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## Review Article



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## A Review on ectoparasites in poultry farm.

**Wondimu Hailu Enaro and Tekalign Woldehana Uro**

Bedessa Veterinary Clinic, Wolaita zone, SNNPRS, Ethiopia.

### Abstract

Ectoparasites can affect the health of chickens by causing tissue damage and blood loss, toxicosis, dermatitis and allergies. Furthermore, some ecto-parasites act as vectors of a number of pathogens and during periods of heavy infestation may weaken them, and lower their resistance and may lead to death. Ecto-parasites impose serious threat to the physiology and feed efficiency by giving continuous irritation and blood sucking effect thus they are associated with emaciation, anemia and eventually loss of production of egg and meat. Although ectoparasites constitutes among the most prevalent and the major causes that decrease productivity of chickens in the traditional managed system, they are mostly neglected. Northern fowl mite (*Ornithonyssus sylviarum*) is the commonest and most important permanent parasites of poultry in all major poultry production areas of the United States.

The incidence of mortality and morbidity due to different ecto-parasitic diseases in chicken demands serious efforts to curtail the diseases. However, despite their devastating effects, ecto-parasites receive less attention than endo-parasites in almost all the production systems, even though, it has been attempted by few researchers. There is no enough information concerning the species composition, distribution, burden, and economic impact of ecto-parasite in different parts of Ethiopia. This contributes to a problem in poultry disease control, planning, monitoring and evaluation strategy of the country for rural poultry programs.

**Keywords:** Ectoparasites, Intensive and Prevalence

### Introduction

In developing countries, animal production is being subjected to great pressure to satisfy the demand for animal protein required by the continued increase in human population, and also to have surplus for international trade. Among the animal production activities, poultry sector is the fastest growing. Nevertheless, it has been adversely affected by a variety of constraints (FAO, 1998). Among the constraints, parasitism ranks top in village chicken production (Nnadi P.,

201). *Ectoparasites* are a parasite that lives on or in the skin but not within the body. A parasite, such as a flea, that lives on the outside of its host. Ethiopia has about 60% of the total chicken population of East Africa, which includes local, exotic, and hybrid chicken breeds. Report on population of Ethiopian chickens estimated to be about 56.53 Million and with regard to breed, 94.3%, 3.21% and 2.49% of the total poultry population to be indigenous, hybrid and exotic, respectively (CSA, 2017).

The poultry sector in Ethiopia can be characterized into three major production systems based on some selected parameters such as breed, flock size, housing, feeding, health, technology and bio-security. These are large scale commercial poultry production system, small-scale commercial poultry production system and village or backyard poultry production system (Bush, 2006).

The large-scale commercial production system is highly intensive production system involves an average of greater or equal to 10,000 birds kept under indoor conditions with a medium to high bio-security level. This system heavily depends on imported exotic breeds that require intensive inputs such as feed, housing, health, and modern management systems. It is estimated that this sector accounts for nearly 2% of the national poultry population. This system is characterized by higher level of productivity where poultry production is entirely market oriented to meet the large poultry demand in major cities. The existence of somehow better biosecurity practices has reduced chick mortality rates to merely 5% (Bush, 2006).

Small-scale intensive production system is characterized by medium level of feed, water and veterinary service inputs and minimal to low bio-security. Most small-scale poultry farms obtain their feed and foundation stock from large-scale commercial farms (Nzietchueng, 2008). There are few studies about diseases affecting poultry in this production system. Kinunghiet *al.*, (2004) mentioned coccidiosis as a cause of mortality, reduced weight gain and egg production and market value of affected birds.

Village/indigenous production system 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).

Parasites of poultry are economically important for several reasons. Some transmit disease, but all cause irritation and stress to some degree and can cause anaemia through blood loss, weight loss, drop in egg production and in cases can be fatal. The lice can be seen by parting the feathers on the breast, abdomen and under the wings. Eggs can be seen on the base of a plucked feather. Although the lice do not transmit disease, they cause irritation resulting in poor growth and decreased egg production. The resultant stress imposed can also make birds more susceptible to other disease. The scaly leg mite only infests birds. It burrows into the unfeathered skin of the head, usually the eyelids, the wattles and comb; the legs and feet and the vent, forming tunnels as it burrows, and feeding on keratin. The exudate resulting from the irritation causes thick crusts to develop beneath which the mites hide. These must be softened using a mild detergent or oil bases dressing before treatment can be applied. Fleas are a serious pest of poultry and can cause losses due to secondary infections at the site of attachment and stress related to irritation.

