained 70% ethanol, were assigned with a serial number for easy identification. Likewise, bio data of each chicken like sex, breed, age, and predilection sites and managements systems were recorded on format prepared for this purpose.

Representative of ectoparasites found in body of the chickens was put in universal bottle (film holders, vial) containing 70% alcohol; predilection sites of the body were simultaneously labeled with marker and transported to kombolcha veterinary clinic laboratory. The identification of Parasites and other relevant activities had done at kombolcha veterinary clinic laboratory. After collection, the parasites was examined and identified under the stereomicroscope by comparing their morphology with identification keys. Identifications of all ectoparasites was performed according to their morphological characteristics using, the entomological diagnostic guidelines by Wall and Shearer (2012).

3.6. Data Analysis

The data collected from each bird were stored in a Microsoft Excel spreadsheet. For statistical analysis, Chi-square test was performed, using SPSS version 20 to determine the association between the prevalence of ectoparasites infestation in relation to age, breed and sex and of the poultry. P-value less than 0.05 were considered as statistically significant.

4. RESULT

4.1. Overall prevalence of ectoparasites

In the current study, Out of the 384 chickens examined by including different risk factors (age, breed and sex) 231 were infested with different external parasites with overall prevalence of (60.15%). According to this study, the major groups of poultry ectoparasites identified were lice, fleas and mites with prevalence of 156(40.62), 62(16.15) and 13(3.38) respectively which was statically significant (Table 1). Lice were relatively highly infesting among external parasite of poultry in this area followed by fleas and mites respectively .during the ectoparasites collection majority of lice were collected from skin, feather, wing, thigh and breast. However, fleas were restricted to around eye, on face, comb and wattles, while mites were found on base of the feathers, Wing and tail, particularly the vent area of tail feather.

Table 1.Prevalence of different external parasite encountered in backyard chicken in selected kebele's .

External parasite	No positive sample	Prevalence rate%
Lice	156	40.62
Flea	62	16.15
Mite	13	3.38
Total	**231**	**60.15**

In recent study the highest and lowest prevalence of parasitism infection was 156 (32.8) and 105(27.3) % in Rural and Urban respectively. In those difference in the prevalence of the parasites in Rural and Urban it was not statistically significant (P>0.05). The prevalence of ectoparasites infestation was higher in female chickens 170(44.2%) than in the males 61(15.8), however there was no statistically significant (P > 0.05). The prevalence of ectoparasites infestation was relatively higher in adult 150 (39.1%) compared to in young chicken 81 (21.3%), it was statistically insignificance (P >0.05). In the present study, the prevalence of infestation with ectoparasites was high in local breeds 132(34.37%) than exotic 99(25.8%) which was not statically significant (P>0.05) table (2).

Table 2.Overall Prevalence of ectoparasites of back yard chicken in selected Guduru woreda

Risk factory	Category	No examined	No positive	Prevalence	χ2	p-value
Breed	Local	274	189	49.218	0.93	0.93
	Exotic	110	42	10.937		
Sex	Female	235	170	44.2	3.95	0.14
	Male	149	61	15.8		
Age	young	168	85	22.1	2.195	0.33
	Adult	186	146	38.02		
Origin	Urban	258	126	32.8	2.9	0.72
	Rural	126	105	27.3		
	Total	384	231	60.15		

Based on the species of poultry five (5) species ectoparasites, were identified these are Monopongallinae, Echidnophagagallinae, Cnemidocoptes mutant, Goniodesgigasand and G. gallinae. Monopongallinae was the most prevalent of ectoparasites with prevalence of 71(18.49%), and Echidnophagagallinae 62(16.15was the second, and also Cnemidocoptes

mutant 13 (3.38) was the least prevalent species infesting poultry followed by Goniodesgigas 50(13.02), and G. gallinae 35(9.11). (Table3)

