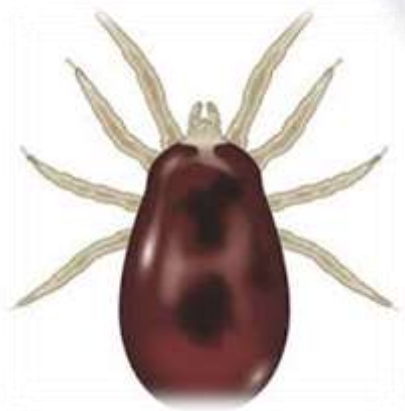
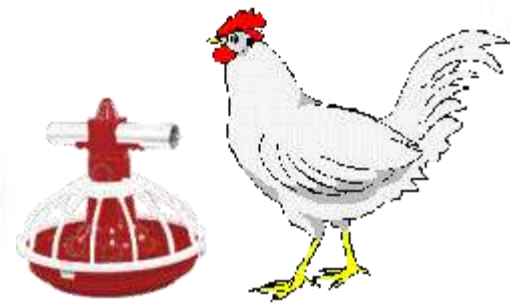


PESTS OF POULTRY AND THEIR FUTURE PRECAUTIONS



Presented by
ARUNKUMAR.p

INTRODUCTION

- ❖ External parasites of poultry are arthropods that live on **skin** and **feathers**.
- ❖ Insects that develop in **poultry manure, dead carcasses, and moist organic debris**, thereby causing sanitation and public relations problems.

ECTOPARASITES

- ❖ Poultry ectoparasites are members of the Animal **Phylum- Arthropoda**
- ❖ Externally **segmented bodies, jointed appendages, and chitinous exoskeletons.**

CLASS:INSECTA

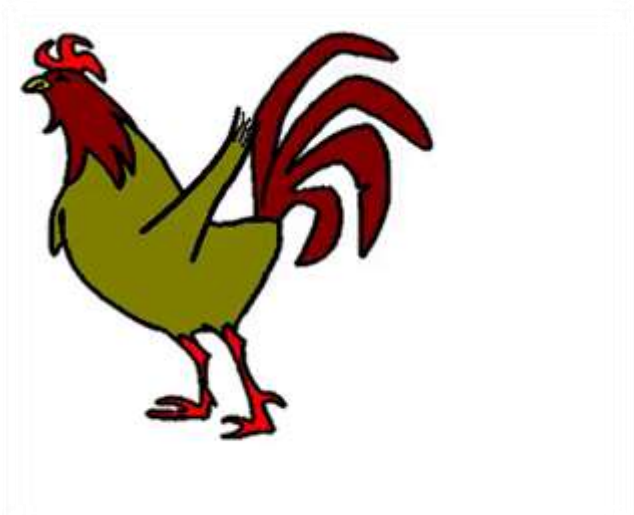
- LICE
- FLIES
- FLEAS
- BUGS

CLASS:ARACHNIDA

- MITE

DETECTION OF PEST

- ❖ Irritation.
- ❖ Scratching.
- ❖ Preening.
- ❖ **Unexplained production drop.**
- ❖ **Lice and northern fowl mites-** examining the skin after parting the feathers.
- ❖ **Vent, head, and legs-** closely examined.



- ❖ **20-50 birds should be checked a minimum of two times a month.**



LICE

- **CHICKEN BODY LOUSE - *Menacanthus stramineus***
- **SHAFT LOUSE - *Menopon gallinae***
- ***CHEWING LICE* - *Menacanthus cornutus***
- **WING LOUSE - *Lipeurus caponis***
- **CHICKEN HEAD LOUSE - *Cuclutogaster heterographus***
- **FLUFF LOUSE - *Goniocotes gallinae***

FLIES

- HOUSE FLY- *Musca domestica*
- FRUIT FLY
- LITTLE HOUSE FLY- *Fannia canicularis*
- BLACK GARBAGE FLY- *Hydrotea ignava*
- BLOW FLIES - *Chrysomya rufifacies*

BEETLE

- DARKLING BEETLE OR LESSER MEALWORM- *Alphitobius diaperinus*

BUGS

- COMMON BED BUG- *Cimex lectularius*

FLEA

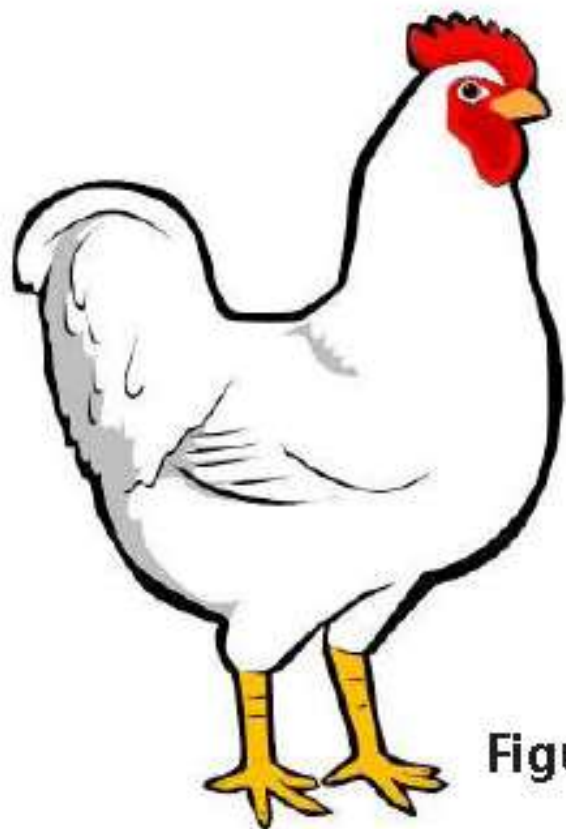
- CAT FLEA- *Ctenocephalides felis*
- STICKTIGHT FLEA- *Echidnophaga gallinacea*

MITE

- NORTHERN FOWL MITE, or FEATHER MITE- *Ornithonyssus sylviarum*
- CHICKEN MITE- *Dermanyssus gallinae*
- SCALY-LEG MITES- *Knemidocoptes mutans*
- DEPLUMING MITE- *Neocnemidocoptes laevis gallinae* var. *gallinae*

- ❖ Lice infestation causes **weight loss** at the rate of about **711 gms per birds** and **decrease the egg yield** at the rate of about **66 egg per bird** in a year (El-Kifl *et al.*, 1973) and lameness is associated with heavy lice infestation (Okaeme, 1989).





CHICKEN BODY LICE

Look for small, yellow-brown, cigar-shaped, quick moving insects on skin and feathers on breast and under wings.

Figure 6. Where to look for chicken body lice on a chicken

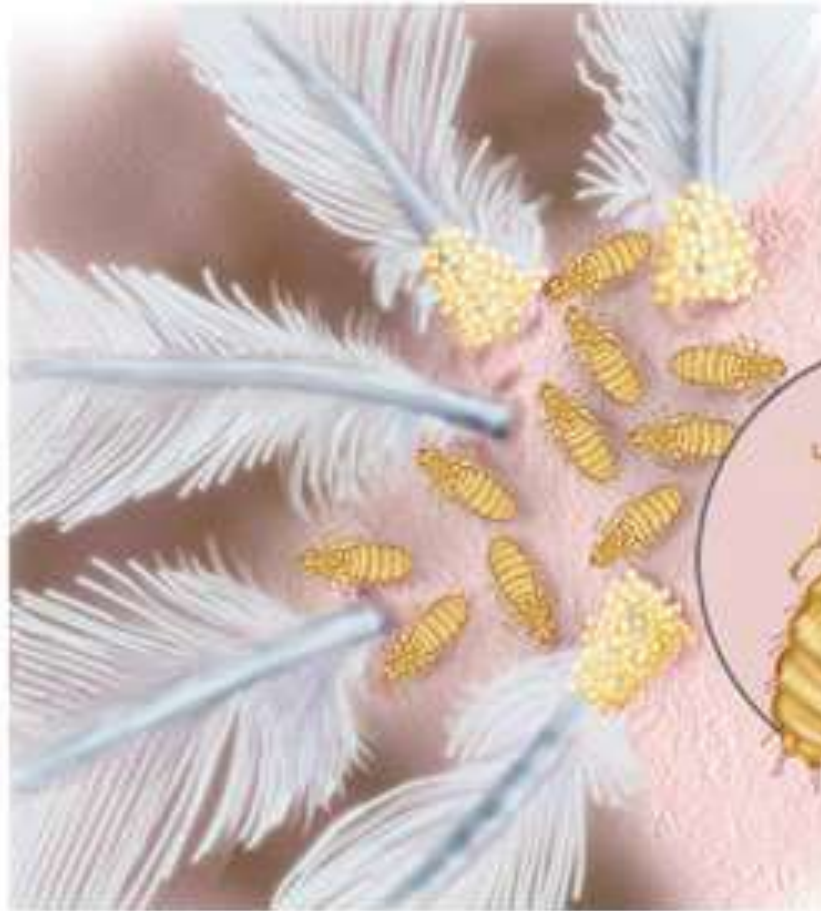
Scientific classification

- ❖ Kingdom: Animalia
- ❖ Phylum: Arthropoda
- ❖ Class: Insecta
- ❖ Order: Phthiraptera
- ❖ Sub order: Amblycera
- ❖ Family: Menoponidae
- ❖ Genus: *Menacanthus*
- ❖ Species: *M. stramineus*, *M. gallinae*,
M. cornutus

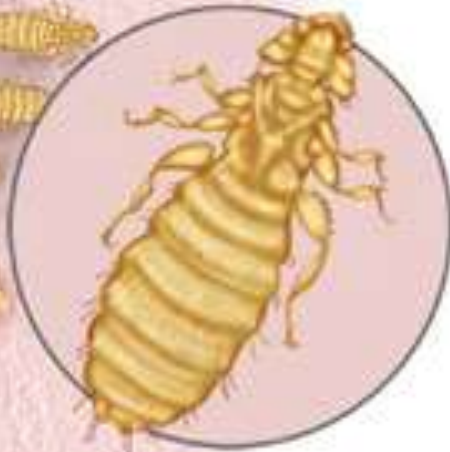
CHICKEN BODY LOUSE - *Menacanthus stramineus*

- ❖ Found on the **host's skin**
- ❖ Detected by **parting the feathers**
- ❖ Abundant in **vent, breast, and thigh** regions.

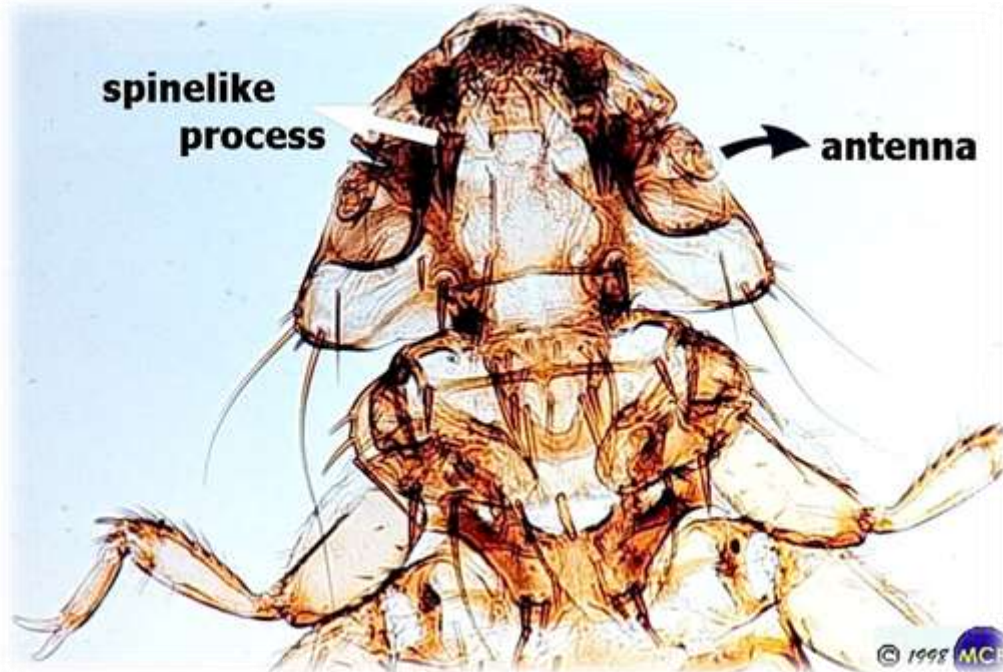




The body louse likes sparsely feathered areas, such as below the vent and under the wings, where it leaves scabs on the skin and masses of eggs at the bases of small feathers.