Ectoparasites constitutes among the most prevalent and the major causes that decrease productivity of chickens in the traditional managed system, they are mostly neglected (AbebeWossene *et al.*, 1997; HundumaD inka *et al.*, 2010). The enormous economic impact of ectoparasitic diseases in poultry due to mortality and morbidity in traditional backyard and intensive care can be minimized through stringent disease combating measures. Nevertheless, a little emphasis has been given for poultry ectoparasites in both intensive and traditional backyard chickens rearing in the country. (Wario *et al.*, 2018).

Moreover, information on prevalence of ectoparasites and associated risk factors generated through organized research approach is indispensable in order to understand the epidemiology of the diseases and devise appropriate control and prevention measures.

Regarding to this, however, in present study area, information on the prevalence of ectoparasites of poultry and their determining factors are generally lacking. Therefore, the following objectives were designed in order to carry out this study.

General objective of this study was to investigate the overall prevalence of ectoparasites of poultry and identify their associated risk factors in extensive and intensive farms.

### Significance of the Study

Ectoparasite in poultry exerts a great negative impact on the socio economic aspect especially for those of farmers' and private organizations whose income rely

on poultry production. Therefore, the benefits and beneficiaries from the output of this research work are summarized as follows:-

- It is expected to know the prevalence of poultry ectoparasite in intensive and extensive production system in the study area.
- The study would help to identify species of ectoparasites of poultry in the study area.
- The major risk factors responsible for the occurrences poultry ectoparasites in the study area would be known.

### Operational Definitions

**Cross-sectional study** is a type of observational study that analyzes data from a population, or a representative. A *cross-sectional study* examines the relationship between disease (or other health related state) and other variables of interest as they exist in a defined population at a single point in time or over a short period of time

**Ecto-parasite:** refers to a parasite that lives on or in the skin but not within the body. A parasite, such as a flea, that lives on the outside of its host

**Extensive farming or extensive agriculture:** refers to is agricultural production *system* that uses small inputs of labor, fertilizers, and capital, relative to the land area being farmed.

### **Intensive farming or Intensive agriculture:**

refers to in agricultural economics, *system* of cultivation using large amounts of labor and capital relative to land area.

**Poor management:** refers to when management has a bad attitude or they don't seem to be honest in their dealings with employees, that create toxicity, and nobody wants to work in a toxic environment. Poor management choices are the difference between a company that's hobbling along and a company that's moving toward the future.

**Poultry farming:** refers to the form of animal husbandry which raises domesticated birds such as chickens, ducks, turkeys and geese to produce meat or eggs for food.

**Prevalence:** refers to the proportion of individuals in a population having a disease or characteristics, and or prevalence is a statistical concept referring to the number of case of a disease that present in a particular population at a given time.

**Risk factor:** is a variable that is associated with an increased likelihood of occurrence of a disease.

## Literature review

### Definition of Ectoparasite

Ectoparasites are organisms that live on the skin of a host, from which they derive their sustenance. Lice, fleas, mites and ticks are ectoparasite. An ectoparasitic infestation in poultry is a parasitic disease of poultry caused by organisms that lives primary on the surface of host of chickens. Ectoparasites or parasites that feed on the outside of the body may cause considerable loss to a poultry operation, particularly by lowered egg production. Generally, serious pest problems are more likely to occur on laying flocks than on broilers. Infestations of external parasites on poultry can be economically controlled with good sanitation and with proper use of insecticides. 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 in many country of the world including Ethiopia. *Dermanyssus gallinae* (also known as the red mite) is a haematophagous ectoparasite of poultry. It has been implicated as a vector of several major pathogenic diseases. Despite its common names, it has a wide range of hosts including several species of wild birds and mammals, including humans. In both size and appearance, it resembles the northern fowl mite, *Ornithonyssus sylviarum* (Doslora *et al.*, 2006).