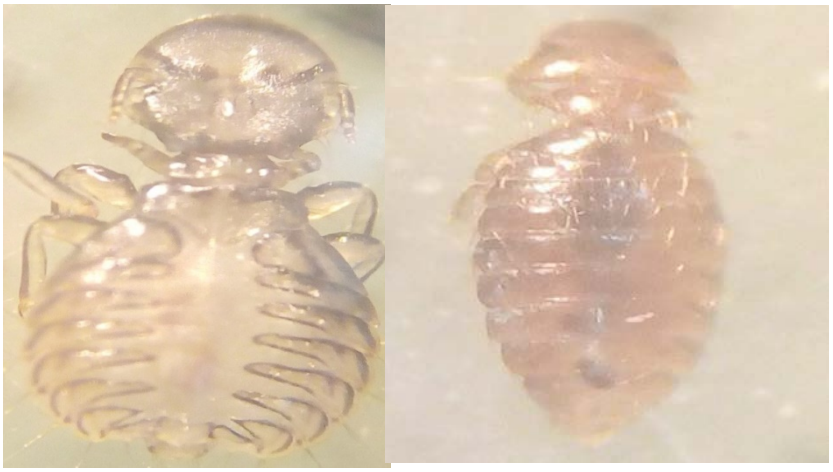


Fig.3. menopongallinae in bachyard chicken (Captured by W.K)

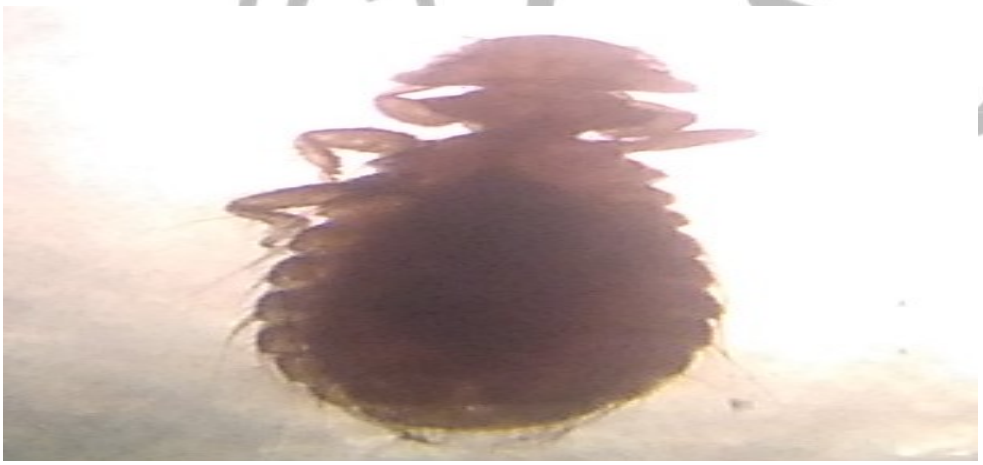


Fig.4. Echidnophaga gallinacean obtained from backyard chicken. (Captured by W.K)

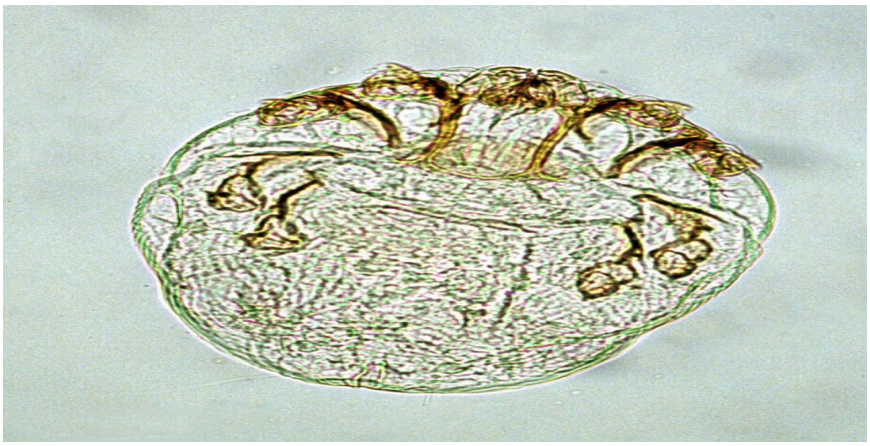


Fig.5.Cnemidocoptes mutant obtained from backyard chicken. (Captured by W.K)

Table 3.The Prevalence of genes and species of ectoparasite encountered in backyard in current study area.