- ❖ **Adults** – (3-3.5mm) in length.
- ❖ **Eggs**- hatch after 4-5 days.
- ❖ **Nymphal instar**- lasts about 3 days
- ❖ **Generation time** –(13-14days)

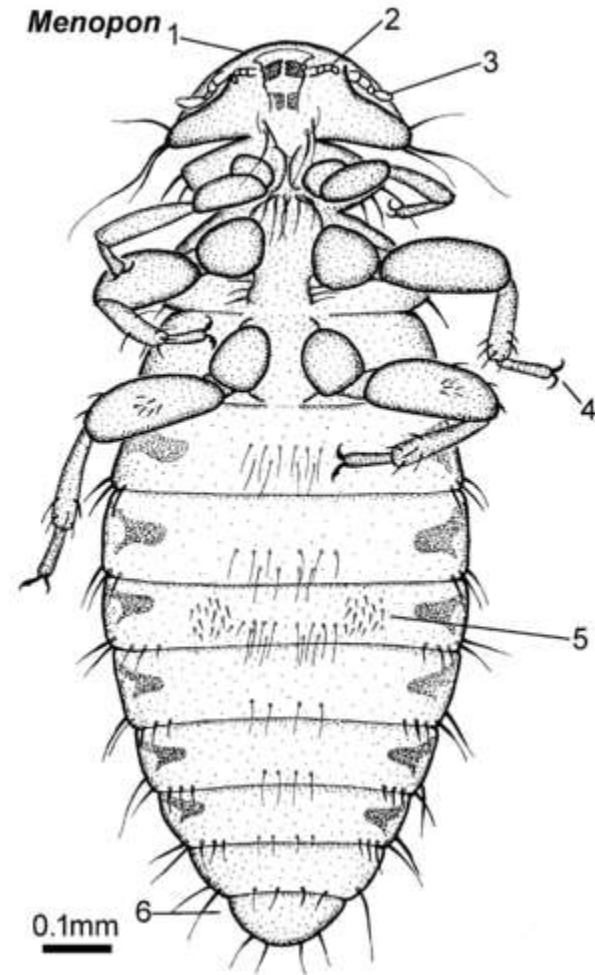


- ❖ **Females**- lay **one or two eggs** per day, cementing them in clusters at the bases of feathers, especially **around the vent**.

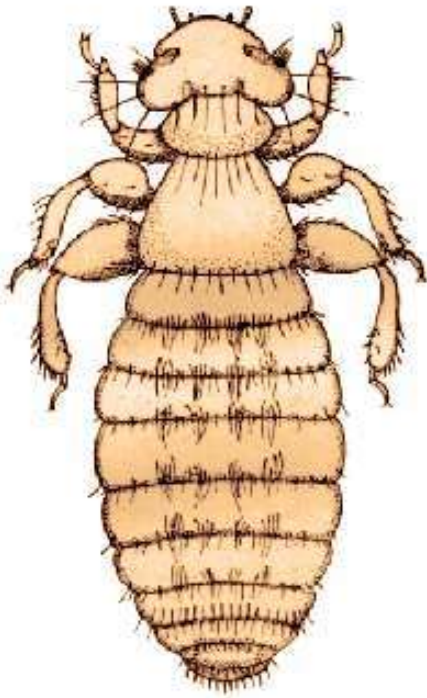


SHAFT LOUSE - *Menopon gallinae*

- Found in a line along the **shaft of a feather.**
- **Do not normally rest on the skin,** they quickly disperse to the skin if disturbed.



- **Adults**-(2 mm) in length
- **Females**- deposit eggs singly at the base of the shaft on **thigh** and **breast feathers**.



CHEWING LICE- Menacanthus cornutus

- Large poultry louse
- Occur in large numbers, especially on **backyard chicken flocks** (Murillo and Mullens, 2016).
- **Poultry lice-** transfer to new birds via **direct host contact**.



- Most species can survive for several **hours or days** off the host.
- They also can **infest** new hosts during transportation.



Scientific classification

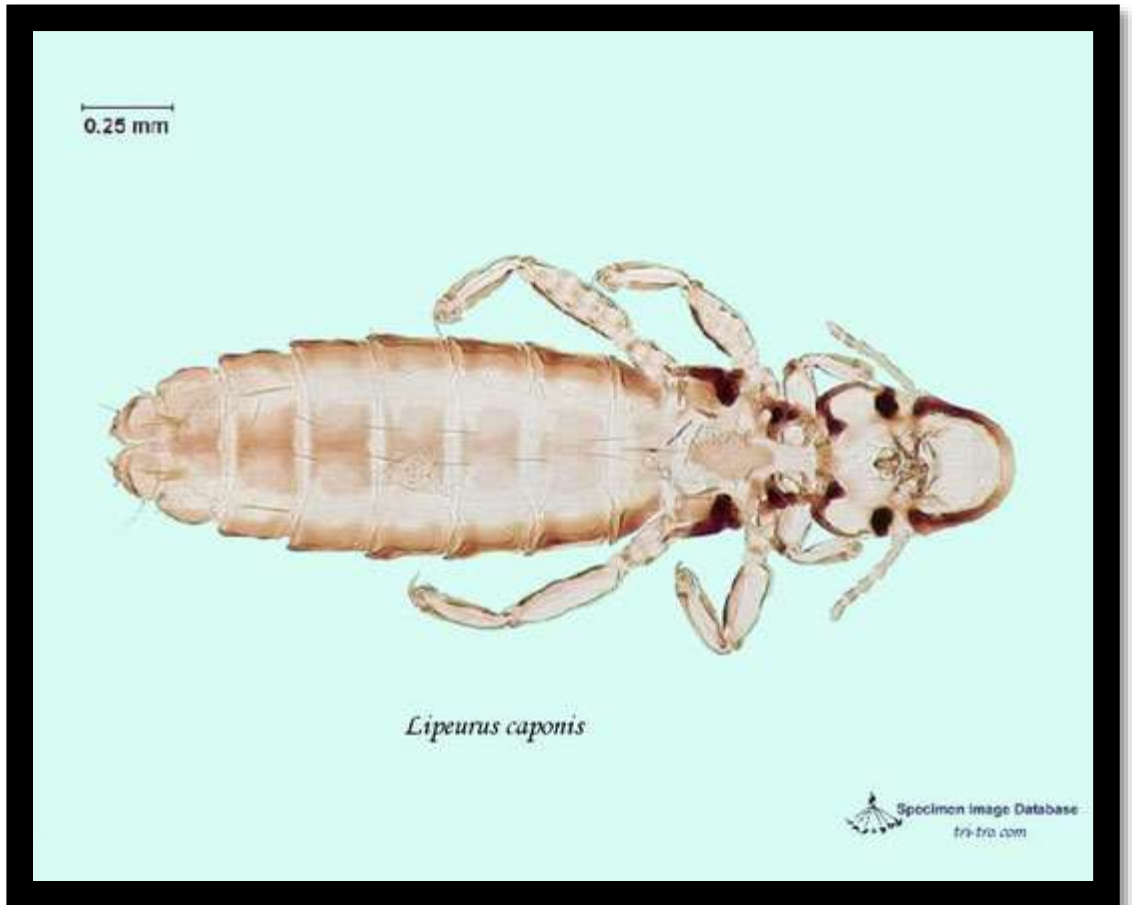
- ❖ Kingdom: **Animalia**
- ❖ Phylum: **Arthropoda**
- ❖ Class: **Insecta**
- ❖ Order: **Psocodea**
- ❖ Family: **Philopteridae**
- ❖ Genus: *Lipeurus*
- ❖ Species: *L. camponis*

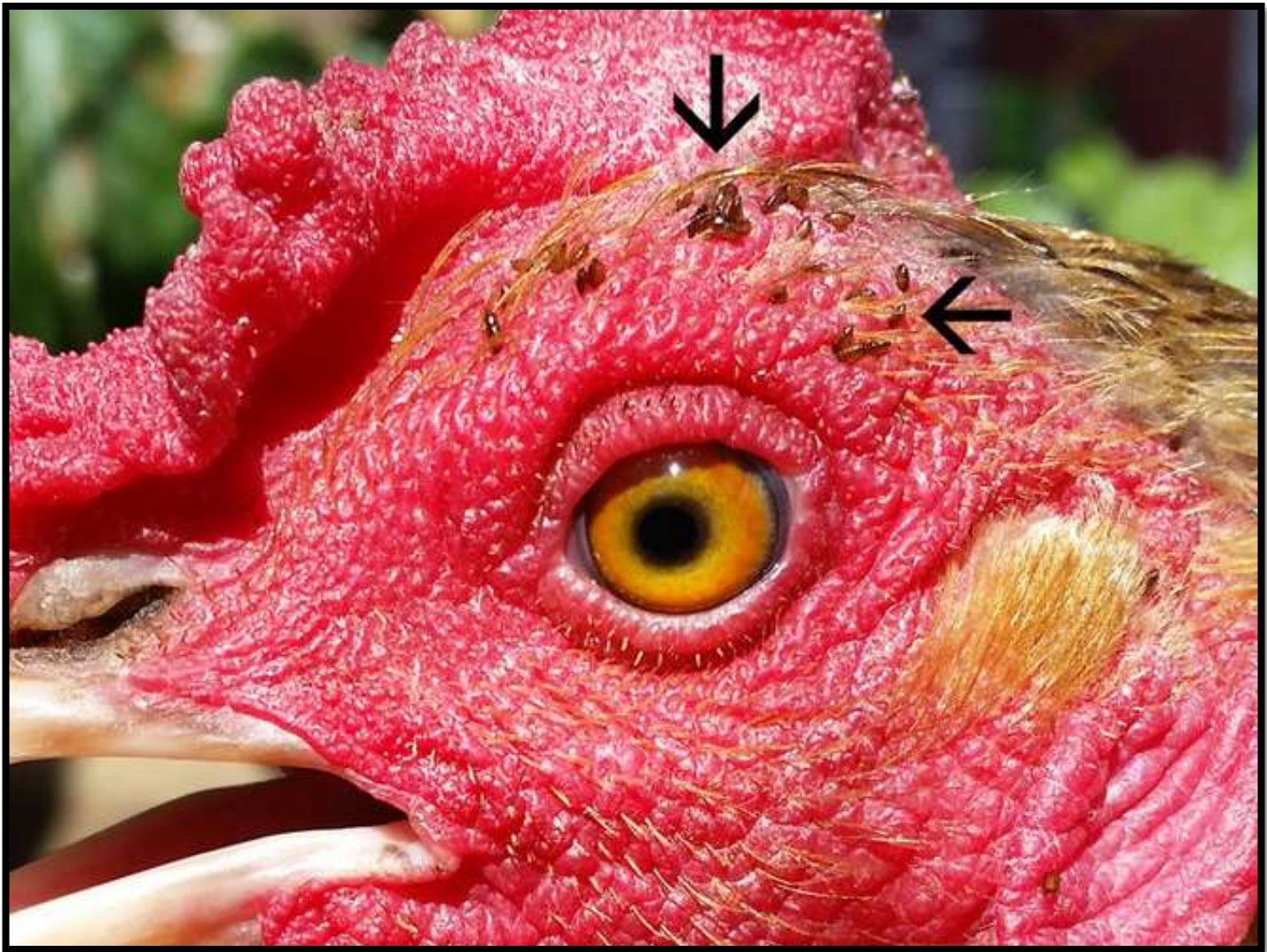
WING LOUSE - *Lipeurus caponis*

- **Slow moving** Lice
- **Eggs**- base of a **feathers**.
- **Nymphal stages**- species each last **5-18 days**



- **Generation time-** typically is **18-27 days**
- **Females-** live up to **36 days.**