### Major Ectoparasites of poultry

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 is markedly influenced by the production method. They live on or in the skin and feathers. They are characterized by possession of externally segmented bodies, jointed appendages, and chitinous exoskeleton (Calneck, 1997). Detection is important and easier for those parasites living on the birds (Northern fowl mites, hard ticks and stick tight fleas) than for those that are attached temporarily only for

feeding (bedbugs, chicken mites, and soft ticks) (Michael, 1999). The order *Hemiptera* (bug) includes several blood sucking parasites of birds. The most wide spread of these bugs is the common bed bug (*Cimex lectularius*) which attacks humans, most other mammals and poultry. It is most prevalent in temperate and subtropical climates. Poultry house and pigeon may become heavily invaded (Calneck, 1997).

Fleas (order *Siphonaptera*) are parasites in the adult stages, but free living as larvae. Adults vary in size, possess a tough laterally compressed body, piercing-sucking mouth parts, short

antennae in grooves and long legs adapted for leaping. Fleas are brown to black in color (Calneck, 1997). The stick tight flea (*Echidnophaga gallinacea*) is unique among poultry fleas in that the adult become sensible parasites and usually remain attached to the skin of the head for days or weeks. The adult females forcibly eject their eggs so that they reach surrounding litter. The larvae develop best in sandy, well drained litter. Hosts of the adult fleas include chickens, turkeys, pigeons, humans and other mammals. Irritation and blood loss may cause anemia and death, particularly in young birds (Kahn, 2005).

Lice are common external parasites of birds which belong to the order *Mallophagia*, the chewing lice and are characterized by possession of chewing type of mandibles located ventrally on the head, incomplete metamorphosis, no wings, dorsoventrally flattened body and short antennae with three to five segments. The most common and economically important louse to both chickens and turkeys is *Menacanthus stramineus*, the chicken body louse. It punctures soft quills near their base or gnaws the skin at the base of the feathers and feeds on the blood. Chickens are less commonly infested with *Menopon gallinae* (on feather shafts), *Lipeurus caponis* (mainly on the wing feathers), *Cuclogaster retrographus* (mainly on the head and neck), *Goniocotes gallinae* (very small in the fluff), *Goniocotes gigas* (the large chicken louse), *Goniocotes dissimilis* (the brown chicken louse), *Menacanthus cornutus* (the body louse), *Uchida pallidula* or *Oxylipurus dentatus* (the small body louse) (Calneck, 1997).

The common free-living ectoparasitic mites of poultry belong to the family *Dermanyssidae* and include the chicken mite, northern fowl mite, and tropical fowl mite. They are blood suckers and can run rapidly on the skin and feathers. The chicken mite

(*Dermanyssus gallinae*, also called red mite, is found worldwide and is particularly serious in warmer parts of the temperate zone in older poultry houses. The mite is rare in modern large commercial caged layer operations, but is seen

frequently in modern broiler breeder farms. It can be identified by the shape of the dorsal plate and by the long whip like chelicerae (Calneck, 1997). The chicken mite infests chickens, turkeys, pigeons, and various wild birds. Chicken mite is nocturnal feeders that hide during the day under manure, on roosts, in cracks, and crevices of the chicken house where they deposit eggs. Populations develop rapidly during the warmer months and more slowly in cold weathers (Kahn, 2005).

Northern fowl mite (*Ornithonyssus sylviarum*) is the commonest and most important permanent parasites of poultry in all major poultry production areas of the United States. It also recognized as a serious pest throughout the temperate zone of other countries. It is extremely common in almost all types of production facilities. Unlike the chicken mite, the northern fowl mite can easily be found on birds in the day as well as night, since breeds continuously (Calneck, 1997). Tropical fowl mite (*Ornithonyssus bursa*) is distributed throughout the warmer region of the world and possibly replaces the northern fowl mite in these regions. It is a much less important pest in the United States. Hosts include poultry, pigeons, sparrows and humans. The tropical fowl mite closely resembles the northern fowl mite but can be distinguished by the shape of the dorsal plate and pattern of setae. This mite can pass entire life cycle on chickens (Calneck, 1997). Transmission of the chicken mite, as well as the northern fowl mite and tropical fowl mite is by depression or by contact with infested birds, animals or inanimate objects (Kahn, 2005).

The fowl tick, also called soft-bodied tick, inhabiting poultry houses belong to the family *Argasidae*. They do not have scutum (dorsal head), with exception for larvae stage they feed intermittently in all stages. The integument is leathery, wrinkled and granulated in appearance. The capitulum (head) is ventrally placed near the anterior margin of the body. The genus *Argas* consist of three species: *Argas persicus*, *Argasanchezi* and *Argas radiates* (Calneck, 1997).