Parasite	Genus name	Species name	Frequency	prevalence
Fleas	Echidnophaga	E.gallinacea)	62	16.15
Lice	Menapon	M. gallinae	71	18.49
	Gonicates	G. gigas	50	13.02
	Gonicates	G. gallinae	35	9.11
Mite	Knemidokopte	Cnemidocoptes mutant	13	3.38
Total			231	60.15

In the present study the attachment site of external parasite of species were found at different parts of the chicken body. Those were Echidnophagagallinae were collected from around eye, on face, comb and wattles with prevalence of 62 (16.15) and Menopongallinae were collected from skin, feather shaft, thight, and breast with 71(18.49), and also 50 (13.02%) of Goniodesgigas were collected from, skin, Wings and body feather. Gonicatesgallinae were collected from wings, feathers body with 35(9.11), and also 13(3.38) of Cnemidocoptes mutant were found on the Wing, skin, tail, and feather particularly the vent area of the chicken. Although different species of ectoparasites were present on chicken , the prevalence attachment site was higher in MonoponGallinae (18.49%) when it compared with the prevalence of others species identified in current study and there was difference in statistically significant ($p<0.05$).(table 4)

Table 4. Prevalence association of ectoparasite regarding on species and attachment

Genus	Species	Attachment	Nopositive	Prevalence %
Echidnophaga	**E. gallinacea)**	Around eye ,on face ,comb and wattles	62	16.15
Menapon	**M. gallinae**	Feather shafts, Skin, thigh, feather and breast	71	18.49
Gonicates	**G.gigas**	wing Skin, body feather	50	13.02
Gonicates	**G. gallinae**	wings, feathers body	35	9.11
Knemidokoptes	**Cnemidocoptes mutant**	Wing, skin, tail feather	13	3.38
	Total		231	

In this study parasites were identified at adult and lymph stage depending on the morphology and structural features of parasite. The study implies that, from 231 positive poultry, the prevalence of adult parasite was statically significant when compared with nymph stage of parasite with 215(56.00) and about 16(4.15%) of them are infected with nymph stage of external parasite identified in study area. This table implies the impact of adult parasite is more hazardous than that of nymph stage parasite in the study area (Table (5).

Table .5. Prevalence of parasite regarding on stage of parasite in study area

Stage of parasite	No positive	Prevalence rate%	p-value
Adult	215	56.00	
Nymph	16	4.15	0.000
Total	231	60.15	

5. DISCUSSION

In the present study, lice, fleas and mite were common ectoparasites infesting chickens with the overall prevalence of 60.15%) out of 384 examined, 231 of chickens infested with ectoparasite were found harboring at least one species of external parasites. The observed overall prevalence of 60.15% of ectoaparasite infestation in the current study conceded with results of 57.03% (Fantaye&Abishu 2018) from Maki district and (56.5%) of Zeryehun and Yohannes(2015) from wolayita zone, 56.5% of Koroglu (1999)and 55.47%.was reported by Biressaw and Michael (2018) from Eastern Hararghe Zone, 67.95% in and around ambo town by (Fraol*et al*; 2014); East shoa zone Ethiopia, 78.0%, of Barsabeh (1999), and study was lower than the reports higher prevalence rate of 93.7% reports (Hagos and Eshetu, 2005) in central Ethiopia and 86.67% from Bangladesh, byShanta*et al*., (2006), 91.5% from Central Ethiopia (Belihu*et al*., 2010), 83.85% by wondimu, (2019) and 100% from Nigeria (Bala*et al*., 2011) were reported . However, it was higher than the result reported19% Al-Saffar and Al-Mawla (2008), 41.1 % by Nandi and George, (2009). These differences in prevalence may be attributed to differences management system, breed, health conditions, high population density of birds, uncontrolled feeding, inattention to treatment and control measures, sample size, season of study, management, and methods of disease control and prevention practiced in the study area, which exposes the chickens to poor hygiene on the farm and chicken houses thus, enabling them to contract a wide range of harmful ectoparasites. In addition, the variation in the prevention and control methods of external parasites from area to area might also responsible for the variation in the prevalence of external parasites in chickens Mekuria, S. and E. Gezahegn, (2010)