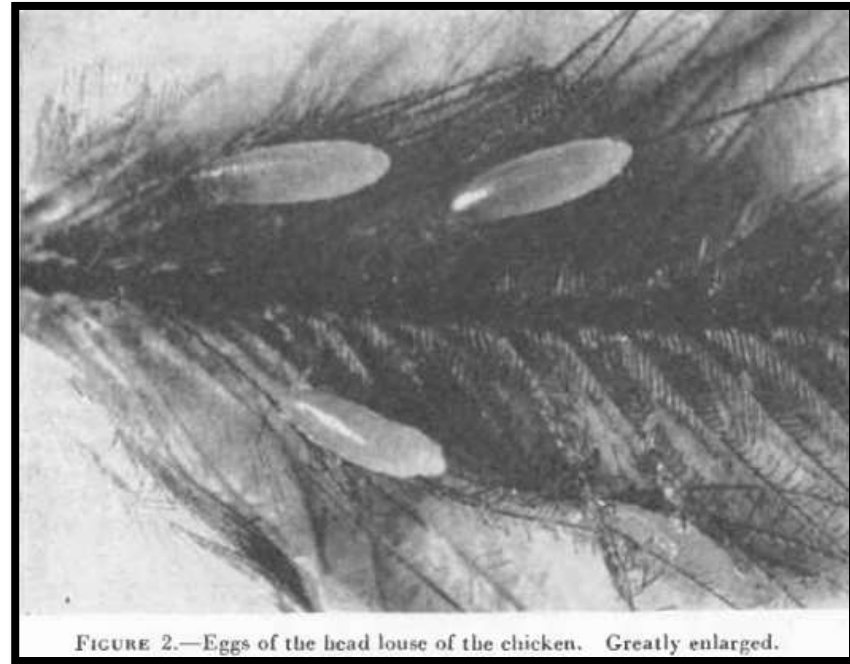


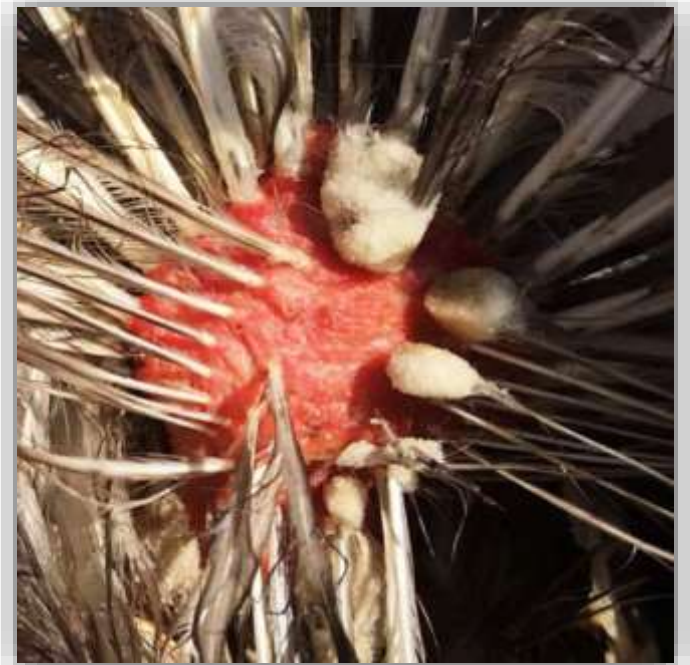
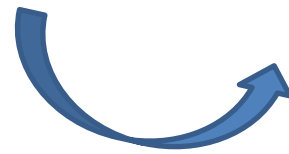
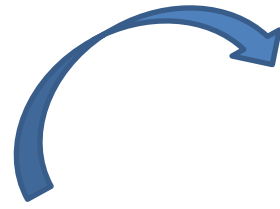


Any Guess?

CHICKEN HEAD LOUSE - *Cuclutogaster heterographus*

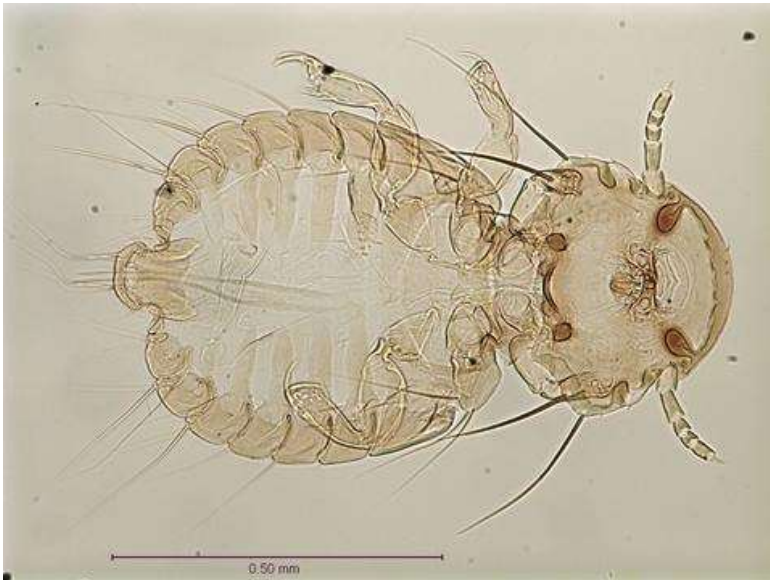
- **Females**- attach their eggs to the bases of downy feathers.
- **Eggs**- hatch after **5-7 days**
- **Nymphal instar**- lasts **6-14 days**
- **Generation time**- **35 days**.





FLUFF LOUSE - *Goniocotes gallinae*

- A **small louse** that often infests the **entire body of chickens**, especially in the **fluffy areas at the feather bases**.



Management of lice

- Chemicals used to kill lice are called **Pediculicides**.
- **SODIUM FLUORIDE:**
 - A single treatment will destroy all species of lice, including all eggs, without injury to the fowls.
 - Use by diluting the powder by adding **2 parts** of some **fine material**, such as **flour**, **road dust**, or **sulfur**, to **1 part** of **sodium fluoride**.

- It is called **pinch method** is preferable to the use of a shaker.
- It involves **less waste** and **less dust floating in the air**, and only one operator is required.
- The fowl is held in one hand by grasping the base of the wings over the back, and the powder, kept in a pan near the hand, is applied by placing a small pinch among the feathers next to the skin.
- About 11 pinches are applied to the fowl, 2 along the **back**, 1 on the **neck**, 1 on the **head**, 1 on the **breast**, 1 **below the vent**, 1 on each **thigh**, 1 on the **tail**, and 1 on **each wing** when spread.

- Since **Sodium fluoride** is irritating to the nose and throat, the operator should wear a respirator or a **piece of wet cloth** over his **nose** and **mouth**.
- The fowls should be released in the open air as fast as they are treated.

- To insure treatment of all louse carriers the fowls should be shut up at night and a search made for any that **do not roost** in the poultry house.



Review

Lice Infestation in Poultry

MUHAMMAD NISAR KHAN, M. NADEEM, ZAFAR IQBAL, MUHAMMAD SOHAIL SAJID AND RAO ZAHID ABBAS
Department of Veterinary Parasitology, University of Agriculture, Faisalabad-38040, Pakistan

- ❖ **Biological control.**
- ❖ **Three biological products were available in the USSR for ectoparasite control:**
- ❖ **Two of them (**Entobakterin 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**).**



Guess?



Scientific classification

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Diptera

Family: Muscidae

Sub family: Muscinae

Genus: *Musca*

Species: *M. domestica*

House fly- *Musca domestica*

- Common **fly pest** with the most persistence.
- Does not bite poultry but can **transmit poultry disease**.



- **Adult flies**- feed on various materials such as **manure**, **broken eggs**, **spilled feed**, and **decaying organic materials**.



❖ **Carry and spread human and poultry disease agents and leave fly specks on eggs.**

❖ **For example:** House fly is the intermediate host for the **common tapeworm** in chickens, and it has been implicated in the transmission of several **viral and bacterial pathogens of people and animals.**



FRUIT FLY

- Nuisance pests.
- They are often live in places where food has been **rotted** and **fermented**.
- Contaminate food with **bacteria** and other disease producing microorganisms.



- **Adult fruit flies- 1/8 inch long and generally have red eyes.**



- **Fruit flies lay their eggs close to the surface of wet organic materials.**



LITTLE HOUSE FLY- *Fannia canicularis*

- ❖ **Smaller** than the **house fly** (3/16 inch long)
- ❖ Prefers **less moist medium** for breeding and reproduction.
- ❖ **Poultry manure media-** egg laying.
- ❖ **Adult fly-** prefers **shade** and **cooler temperatures**.



❖ Often seen **circling aimlessly** under hanging objects in the poultry house, egg room and feed room.



BLACK GARBAGE FLY- *Hydroteia ignava*

- ❖ **Colour**- shiny **bronze-black**
- ❖ **Size**- **smaller** than the house fly.
- ❖ **wings**- held **straight back**.
- ❖ Tends to **remain on its food source** at night rather than resting on the ceiling or on outdoor vegetation, as does the house fly.



❖ **Female fly-** does not seem to fly great distances, but it has been found about **5 miles from its breeding area.**

❖ Known to **exterminate house fly populations**

❖ **Tolerate cold weather**

❖ **Life cycle-** similar to that of the **house fly.**

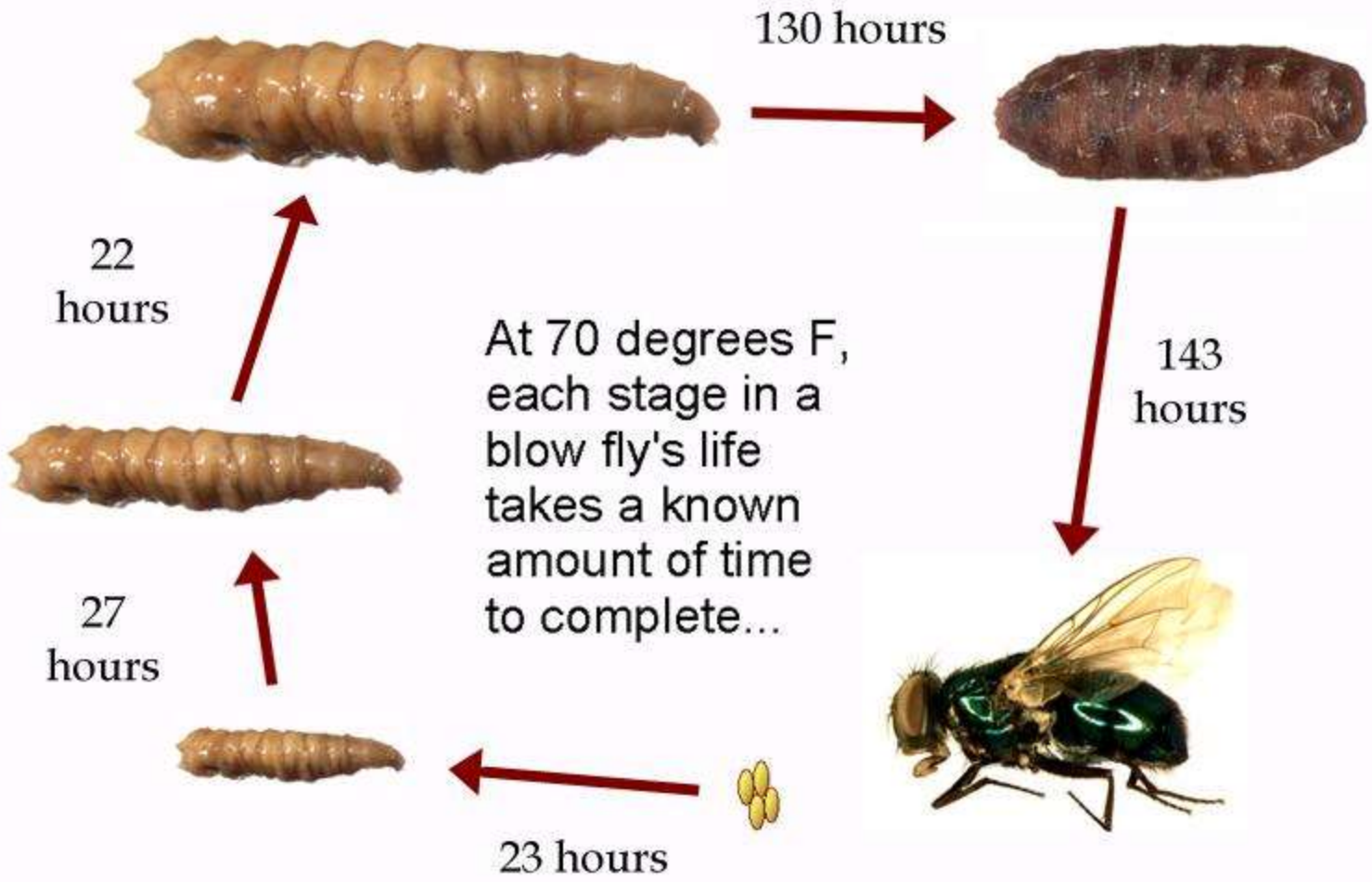


BLOW FLIES - *Chrysomya rufifacies*

- ❖ Also known as **green** or **blue** bottle flies
- ❖ **Size**- slightly **larger than** house flies
- ❖ **Colour**- **green**, **blue** or nearly black



The blow fly life cycle has six parts: the egg, three larval stages, the pupa, and adult.