Soft bodied ticks (*Argasidae*) are the most important ticks of poultry. Birds suffer chiefly from attacks of these ticks during the warm dry season. Loss of blood may reach proportion of fatal anemia at the least, there may be emaciation, weakness, slow growth and

lowered production. Ruffled feathers, poor appetite, and diarrhea are signs suggesting tick infestations. The fowl tick is capable of transmitting the highly pathogenic spirochetes *Borrelia anserine* in many parts of the world. Tick-borne avian spirochetosis has been reported in chickens and turkeys in the United States. Fowl ticks have been reported to transmit *Aegyptianellapullorum* and fowl cholera (*Pasteurellamultocida*) in some regions of the world (Calneck, 1997).

The phylum Arthropoda includes the two-winged, or dipterous, flies. The larvae or maggots of these flies may invade living or necrotic tissue of animals and humans, producing myiasis. Multiple dipterous flies are thought to be capable of producing ocular myiasis. It is thought that the larvae are imbedded in the eye, that they burrow directly through the sclera and then under the retina. Typically, they leave asymptomatic tracks throughout the fundus, but a number of cases of destructive endophthalmitis have been reported, particularly from Scandinavia. Ectoparasitic infestations are often intensely itchy, causing considerable annoyance and discomfort. These conditions are often focally hyperendemic in impoverished communities, with a particularly high prevalence in vulnerable families, households, and neighborhoods (Richard, J., and Scott, A., 2017).

### **Epidemiology of Ectoparasites of Chickens in Ethiopia**

Ectoparasites pose a serious health threat and constitute major impediments in poultry production in many countries of world including Ethiopia. External parasites of poultry are common in the tropics because of the favorable climatic conditions for their development and the

poor standards of poultry husbandry. Some of the ectoparasites are of particular importance as vectors of pathogens and host specific. The overall ectoparasite prevalence indicates that lice received the highest percentage (65.1%), and followed by fleas (12.8%), tick (6.8%) and mite (5.9%) with significant difference ( $P < 0.001$ ). Fleas had the highest frequency of occurrence with an 83.5% prevalence followed by the lice with the prevalence of 33.85% and the lowest was fowl tick with the prevalence of 4.96% (Tessema, 2019). Among the lice species observed, *Menopongallinae* had the highest prevalence (49%) in backyard farm. *Culclotogaster heterographus* (40%) was the second most prevalent species of lice encountered (Mekuria S., and Gezahegn E., 2010).

Incidence rates remained distinctly higher on older birds; the intensity of infection remained distinctly higher during the summer months (Saxena *et al.*, 1995). The major outbreaks of lice infestation occurred in the hot dry period of February-May (Fabiya, 1980). *L. caponis* infestations were diagnosed in April, July, August, November (Islam *et al.*, 1999). In terms of ectoparasite prevalence, chicken breeds were in order: Harco > Lumacco > Rhode Island Red > Barbrock (Ugochukwu & Omije, 1986). The lice are most prevalent in summer seasons i.e. June, July & August and scarcest from November to February (EL-Kiflet *et al.*, 1973). The optimum temperature for the development of *Manacanthus stramineus* is 37.7 – 41.5°C (Brown, 1970). *Menacanthus pallidulus*, *Menopongallinae*, *Goniodes dissimilis* and *Goniocotes gallinae* were most abundant on the back region of the host and *Lipeurus caponis* on the wing feathers (Manuel & Anceno, 1981).

### **Risk factors**

In distribution poultry ectoparasite the most common risk factors are management system, age group, sex and breeds of chicken respectively. Regarding to risk factors of disease ectoparasite

adult age groups more susceptible to ectoparasite than young chicken due to most of the time young chicken confined in the house than scavenging outdoor like adult chicken (Asefa *et al.*, 2017). 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, becoming vulnerable to ectoparasitism. Indigenous chicken are raised under traditional or 'backyard' conditions without any input and are difficult to monitor, so extensive management system more susceptible to ectoparasite than intensive management system this due to scavenging manner system they prove to more ectoparasite than intensive system that suitable environment for disease (Mungube *et al.*, 2008). The poor hygiene and management practices could favor propagation and fasten the life cycle of the parasites. In addition to management problems and inadequate feeding, prevalence of disease also reduces the productivity of chickens under traditional management system (Sonaiya, 1990).