In the present finding, lice were the highest prevalence with (40.62) when compared with other parasite recorded in current study. This is more conceded with result of 35.1% recorded by Amede*et al*., (2011), from east Ethiopia. 33.85% reported by Wondimu*et al*, (2019) from MarekaWoreda of Dawuro Zone, Snnpr, Ethiopia. The recorded result is higher than in recorded in Northern Tanzania 28.5% by Swai*et al*., (2009), and (12.5%) by Al-Saffar and Al-Mawla (2008). The current study is lower than different studies conducted in different section of the world. 60.9% lice infestation was reported by Saxena*et al*., (2004) from. The difference between reported prevalence may be due to poultry management system, season of study and other agro ecology influencing the distribution of lice and due to less attention on culling system when the

chicken are infected with the lice and regular attendance of chicken when they are shows discomfort feeling. Because of those factors, the prevalence of lice was variable when compared with reported and current study, due to variation in agro-climatic and topographic conditions and species adaptability. Besides climatic conditions, these investigators did their work in different ecological locations where differences in breed and general husbandry practices would account for the difference in finding. In addition, a longer period of study might show the seasonal prevalence pattern of the parasites compared to the shorter one .Clayton *et al*. (1997).

In this study three (3) species of lice were recorded and identified; these were menopongallinae, goniodesgigas, and gonicatesgallinae. From the species of external parasite identified, monopongallinae (18.49%) was the highest prevalence while Cnemidocoptes mutant (3.38) was the least from current study. When we compare the prevalence of previous reported, 70%, Shanta, etal. (2006 and 65.33% Bersabeh*et al*. (1999) M. stramineus reported, was higher than the present study. These variations may be due to climatic condition, host receptor and may be due to high potential transmission between hosts.

The lowest prevalence recorded among the ectoparasites in this study was mite(Cnemidocoptes mutant) which was thirteen (2, 1%).The current study agree with that of Nnadi and George (2010) who showed in their study that mites were the least among the ectoparasites encountered and the present study were not agree with the second highest prevalence in this study of Fufa*et al* (2019) from North-Eastern Nigeria, mite is considered as one of the common ectoparasites of village chicken (Adene and Dipeolu 1975; Saidu*et al* 1994). This difference may, be due to differences in the weather and ecological settings of the study area, sample size and area covered.

The Echidnophaga gallinacean (stick tight flea) 79(20.6) has the second prevalence when compared to other ectoparasites found in present study. The prevalence of Echidnophaga gallinacean in the present study (16.15%) was almost comparative when compared to the other studies carried by Solomon and Elsabet (2009) (16.5%) in WolaytaSoddo town in southern Ethiopia, Gedion (1991) (14.6%) in and around Dire Dawa. The high prevalence 269(83.5%) was reported by Wondimuetal (2019) from MarekaWoreda of Dawuro Zone, Snnpr, Ethiopia, (71.9%) of Echidnophaga gallinacean reported by Swai*et al*. (2009) in northern Tanzania, 51.2%, was reported by Belihu*et al*., (2010) in Ethiopia, 75.3% was reported by Swai*et al*.,

(2010) in Tanzania and 35.7% was reported by Nnadi and George (2010) in Nigeria. The free-range system provides a more sustainable environment for the parasites. Mungube*et al* (2008) reported that lack of control measures towards these parasites was a possible factor contributing to the high prevalence of the parasites.

In the current study the parasitic Infestation in female birds was (44.2%) almost higher in comparison with male chickens (15.815%). Wowever there was not sttiallysigifcant difference P>0.05. This result agrees with the finding of Mugube*et al*., 2008, Belihu*et al*. 2010; Fantaye and Abishu, 2018; Germay*et al*., 2018, reported a slightly higher rate of ectoparasites in males, compared to females. This result disagrees with the finding of (Sabuni*et al*.,2010), Prevalence of ectoparasites infestation in indigenous free ranging village chicken in different agro ecological zones in Kenya and (Nandi and George, 2010), Prevalence of Parasites of the Village Chicken in Nigeria, (Asefa*et al*, 2017) Study on Prevalence of Ectoparasites of Poultry in and Around Jimma Town, Prevalence of the major ectoparasites of poultry in extensive and intensive farms in Jimma, Southwestern Ethiopia by (Wario*et al*., 2018) and (Wondimu, 2019) study on Prevalence of Ectoparasites in Poultry Managed Under Backyard System in MarekaWoreda of Dawuro Zone, Snnpr, Ethiopia. The observed discrepancy between the findings might be due to the setting and other factors in the studied areas.