❖ **Reproduction**- decaying animal and bird carcasses, dog manure, broken eggs and wet garbage



FLY MANAGMENT

❖ Cultural control:

• Sanitation:

- ✓ Quickly **remove** and **dispose of dead birds** and **broken eggs**.
- ✓ Immediately clean up and dispose of **feed spills** and **manure spills**, especially if they are wet.

• Moisture control

- ✓ Repair **leaks** in water system.
- ✓ Provide **adequate ventilation**.
- ✓ Provide proper **grading and drainage**.
- ✓ Use **pit fans**.

- **Manure management:**
 - ✓ To prevent fly breeding, **remove the manure often, at least twice a week.**
 - ✓ This **breaks the breeding life cycle.**
 - ✓ Spread as **thin layer.**
 - ✓ Avoid **piles or clumps of manure.**

Biological control:

- *Spalangia nigroaenea*

- ✓ Adult female wasp lays an egg on the fly pupa within the puparium (the hard, brown case containing the fly pupa).
- ✓ Then the developing wasp larva consumes the pupa and emerges as an adult.
- ✓ And never treat the entire manure surface with insecticides, except for **Cyromazine** (Larvadex®)
- ✓ otherwise, the beneficial insects as well as the pest flies will be killed.



Taxonomic studies of Macrochelidae mites (Acari: Mesostigmata) and their potential use to control *Stomoxys calcitrans* and *Musca domestica* (Diptera: Muscidae)

Advisor:

Prof. Dr. GILBERTO JOSÉ DE MORAES

Thesis presented to obtain the degree of Doctor in
Science. Area Entomology

- **Macrochelid mite- *Glyphtholaspis* sp**
- It feeds on **house fly eggs**.
- **First-instar (or first-stage) larvae**.
- Found on the **outside layer of manure**
- Consume up to **20 house fly eggs a day**.



Adult female of *Glyphtholaspis* sp. (Macrochelidae) preying larvae of *Musca domestica*

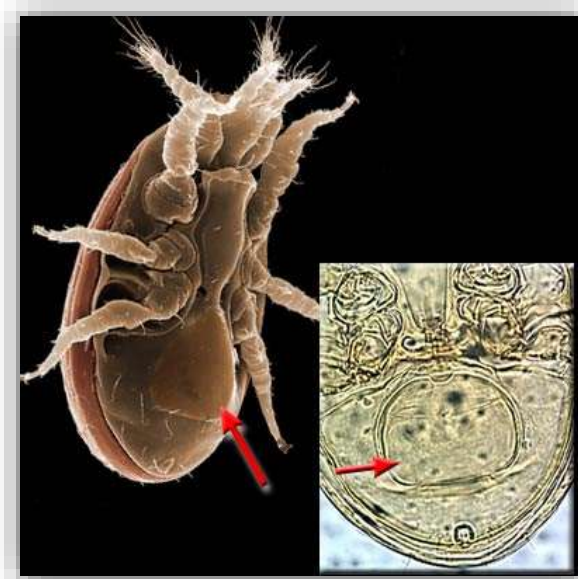
✓ Uropodid mite- *Fuscuropoda vegetans*

✓ Feeds only on first-instar house fly

❖ Hister beetle- *Carcinops pumilio*

❖ It feeds on house fly eggs and first-instar larvae.

❖ It can consume 13 to 24 house fly eggs per day.



**BIOLOGICAL CONTROL OF THE COMMON HOUSEFLY
(*MUSCA DOMESTICA L*) USING *BACILLUS THURINGIENSIS*
(ISHIWATA) BERLINER VAR. *ISRAELENSIS* AND *BEAUVERIA*
BASSIANA (BALS.) VUILLEMIN IN CAGED POULTRY
FACILITIES**

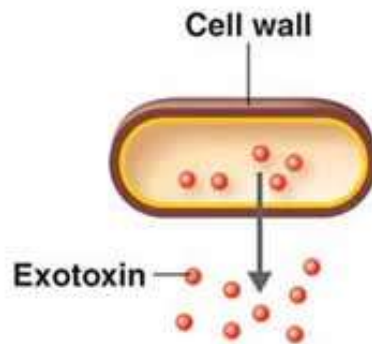
By

Lizzy A. Mwamburi

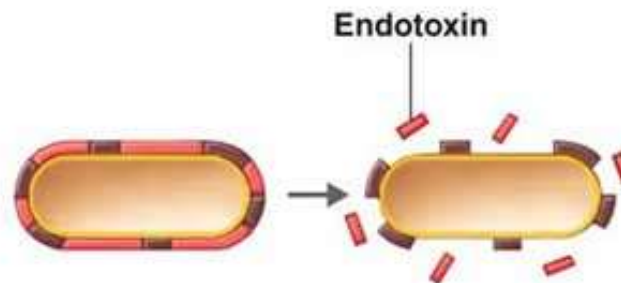
- The insect, usually the **larval stage**, must ingest the **crystal protoxin** for them to be effective (Schnepf et al., 1998).
- The **protoxins** are converted to **toxins** that exert their effect on the host by causing **lysis of midgut epithelial cells**, which leads to **gut paralysis, cessation of feeding and eventual death of the host**.

- **Exotoxins** are toxic substances secreted by bacteria and released **outside the cell**.
- Whereas **Endotoxins** are bacterial toxins consisting of lipids that are located **within a cell**.

Differences Between Exotoxins and Endotoxins



(a) Exotoxins are proteins produced inside pathogenic bacteria, most commonly gram-positive bacteria, as part of their growth and metabolism. The exotoxins are then secreted or released into the surrounding medium following lysis.



(b) Endotoxins are the lipid portions of lipopolysaccharides (LPSs) that are part of the outer membrane of the cell wall of gram-negative bacteria (lipid A; see Figure 4.13c). The endotoxins are liberated when the bacteria die and the cell wall breaks apart.

Bacillus thuringiensis as a feed additive to control *Musca domestica* associated with poultry houses

Article · January 2012

DOI:10.1016/j.jobaz.2012.10.006

- *B. thuringiensis* fed to chicken is reported to **inhibit the development of *M. domestica*** in chicken feces (Hodgman et al., 1993; Mwamburi et al., 2010).
- *B. thuringiensis* is known to produce several **toxins** during its **logarithmic phase of growth**.
- Heat labile, **α -exotoxins** (Lecithinase C) and **β -exotoxin** which are water-in soluble and heat stable and highly toxic to the larvae of flies, which has the name (**Thuringiensin**)
- It is applied to control flies in Russia (Toumanoff, 1956).

- **Mechanical control:**
- **Sticky fly strips, Funnel-type traps and Fly zappers- which use black lights with electrically charged grids to kill the insects.**



Funnel-type traps



Sticky fly strips



Fly zappers

Scientific classification

Kingdom: Animalia

Phylum: Euarthropoda

Class: Insecta

Order: Hemiptera

Family: Cimicidae

Genus: *Cimex*

Species: *lectularius*

COMMON BED BUG- *Cimex lectularius*

- ❖ **Colour-** (Adult) **reddish brown.**
- ❖ **Oval-** shaped.
- ❖ **Size-** **1/4 to 5/8 inch long.**
- ❖ **Generation-** **three or more generations per year.**
- ❖ There is **no evidence** that bed bugs spread disease.



- ❖ Occasionally **attacks** poultry
- ❖ Hides in **cracks** within the housing during the day
- ❖ Feeds mostly at **night** on blood while the host is asleep
- ❖ **Symptoms** - **small, hard, swollen, white** welts that become **inflamed** and **itch** severely.



The re-emergence of the bed bug as a nuisance pest: implications of resistance to the pyrethroid insecticides

T. G. E. DAVIES, L. M. FIELD and M. S. WILLIAMSON

Department of Biological Chemistry, Rothamsted Research, Harpenden, U.K.

Avoid using Pyrethroids



Guess?

Scientific classification

Kingdom: Animalia

Phylum: Euarthropoda

Class: Insecta

Order: Siphonaptera

Family: Pulidae

Genus: *Ctenocephalides*

Species: *C. felis*, *C. gallinacea*



FLEA



- ❖ **Fleas** - occasionally found in the **poultry house(litter)**
- ❖ **Wide range of hosts are attached- rats, mice, chickens and people.**
- ❖ **Bites annoying egg handlers occur primarily on the ankles and legs, causing a swollen itchy spot.**



- ❖ The adult flea, an excellent jumper, passes through a complete life cycle consisting of **egg, larva, pupa and adult**.
- ❖ **Life cycle - 2 weeks to 8 months**, depending on temperature, humidity, food and species.

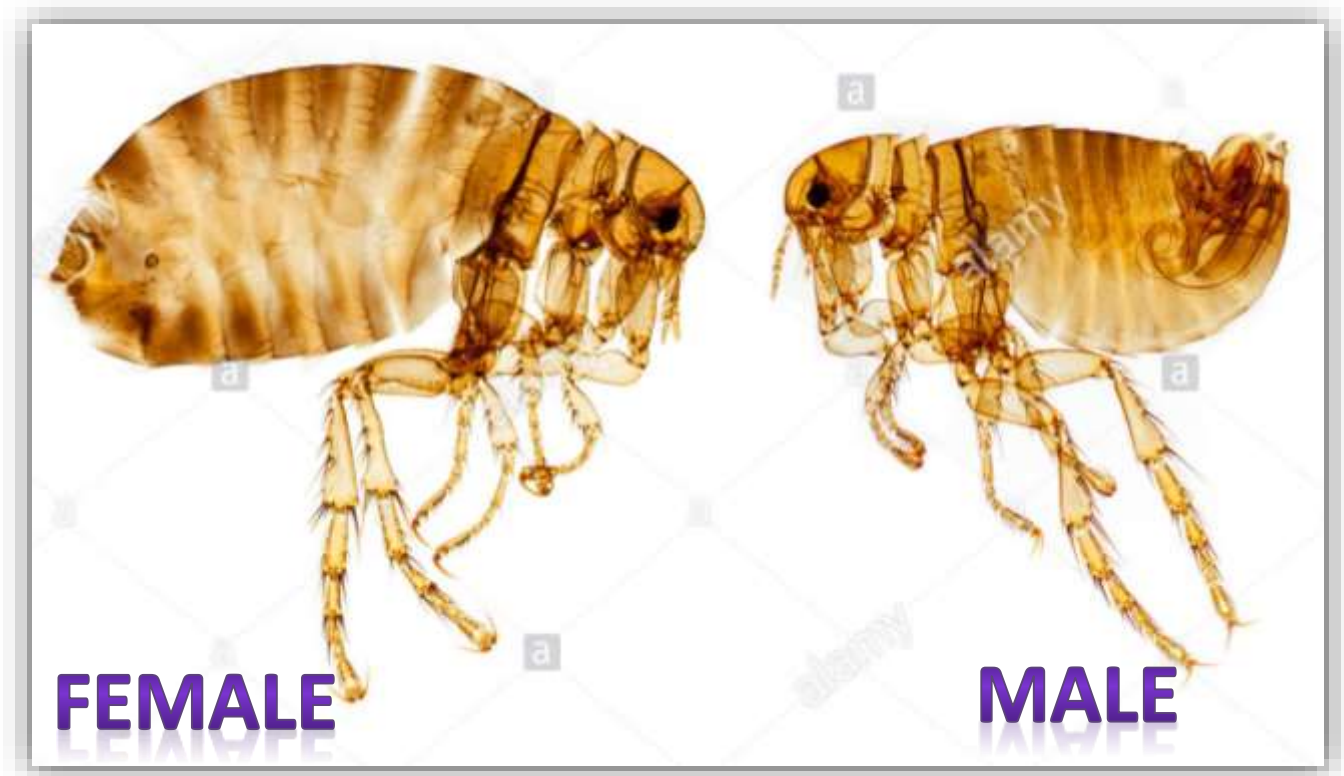


CAT FLEA- *Ctenocephalides felis*

- ❖ Important flea pest of **humans** and many **domestic animals**.
- ❖ **Feeding**- domestic and feral cats, humans, domestic dogs, and several livestock species.
- ❖ Parasitizes wild mammals- **Opossums** and **Raccoons**.
- ❖ Common flea on **dogs** and **cats**.