Regarding to risk factors of disease ectoparasite infestation female chicken more infected with ectoparasite than male chicken. Social behavior also increases opportunities for vertical (within species) transmission of ectoparasites from one individual to the other as most of the time female's huddle together. The male chicken may introduce more parasites on to the female during mating, since the male is forced upon the female for every mating (Saxena *et al.*, 1995). However, some have stated that a number of host factors may occasionally cause variation in louse prevalence in some cases (Saxena *et al.*, 1995) but generally there is no significant difference in prevalence with respect to host sex. Local breed chicken was more infested than exotic breed chicken. Due to Local breeds are allowed to free-range, thus becoming more vulnerable to ectoparasite than exotic breed, which are almost kept in door. The management system is also

varying from place to place and in different husbandry system.

### Constraints to the Poultry Production

External parasites of poultry are common in the tropics because of the favorable climatic conditions for their development and the poor standards of poultry husbandry. Some of the ectoparasites are of particular importance as vectors of pathogens and host specific (Hopla *et al.*, 1994). They can inhibit the skin or outgrowths of the skin of the host organism for various periods (Durdene *et al.*, 1997). Some are blood suckers while others burrow in the skin or live on or in the feathers (Bishop *et al.*, 1942). Ectoparasites, such as ticks, mites and fleas, live on domestic chickens. Mites have long been recognized as a cause of dermatitis and skin damage on all classes of poultry (Hobbenaghi *et al.*, 2012). Among the animal production activities, poultry sector is the fastest growing. Nevertheless, it has been adversely affected by a variety of constraints (FAO, 2006). Among the constraints, parasitism ranks top in village chicken production (Nnadi P., 2010)

The enormous expansion in the commercial poultry production sector has been possible through improved management in terms of management procedures such as total separation between different age groups, introduction of the "all in - all out" system, efficient housing systems, routine vaccination programmes, proper feeding and avoidance of predators. The mortality in commercial systems is 10% or less per year. However, development of resistant infectious agents (e.g., *E.coli*, *Salmonella*, *Eimeria* spp. etc.) is

introducing new problems to the commercial sector. Especially the aspect of zoonotic diseases such as *Salmonella* and *Campylobacter* is of great concern. The widespread use of drugs has led to resistance towards a range of antibacterial and anthelmintic drugs. Furthermore, concern about drug residues in poultry products is growing

among consumers. The low productivity in traditional systems is mainly due to high mortality, which is caused by mismanagement, diseases, lack of nutritional feeding and predators. In traditional systems the mortality has been estimated to be in the range of 80 - 90% within the first year after hatching! Especially chicks under 3 months of age have high mortality rates. This means that populations can hardly survive (Calnek *et al.*, 1991).

### Ectoparasite Infestation of Chicken in Extensive System in Ethiopia

Rural poultry production is an integral part of a balanced farming system and has 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 households, 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 compared to other farm activities (Tadelle and Ogle, 1996).

Traditional backyard poultry husbandry exposes chickens to many types of parasites. 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).

Indigenous chickens are known to roam around homesteads scavenging for food leading to spread of ectoparasites when they come into contact with infested birds (Sabuni *et al.*, 2010). Mungube *et al.*, (2008) stated that some of these ectoparasites are known to hide in poor hygiene poultry houses and thus poor husbandry and lack of ectoparasite control measures were possible factors contributing towards their high prevalence. Previous studies showed that mites, fleas, and lice are the most common ectoparasites affecting indigenous chickens. Mites were the most common of all ectoparasites observed similar to followed closely by fleas (Amede *et al.*, 2011).