Prevalence of the ectoparasites infestation was found to be statistically higher in adult (39.1) than in growers (20.3). The present result were agree with the previous report of Malann*et al*. (2016), Ochee*t al*. (2016), Kebede*et al*. (2017) and Lawal*et al*. (2017) have also reported that adult village chickens were more infested by ectoparasites compared with younger ones.

This finding might be associated with the frequent contact of adult chickens with other species of animals and may be exposed longer to the infested environment and other source of infestation. The current study results regarding on the age of chicken were disagreement with the findings of Mulugeta*et al*. (2013), Firaol*et al*. (2014) and Rezaei*et al*. (2016) who reported that young chickens were more infested than adult birds.

Local breed of chicken had more of external parasite than exotic breed in present study. This is study had agreement with report of Mekuria and Gezahegn (2010), Belihu*et al*. (2010) and Firaol*et al*. (2014) who reported that local breed (87.5%), 87.46% and (87.55%) found to be

more prone than exotic breed in a study carried out in Wolaytasoddo, Bishoftu and Ambo town respectively. The result of local breed was more susceptible to external parasite might be local chickens had been released and stay away from home, community is more focused in exotic breed than local, poor hygiene and minimal health care provision in local chickens.Thus becomes more vulnerable to ectoparasite than exotic breed. This study hadn't agreement with the report of Tolossa and Tafesse (2013) who reported 2.35% in Bishoftu in semi intensive farm and Bala*et al*. (2011) 100% in Nigeria free ranging chickens as exotic breed more infected than local breed. This might be due to better measures and practices related to good housing, feeding and husbandry system applied for exotic breed than local breed.

The adult chickens had prevalence of ectoparasite (38.05%) which was higher than that of younger which was (4.2%). This association agreed with the studies of Permin*et al*. (2002) and Biu*et al*. (2007), Sabuni*et al*. (2010) and Nnadi and George (2010) in which adult chickens were highly infested as compared to younger chickens. However, the current result disagrees with the findings of Sabuni*et al*. (2010) were young chickens were found more infested by ectoparasites than adult chickens. The higher prevalence of ectoparasite in adult chickens than younger one may be due to longer exposure to the infested environment than the young grower, hence a higher prevalence and intensity rates. This is why adult parasite was more prevalence than nymph.

6. CONCLUSSION AND RECOMANDATION

Poultry provides a valuable protein to the diets of people world- wide and is an important source of egg production. Some of the ectoparasites of poultry like ticks, lice and mites play an important role in the transmission of certain pathogens which cause heavy economic losses to poultry industry in addition to direct effect of causing morbidity by sucking blood and causing irritation to the birds which adversely affects economic production of poultry.

The different species of ectoparasites identified in this study provide evidence of the existence of diverse ectoparasites fauna in the present study locations, however, in the present study lice is the most prevalent followed by flea and mites. Three (3) species of lice M. gallinae, G.gigas, and G.gallinae, stick tight flea (E.gallinacean) and Mite (Cnemidocoptes mutant) were identified. The attachment sites of external parasite in current study eye, skin, thigh, feather, breast, body

feather and vent were identified. Generally, in present study, backyard chickens were affected by different infestation of ectoparasite, due to the paucity of appropriate management. Therefore, based on the above conclusion the following points were taken as recommendations:

- Government and Community could be gave attention for local chickens to prolonged local species.
- Awareness should be created to the community on the impact of ectoparasites on poultry production
- Further research to evaluate the impact of ectoparasites on health and production performance of chicken including cost effectiveness of control strategies should be conducted
- Farmers and extension staff should be trained regarding on improved housing, feeding, disease control and improved productivity of local chicken.
- Application of anti-parasitic drugs should be necessary to control of external parasite.

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