- ❖ **Female cat fleas** - produce larger numbers of **fertile eggs** if they take their blood meals from cats rather than other host species.
- ❖ **Female cat flea** - lays about **25 eggs per day** for a month, (very high densities of fleas in a relatively short time).



❖ Cat flea bites- causes **Anemia**

❖ (Distinguished from the dog flea (*Ctenocephalides canis*) by the longer head and longer first spine in the genal comb in *Ctenocephalides felis*)

❖ **Adult cat fleas** - well-developed **genal and pronotal ctenidia**



Short Communication

Ctenocephalides felis flea infestation in horsesI. Yeruham^a, S. Rosen^b, Y. Braverman^{c,*}^a "Hachklair" Gedera and the Koret School of Veterinary Medicine, the Hebrew University of Jerusalem, Bet-Dagan, 50250, Israel^b The Koret School of Veterinary Medicine, the Hebrew University of Jerusalem, Bet-Dagan, 50250, Israel^c The Kimron Veterinary Institute, Bet-Dagan, 50250, Israel

Received 29 March 1995; accepted 5 July 1995

Abstract

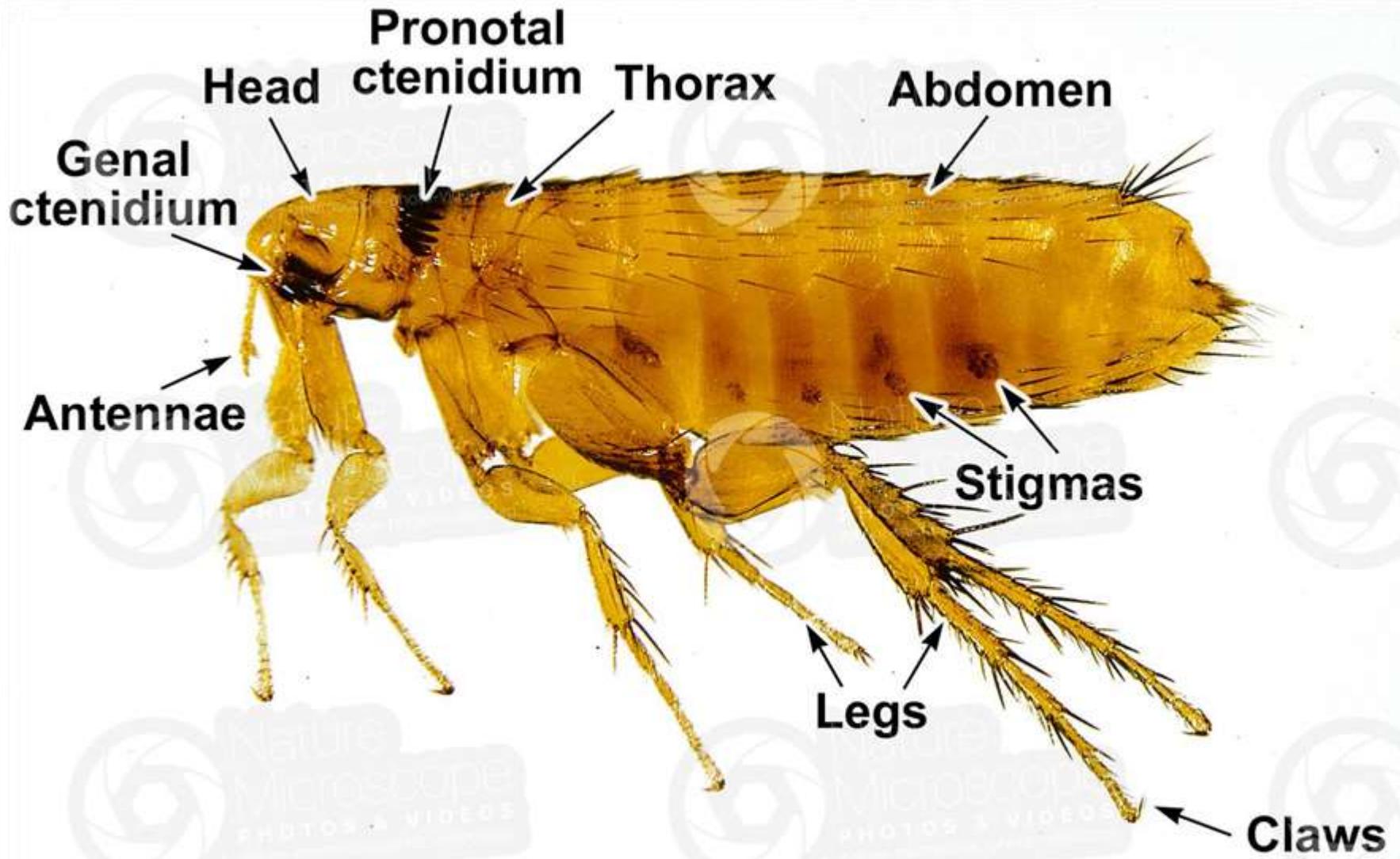
The horses were in two stables: in the first stable they were kept together with sheep and in the second stable they were kept together with goats. All horses in both stables were diagnosed as being infested with the cat flea *Ctenocephalides felis felis*. Foals were severely infested, whereas adult horses were only moderately infested.

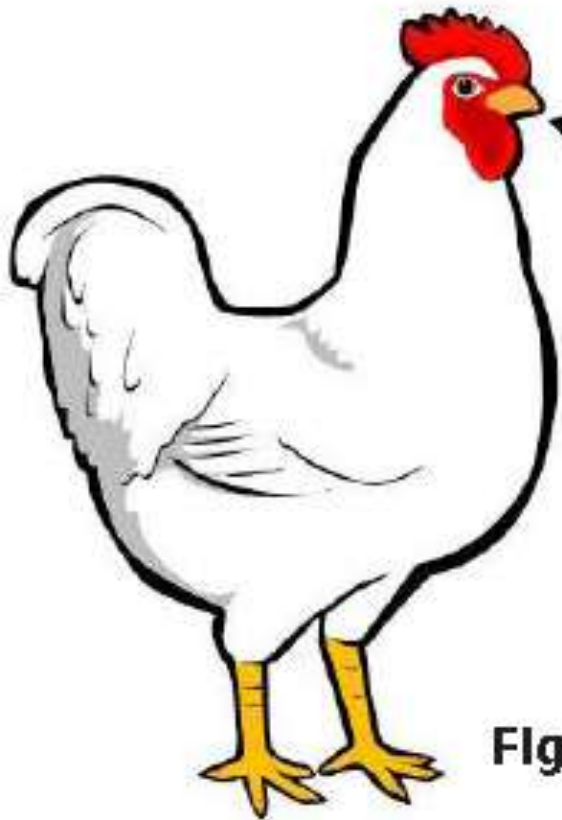
Keywords: *Ctenocephalides felis*; Horse

1. Introduction

Fleas are well known as vectors of pathogens such as typhus-like rickettsia, as the intermediate host for *Dipylidium caninum*, and as a source of irritation and restlessness (Dryden and Rust, 1994), flea allergy dermatitis (Halliwell, 1984) and anemia (Yeruham et al., 1989).

Ctenocephalides felis felis, the cat flea, is found worldwide and has been reported to parasitize many species of wild and domestic animals, including dogs, cats, goats, sheep, cattle, chickens, bears, raccoons, ferrets, opossum and lizards (Fox et al., 1966; Williams, 1986; Yeruham et al., 1989; Dryden, 1993). There is only one report of a pony which was infested with *C. felis felis* (Fletcher, 1962), and an additional report based on a collection (Hopkins and Rothschild, 1953). This report describes flea infestation in horses kept mixed either with sheep or with goats.





STICKTIGHT FLEAS

Look for small brown insects that appears as dots clinging to or embedded in the fleshy parts of the chicken's head around the eye.

Figure 2. Where to look for sticktight fleas on a chicken

STICKTIGHT FLEA- *Echidnophaga gallinacea*

- ❖ As name indicates it is **sedentary flea**
- ❖ **Distribution**- globally where chickens have been introduced as domestic animals.
- ❖ Semi- Permanently **around the head** and especially the **wattle of chickens**



- ❖ **Parasitization**- Domestic birds (e.g., turkeys, quail), wild birds, Peri-domestic rats, Dogs, Cats, and occasionally humans.
- ❖ **Adults**- easily recognized by their **sharply angled squarish head** and the **absence** of both **pronotal** and **genal ctenidia**



Management of flea

- Impenetrable floors are necessary for breaking the life cycle of fleas as they deny flea larvae the ability to burrow 15 cm into the soil to form a cocoon.
- One of the most effective broad-spectrum insecticides is **Permethrin**.
- This has a significant residual activity, thus making it ideal for treating poultry housing and equipment.
- At reduced concentrations, Permethrin can also be applied directly to the bird.
- Removing infested litter and dusting the litter surface with **Carbaryl, Malathion, or Pyrethroids** to kill immature **fleas**.
- Insect growth regulators such as **Methoprene** are also effective.
- wood ashes (these remedies are believed to suffocate lice and mites without a chemical effect).

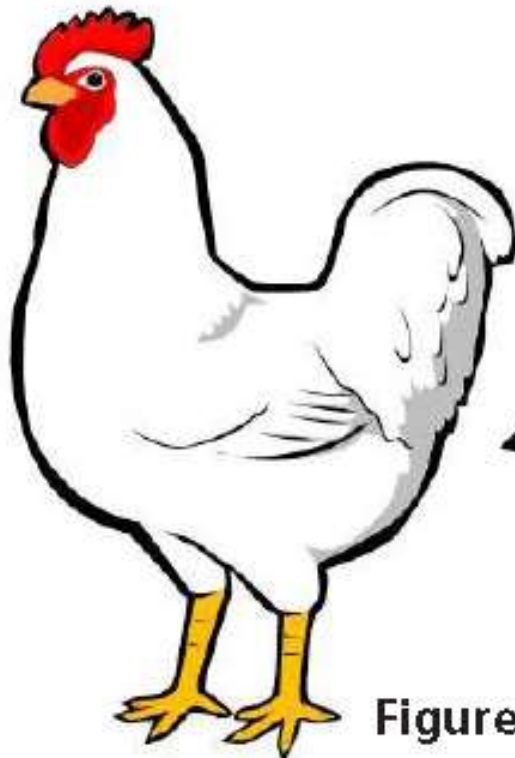
- ❖ Exploring the potential of organic plant-derived products.
- ❖ Environmentally non-persistent and possess low toxicity.
- ❖ Includes plant essential oils or organic oil-based products (linseed oil, castor oil, olive oil), tea tree leaves, garlic and neem (*Azadirachta indica*) oil micro-emulsions.

- **Diatomaceous earth** is a natural compound made of fossilised remains of microscopic water plants, which once sprinkled over all surfaces in the chicken coop, including nest boxes and dirt flooring, control fleas through piercing the **exo-skeletons** of the fleas, dehydrating them and causing their death.
- **Diatomaceous earth** is safe for your chickens even if they ingest it.
- Systemic control of flea infestation by use of bird injections with drugs like **Ivermectin** or **Moxidectin** is another alternative.