## Ectoparasite Infestation of Chicken in Intensive System in Ethiopia

We noted that most of the regions showed a high percentage of ectoparasite infestation, clearly indicating how common the problem is, hence should not be overlooked as was suggested by Amedeet *et al.*, (2011). Ectoparasites are known to be rampant in warmer regions as the environment favors parasitic life cycles (Sabuni *et al.*, 2010). Despite its drawbacks, the largest proportion of eggs and poultry meat consumed in the country comes from indigenous birds produced by rural growers. Since recent years, an emerging middle-class urban sector with higher income and more buying power has boosted the demand for poultry products. However, the traditional production system could not satisfy this demand; consequently, this condition has led directly to expansion of intensive and semi-intensive poultry production particularly within urban and peri-urban areas (Paolo, P., and W. Abebe, 2008 and Demeke S., 2007). Parasitic diseases and particularly ectoparasites have been identified as the major impediment to chicken health worldwide owing to the direct and indirect losses they cause (Permin *et al.*, 2002). They can affect bird health directly by causing irritation, discomfort, tissue damage, blood loss, toxicosis, allergies and dermatitis which in turn alleviate quality and quantities of meat and egg production. Also they act as mechanical or biological vectors transmitting number of pathogens (Gedion, Y., 1991).

### Clinical signs and pathogenesis

Flocks infested with lice or mites show similar general symptoms. Birds will have decreased egg production; decreased weight gain; decreased carcass-grading quality; increased disease susceptibility and decreased food intake. If any of these generalized symptoms are observed, a visual evaluation is recommended. Inspect birds around the ventral region for signs of lice or mites since infestations usually start in this area of the bird. Ectoparasites can affect the health of chickens by causing tissue damage and blood loss (Vegad,

2004), toxicosis (Aleya and Sabrina, 2011), dermatitis and allergies (Taylor *et al.*, 2007). Furthermore, some ectoparasites act as vectors of a number of pathogens (Swai *et al.*, 2010) and during periods of heavy infestation, may weaken them, and lower their resistance and may lead to death (Soulsby, 1982).

Ectoparasites impose serious threat to the physiology and feed efficiency by giving continuous irritation and blood sucking effect thus they are associated with emaciation, anemia and eventually loss of production of egg and meat (Perminet *et al.*, 2002).

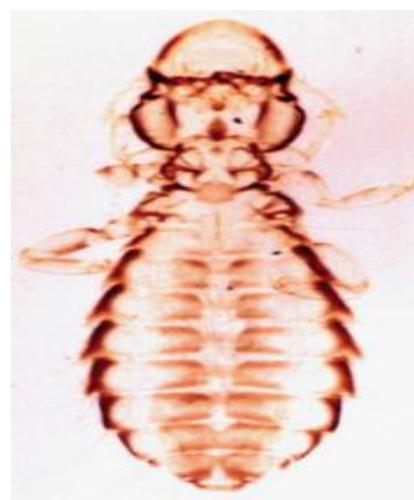


Figure 1 Chicken head louse & chicken Stick tight flea from left to right (P. E. Kaufman, 2016)

**Diagnostics and Identification method**

The common free living ectoparasitic mites of poultry belong to the family *Dermanyssidae* and include the chicken mite, northern fowl mite, and tropical fowl mite. They are blood suckers and can run rapidly on the skin and feathers. The chicken mite (*Dermanyssus gallinea*, also called red mite, is found worldwide and is particularly serious in warmer parts of the temperate zone in older poultry houses. The mite is rare in modern large commercial caged layer operations, but is seen frequently in modern broiler breeder farms. It can be identified by the shape of the dorsal plate and by the long whip like chelicerae (Calneck, 1997). The chicken mite infests chickens, turkeys, pigeons, and various wild birds. Chicken mite is nocturnal feeders that hide during the day under manure, on roosts, in cracks, and crevices of the chicken house where they deposit eggs. Populations develop rapidly during the warmer months and more slowly in cold weathers (Kahn, 2005).

There are two major types of mites found on the body of poultry. They are the Northern Fowl Mite (or in tropical environments the Tropical Fowl Mite) and the Chicken Mite (or Red Roost Mite). The Northern Fowl Mite is the most common external parasite in poultry, especially in cool weather climates. It sucks blood from all different types of fowl and can live in the temperate regions of the world. As compared to the Chicken Mite, the Northern Fowl Mite primarily remains on the host for its entire life cycle (Calneck, 1997).