Cleansing	Gently bathe infested chickens with a mixture of 1.5L of water and 1 ml of mild dishwashing liquid, rinse with fresh water. Avoid contact with the chicken's eyes.	
Malathion spray	Apply to walls and floors of coop	C Stadler et al., 1996
Pyrethrin spray	Applied to nestbox and bedding litter	C Stadler et al., 1996
Petroleum jelly	Apply copious amounts of petroleum jelly to the bird's comb and wattles, aiming to coat over the adult fleas. The petroleum jelly suffocates the fleas. Repeat application weekly until fleas are gone.	
Physical removal	Individual fleas can be removed from birds with tweezers by grasping and pilling firmly, followed by applying an antibiotic ointment to the area where the flea was found to minimize risk of secondary infections.	P Koehler et al., 2015

Non insect pests



NORTHERN FOWL MITES

Look for dark patches in the feathers and on the skin around the vent area. Mites appear as fast-moving, white or dark specks in these areas. They also leave behind a lot of mite fecal material.

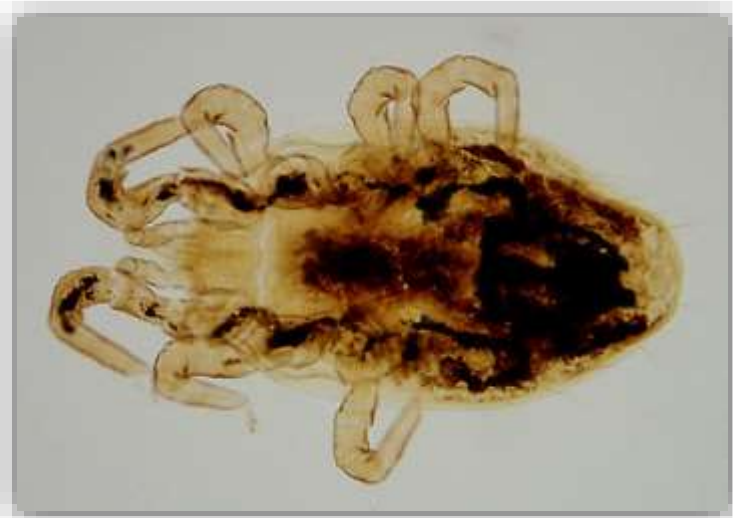
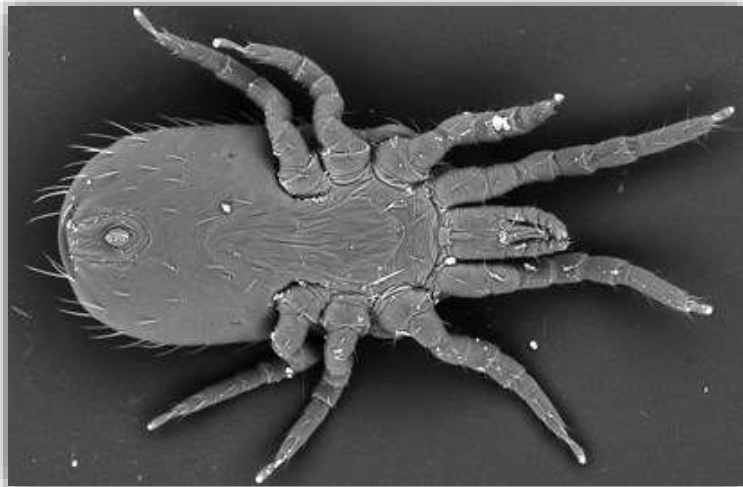
Figure 1. Where to look for northern fowl mites on a chicken

Scientific classification

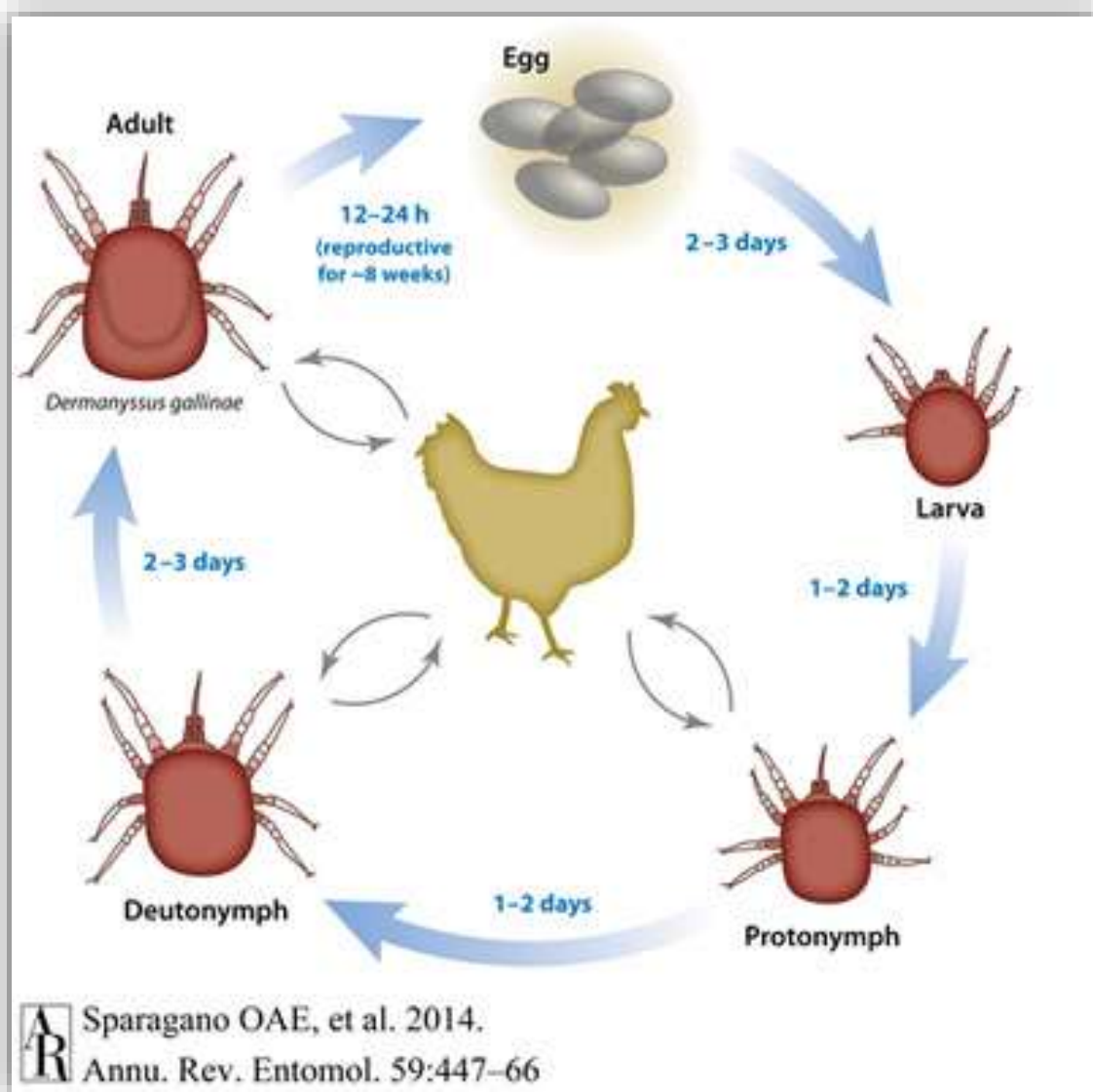
- ❖ Kingdom: **Animalia**
- ❖ Phylum: **Arthropoda**
- ❖ Class: **Arachnida**
- ❖ Sub class: **Acari**
- ❖ Order: **Mesostigmata**
- ❖ Family: **Macronyssidae**
- ❖ Sub-Family: **Macronyssinae**
- ❖ Genus: ***Ornithonyssus***
- ❖ Species: ***O. sylviarum***

NORTHERN FOWL MITE, or FEATHER MITE- *Ornithonyssus sylviarum*

- ❖ Often noticed first on the **eggs**.
- ❖ **Heavy populations**- reduces egg production by **10 to 15 percent**.
- ❖ Annoys **egg handlers** and **other people**.
- ❖ Found in **vent**, then on the **tail, back** and **legs of layers**.
- ❖ **Adult**- **1/26 inch long** and **dark red to black**.



❖ **Life cycle- Egg, larva, several nymphal stage and adult completed on bird(1 week)**



❖ **Mite populations-** increases in **cooler weather.**

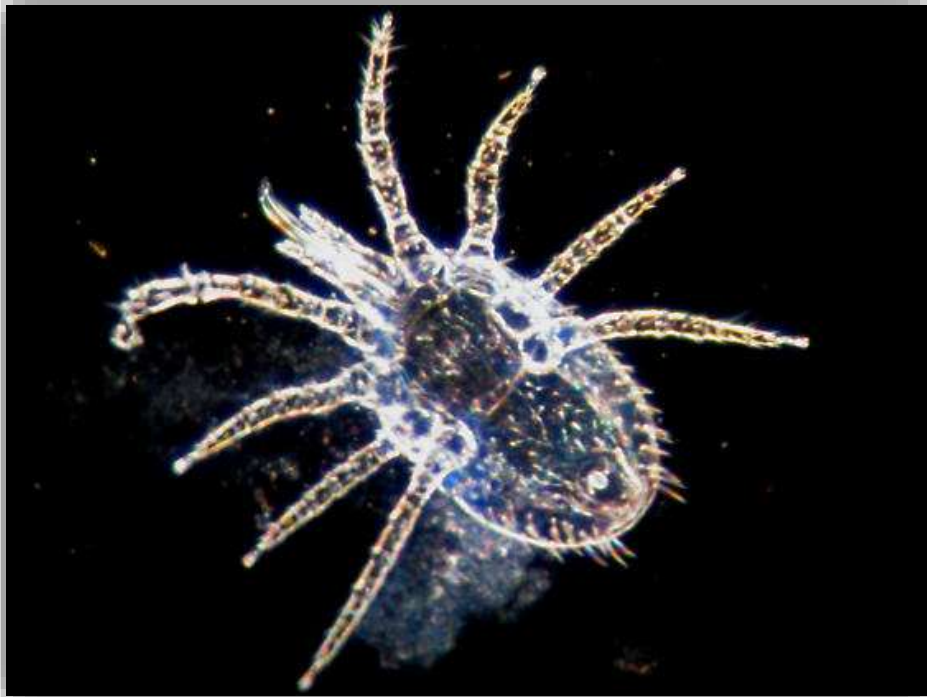


Photo source:

http://entnemdept.ufl.edu/creatures/livestock/tropical_fowl_mite.htm



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http://entnemdept.ufl.edu/creatures/livestock/tropical_fowl_mite.htm

Scientific classification

- ❖ Kingdom: **Animalia**
- ❖ Phylum: **Arthropoda**
- ❖ Class: **Arachnida**
- ❖ Sub class: **Acari**
- ❖ Order: **Mesostigmata**
- ❖ Family: **Dermanyssidae**
- ❖ Genus: ***Dermanyssus***
- ❖ Species: ***D. gallinae***