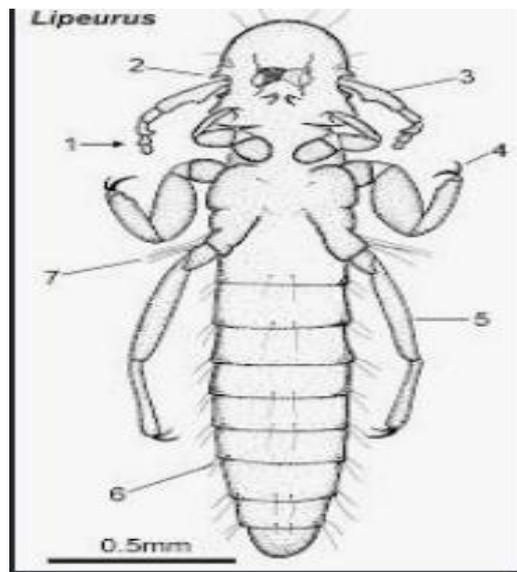
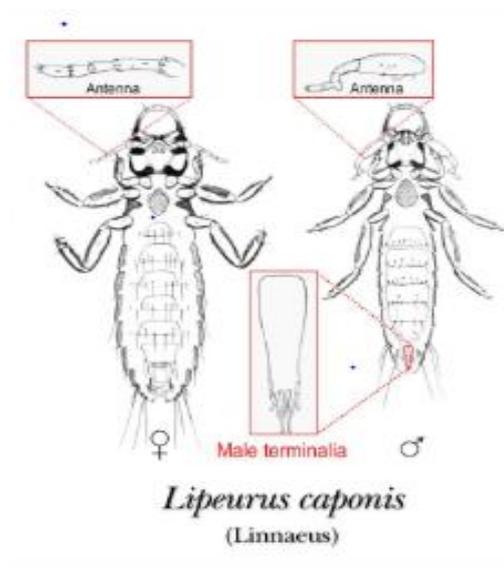


Figure 2 *Lipeurus caponis*



Figure 3 Wing louse and Shaft louse from left to right

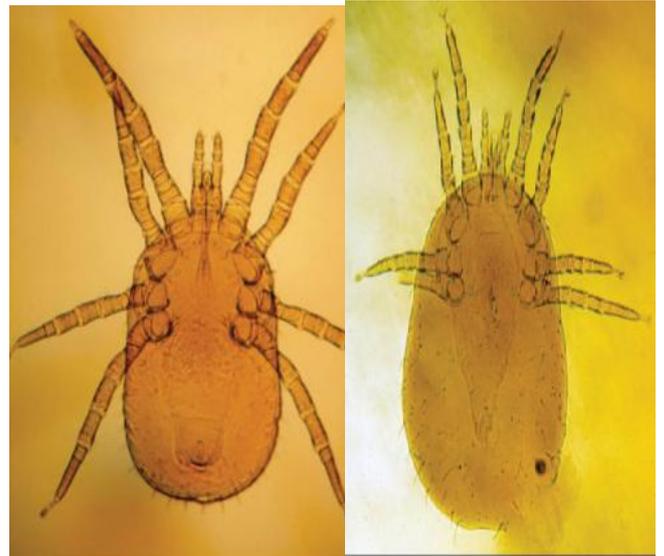


Figure 4 Red chicken mite, Northern fowl mite and Tropical fowl mite from left to right



Figure 5 Fowl tick and Stick tight flea from left to right

(P. E. Kaufman, 2016)

### Treatment

A number of chemicals and herbal products are used for the treatment of ectoparasite in poultry some of them include the use of *carbaryl* (*Sevin*®). Treat the walls, floors, roosts, nest boxes, and the birds simultaneously. When dusting an entire house, be careful to avoid feed contamination. One treatment method for small flocks or individual birds is the use of a dusting bath with *Sevin*®. Place the bird into a garbage bag containing the medicated powder with the birds' head out and rotate/shake the bag to completely cover the bird with powder. Be sure

not to inhale the medicated powder during treatments. The use of a facial mask is recommended to prevent inhaling this medicated powder. Because the life cycle of lice and mites is approximately 2 weeks, treatments should be repeated every 2 weeks as needed. Carefully read all labels prior to treatment to make sure withdrawal times are followed for food-producing poultry. Severe lice or mite infestations can be treated initially with a kitten strength dose of a *pyrethrin*-based medicated spray on the birds to reduce the initial numbers. If problems persist, contact a veterinarian for treatment with such medications as Ivermectin®. Prevention is the best method of treatment. For poultry used in exhibition or for new poultry entering the flock, a minimum quarantine period of 2 weeks is recommended. During this time birds should be physically examined and treated if necessary (Manuel & Macatangay, 1981)

### Control and prevention

Sanitation and cleanliness are the keys to lice and mite control. Sanitation includes cleaning and disinfecting housing facilities and equipment between flocks. Moreover, reducing people traffic through housing facilities is recommended. Eliminating the contact between flocks and wild birds can reduce the potential transfer of external parasites. A number of chemicals and herbal products are used for the control of biting and sucking lice infestation of poultry. *Malix*, a dusting powder containing derris Phenol and Cresols at 2% kill lice. Complete control of *M. stramineus* on hens by treating with 100 mg *Coumaphos* (Co-Ral) dust per square fut.