CHICKEN MITE- *Dermanyssus gallinae*

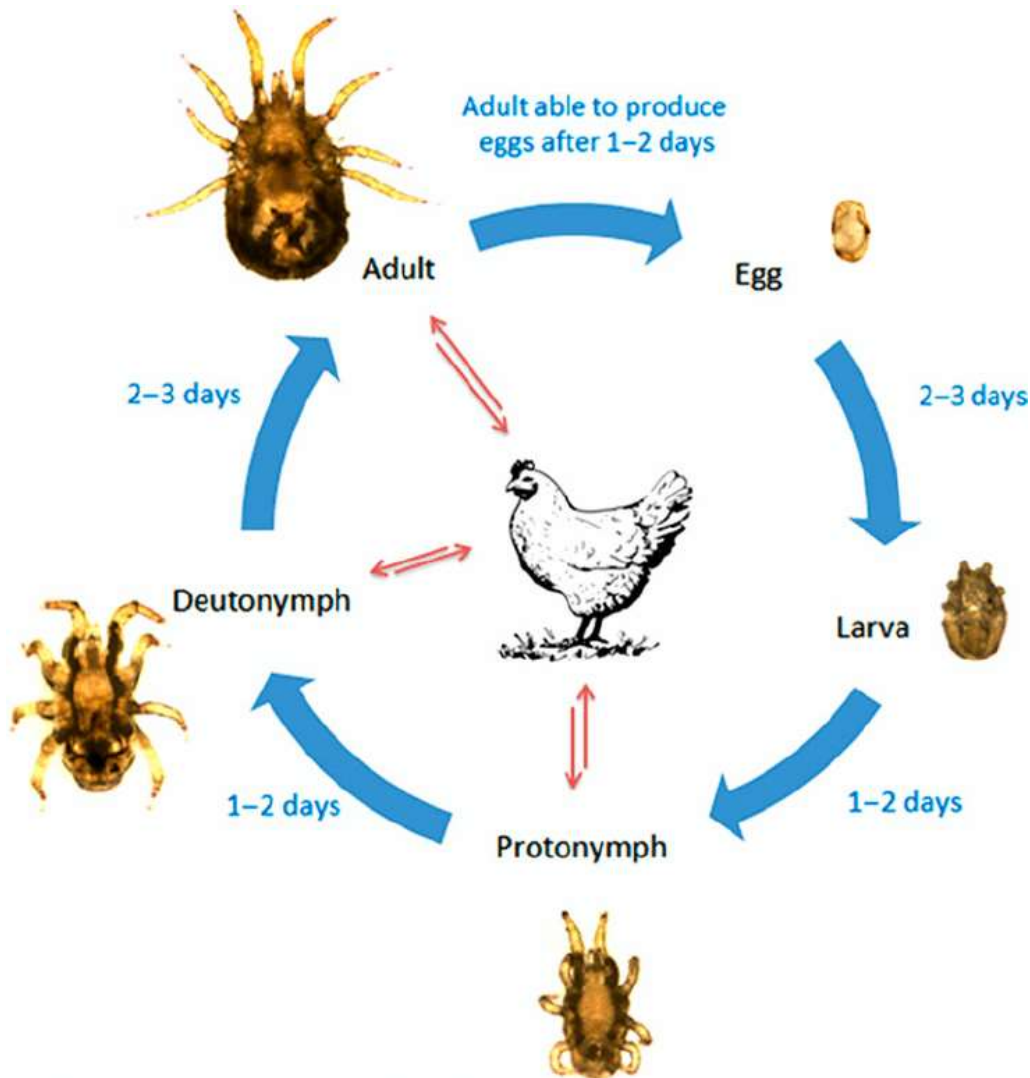
- ❖ **Poultry workers-** bitten by these mites at night time.
- ❖ **Increase in population-** weight gains and egg production can be reduced.
- ❖ **Red and gray mites-** difficult to see without a magnifying glass.

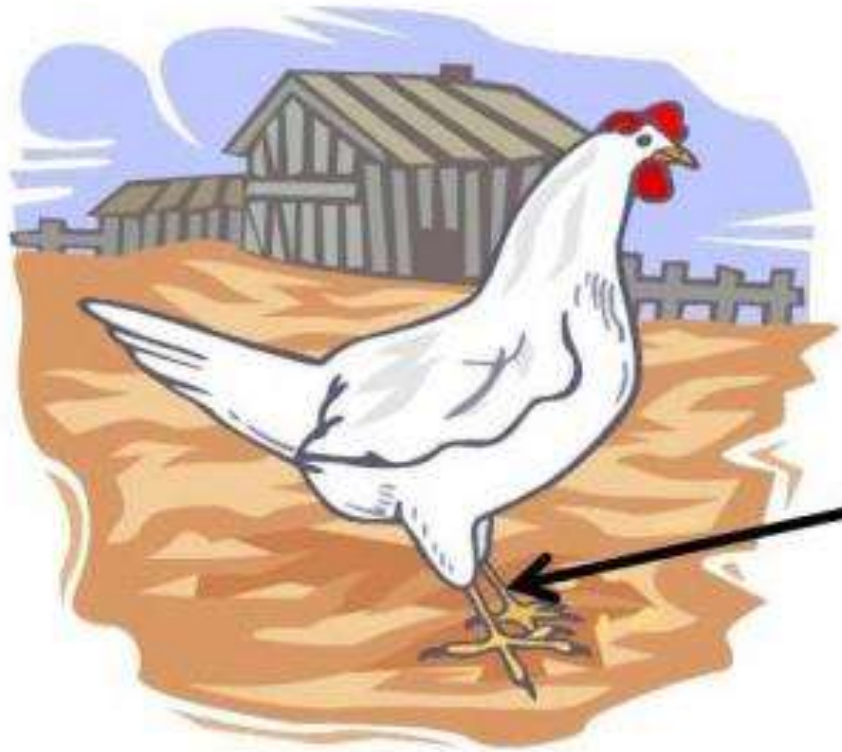


https://www.researchgate.net/figure/The-poultry-red-mite-Dermanyssus-gallinae_fig2_320475378

❖ **Life cycle-** completed in 7 to 10 days during warm weather.

❖ **Inactive during cold weather.**





SCALY-LEG MITES

Mites burrow under scales on lower legs (shanks) and toes causing scales to bulge out. Legs and toes become deformed.

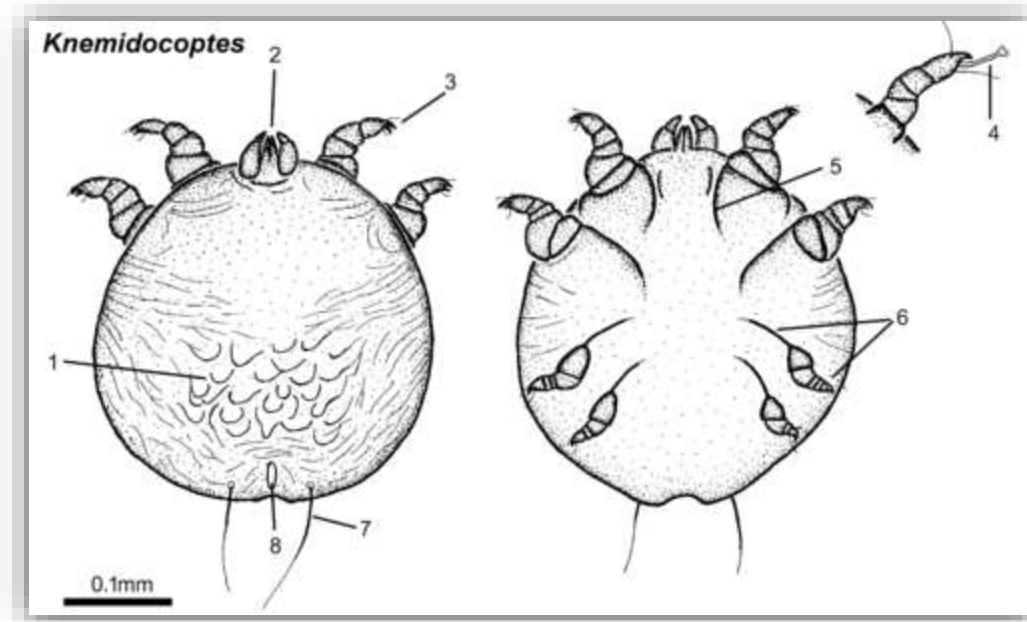


Scientific classification

- ❖ Kingdom: **Animalia**
- ❖ Phylum: **Arthropoda**
- ❖ Class: **Arachnida**
- ❖ Order: **Sarcoptiformes**
- ❖ Family: **Knemidokoptidae**
- ❖ Genus: ***Knemidokoptes***
- ❖ Species: ***K. mutans***

SCALY-LEG MITES- *Knemidocoptes mutans*

- ❖ Attacks **poultry**, commonly **chickens** and **turkeys**.
- ❖ **Infestations**- found on young birds only
- ❖ **Scaly-leg mite**- reported on **pheasants**, **partridges**, **bullfinches**, **gold finches** and many **passerine** (perching) birds.

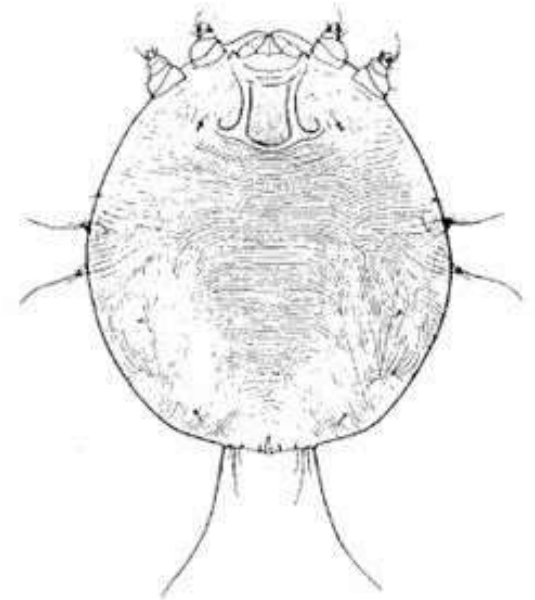


- ❖ **Females**- burrow under scales on the **feet and legs of poultry** and **deposit eggs**.
- ❖ **Complete development for an egg**- Laying **female(10 to 14 days)**.
- ❖ **Burrowing** under the scales on the feet and legs of poultry, a powdery material accumulates and binds into a scab of serum discharge.
- ❖ Affected **feet** and **legs** usually have **red blotches**.



DEPLUMING MITE- *Neocnemidocoptes laevis gallinae* var. *gallinae*

- ❖ Similar to the scaly leg mite but is smaller and more oval.
- ❖ Life stages- egg, larva, nymph, male adult, and immature and mature female adult.
- ❖ Transformation from immature to mature female occurs after fertilization.



<https://in.pinterest.com/pin/492651646708614432/?lp=true>

- ❖ Eggs hatch in about 5 days.
- ❖ Development from egg to egg-laying female requires 10 to 14 days.
- ❖ Fewer than 10 percent of the eggs mature into adults.



CAUSES

- ❖ **Itching**, often resulting in feather pulling.
- ❖ **Fowls**- lose feathers over large areas of the body.
- ❖ **Infestations**- noticeable in spring and summer
- ❖ **Disappear** in autumn.



The following index is effective for estimating infestation levels:

- 0 = no mites observed**
- 1 = 1 to 2 mites**
- 2 = 3 to 9 mites**
- 3 = 10 to 31 mites**
- 4 = 32 to 99 mites**
- 5 = 100 to 300 mites**
- 6 = 301 to 999 mites**
- 7 = 1,000 to 3,000 mites**
- 8 = 3,001 to 9,999 mites**
- 9 = 10,000 to 32,000 mites**
- 10 = more than 32,000 mites**

An average index of 5 or greater for all examined birds generally indicates the need for chemical treatment.

Management of Mites

- ✓ Control of northern fowl mites in **caged-layer operations** is based on efforts to prevent infestation and to apply an **acaricide** when an infestation occurs.
- ✓ **Regularly monitoring flocks** for the presence of mites will allow them to be detected while the population is low or isolated to a few birds.
- ✓ A house should be **clean** and mite-free before new birds are moved in, and the new flock should be mite free.
- ✓ Once the flock is in the house, care should be taken to prevent contamination from the **clothing of workers** and various equipment, since mites can live for a few weeks off the host.
- ✓ Mites have been shown to be readily transferred from an infested house to a un infested house **by contaminated egg flats**.

- ✓ **Wild birds** and **rodents** can harbor and disseminate northern fowl mites as well.
- ✓ With early detection, only part of a **caged-layer house** may need to be treated.
- ✓ At least **10 randomly selected birds** from each cage row in the entire house should be **monitored weekly**.
- ✓ The vent area should be examined under a bright light, and the feathers parted to reveal the mites.
- ✓ Single caged birds often have more mites than those caged in groups and, because of variation in susceptibility among birds, one bird may have mites while its cage mates are mite-free.

Scientific classification

- ❖ Kingdom: **Animalia**
- ❖ Phylum: **Arthropoda**
- ❖ Class: **Insecta**
- ❖ Order: **Coleoptera**
- ❖ Family: **Tenebrionidae**
- ❖ Sub family: **Tenebrioninae**
- ❖ Genus: ***Alphitobius***
- ❖ Species: ***A. diaperinus***

Darkling beetle or Lesser mealworm- *Alphitobius diaperinus*

- ❖ **Nuisance** in poultry operations.
- ❖ Large number of beetles **migrates** to nearby residential areas.
- ❖ **Larvae**- known as **lesser mealworms**.
- ❖ Adults and larvae **consume poultry feed** in amounts .