A variety of chemical are used for the control of ectoparasite infestation in poultry. These include Phenol, Cresols, Pestoban, Malathion, Carbamates, Pyrethroids (i.e. Permethrin, Cypermethrin), Trichlorphon, Dichlorvos, DDT powder, Coumaphos, Lindane and BHC, Pflispray, Carbaryl, Methyl bromfenvinphos and Herbal products. 2.7% butanate and 0.5% lindane suppress (Jungmannet *al.*, 1970). 2% trichlorphon (Puchkova – EA, 1977). *Biollethrin*, *Biopresmetrin*, *Neo-pinamin* and *Pybuthrin* were

effective in low concentration against *Menacanthus stramineus* (Kachekova & Frolov, 1978). *Dichlorvos* (Nuvan.7) effective for lice control (Grzywinski *et al.*, 1980); 0.5 1% solution of Phosalone (Zolone) effective against lice infestation (Reddy *et al.*, 1980). Coumaphos (as Asuntol-50) Malathion, Trichorphan (Neguvon) Pflspray, Permethrin (Coopex) and Carbaryl were highly effective in killing lice (Manuel & Macatangay, 1981). The effectiveness of 5% Methyl bromfenvinphos (Polwet. 5) against the fowl ectoparasite (Zlotorycka *et al.*, 1982).

A 2% aqueous solution of Pestoban (Herbal products) very effective against lice infestation (Ahmed, 1986). Pestoban application at a dilution at 1:30 was sufficient to control lice infestation (Sinha *et al.*, 1989). Bacilan, Dipel (a commercial preparation of *Bacillus thuringiensis* subsp. *Kurstaki*) *B. thuringiensis* the serotypes *Kurstaki*, *Finitimus*, *Kenya* and *Morrisoni* were most toxic to *M. gallinae* (Loncet *et al.*, 1988). Permethrin (Pavlovic *et al.*, 1989). Pyrethroids are effective against ectoparasites (Salisch, 1989). Vixon (Carbaryl preparation) highly effective against sucking and biting lice (Werner *et al.*, 1989).

The Guinea fowl and chicken were successfully treated with DDT powder and the Peahen with Coumaphos (Okaeme, 1989). Cypermethrin (Chhabra & Donora, 1994). A single treatment with Gammatox as 1% dip was effective in controlling *L. caponis* infestation (Islam *et al.*, 1999). Three biological products were available in the USSR for ectoparasite control: two of them (*Entobacterin* and *Dendrobacillin*) were preparations of spores and endotoxin of *Bacillus thuringiensis* and the third (*Boverin*) Conidiospores of the Fungus *Beauveria bassiana*. These were active, alone or in combination with chemical pesticides, against lice infestation (Frolov *et al.*, 1974).

### Conclusion and Recommendations

Poultry production has been a major source of poultry meat and egg production in Ethiopia and yet is still the most neglected in husbandry practices and particular

health care. Generally, the study indicated that ectoparasites are highly prevalent in backyard production systems than in intensive farming system and in local chickens than exotic ones., which is associated with lack of due attention with respect to hygienic system, treatment and control practices. In the study area special in farmers rearing poultry in rural when comparing with urban area there was no any modern animal health care for these back yard kept poultry that might have attributed for higher distribution of ectoparasites. The occurrence and intensity of parasitic infestations may be influenced by a number of epidemiological factors including host, sex, age, breed and management system. Based on the above conclusions the following recommendations are forwarded:

- An integrated poultry ectoparasitism control strategy should be implemented.
- Proper sanitation, good hygiene, use of specific tested chemicals should be practiced.
- Provision of regular training on poultry production and health care need to be done in order to enhance the awareness of poultry producers.
- Veterinary service delivery to poultry producers in rural, peri-urban and urban areas should be made.

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