Marek's disease

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Regular Articles

Load of Challenge Marek's Disease Virus DNA in Blood as a Criterion for Early Diagnosis of Marek's Disease Tumors

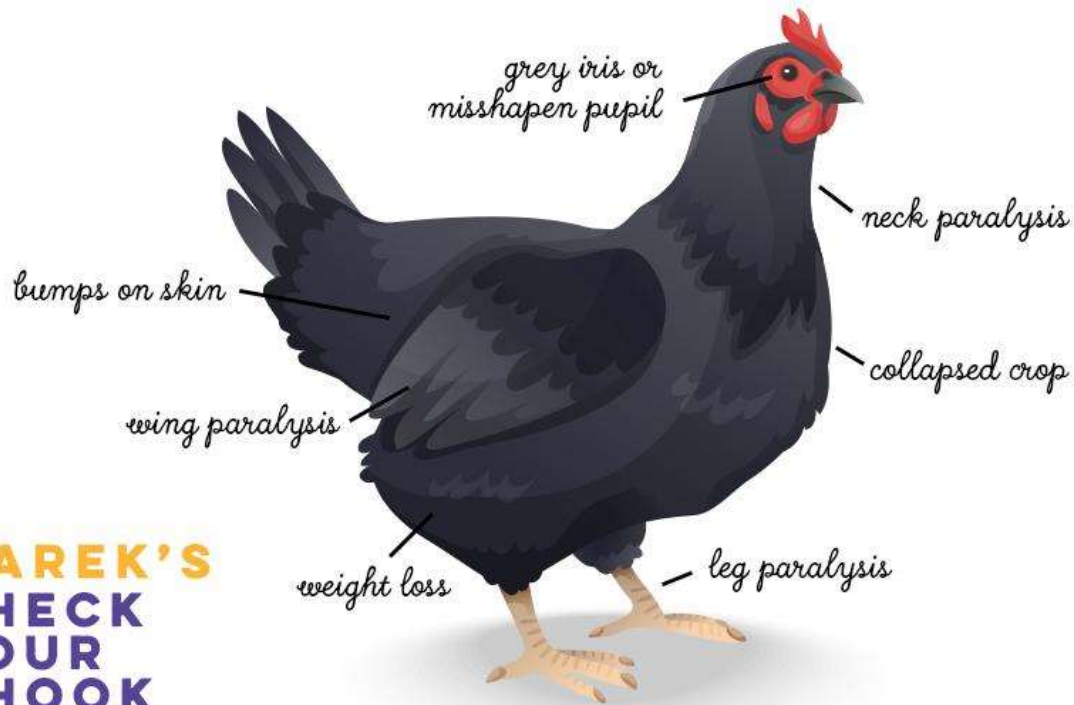
Isabel M. Gimeno^{Ca,b}, Aneg L. Cortes^a, and R. F. Silva^b

^aPopulation Health and Pathobiology Department, College of Veterinary Medicine, North Carolina State University, 4700 Hillsborough Street, Raleigh, NC 27606

^bUSDA-ARS Avian Disease and Oncology Laboratory, 3606 East Mount Hope Road, East Lansing, MI 48823

Alerts for the Journal

- ❖ Researchers have found that this beetle has transmitted **acute leucosis (Marek's disease)** to chickens.
- ❖ **Marek's disease** usually affects (3-4) month old birds



- ❖ **Clinical signs-** paralysis, most easily observed in legs and wings, as well as droopy wings, gasping, loss of weight, pallor and sometimes diarrhea.
- ❖ **Birds** severely affected may be found lying on their sides with one leg stretched forward and the other held behind.
- ❖ **Disease** affects both broiler and egg-laying poultry.
- ❖ **Losses-** reach 2% of the flock per day, with mortality at 30% of the flock within a few weeks.
- ❖ Highly contagious and Airborne.



University of Florida

Isolation of Infectious Bursal Disease Virus from the Lesser Mealworm, *Alphitobius diaperinus* (Panzer)¹

J. C. MCALLISTER,² C. D. STEELMAN,³
L. A. NEWBERRY,⁴ and J. K. SKEELES⁴

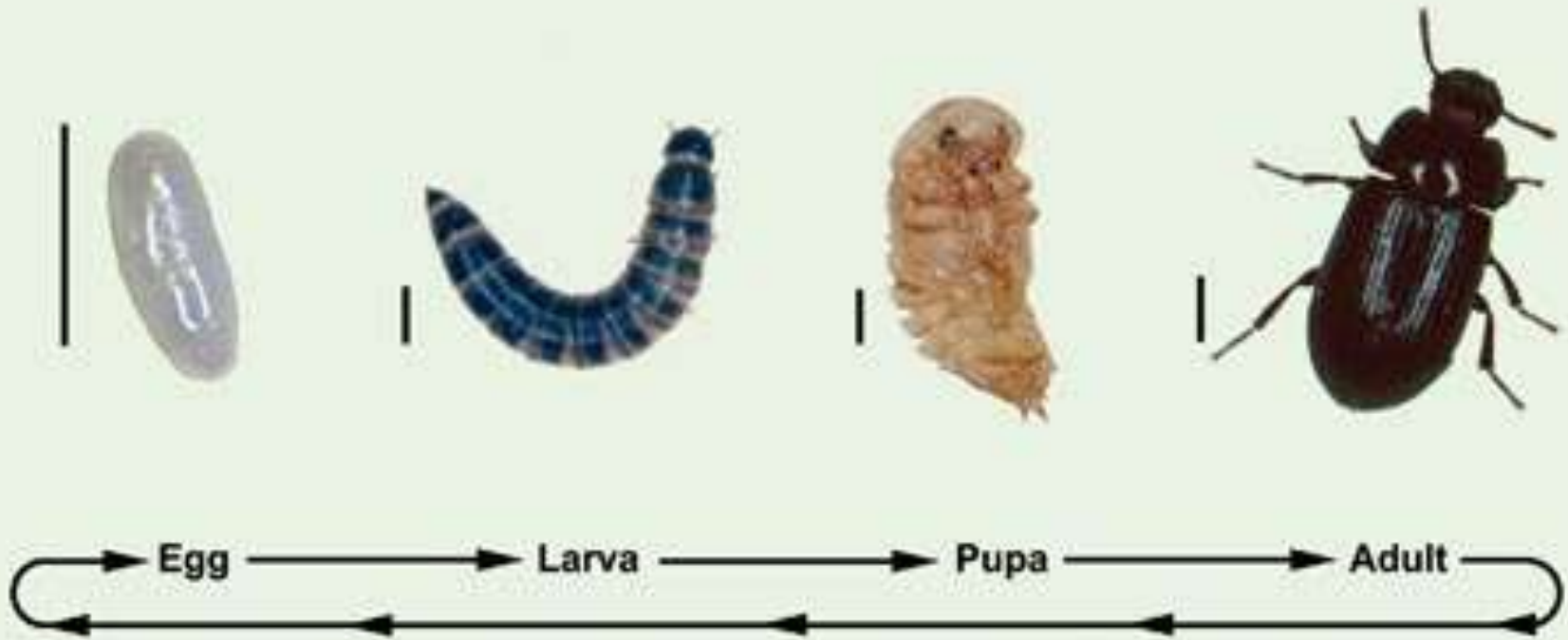
*Department of Entomology, Arkansas Agricultural Experiment Station,
University of Arkansas, Fayetteville, Arkansas 72701*

- ❖ **Infectious bursal disease (IBD)** is an acute, highly contagious viral disease of young chickens that has occurred for many years in the major broiler production areas worldwide.
- ❖ The **virus (IBDV)** tends to reoccur, causing disease in successive broiler flocks in spite of good sanitary measures (**Snedeker *et al*, 1966**).
- ❖ Caused by- **Infectious Bursal Disease Virus (IBDV)**

■ SYMPTOMS:

- Ruffling of **feathers** **poor**
- Lack of **appetite**
- **Huddling**
- Unsteady gate
- **Diarrhea** (sometimes bloody).
- Secondary infections- can end in **death**

Life cycle of Darkling beetle



The lifecycle of the darkling beetle, *Alphitobius diaperinus* (Panzer), from egg to adult.

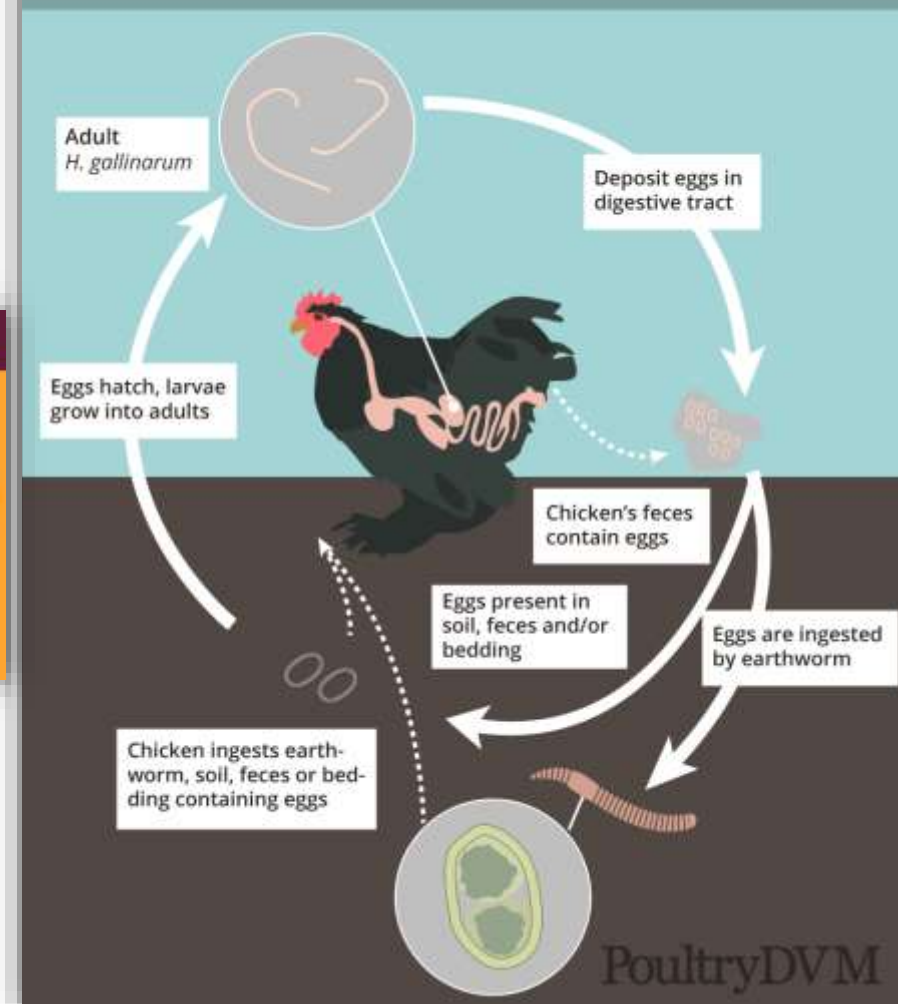
❖ The beetle also spreads **cecal worms** and **avian tapeworms**.

❖ Adult chickens and chicks are more likely than turkeys to eat the beetles and their larvae.

Tapeworms



Cecal worm (*Heterakis gallinarum*) Life Cycle



Management of beetles:

- Once a poultry house becomes infested, control is difficult because beetles migrate throughout the house, and pupation occurs in wood and insulation.
- A thorough house cleaning, combined with chemical control when the birds are removed, will usually suppress the population for a short time.
- Migration may be reduced by applying insecticide sprays to the pit walls and posts.



- Attaching well-sealed, angled, metal flashing to pit walls at the masonry-frame wall joints- **reduce immature beetle migration out of the pit**
- Rapid accumulation of **dust** and **debris** may make the **flashing** ineffective.



- During spring and summer- manure that must be removed from the building can be piled and trapped to kill developing pests.
- It is important that the manure be sealed completely under the tarp and the pile be placed in direct sunlight.



- **When uncovering the manure pile, take care to avoid inhaling the excessive gas that accumulates under the tarp.**
- **Following a minimum of 2 weeks under the tarp, manure can be spread on fields without concern for pest dispersal.**

MIST SPRAYS

Lice	Tetrachlorvinphos 80% S	<ul style="list-style-type: none"> ⚠ Do not spray nests, eggs, feed or water.
Northern fowl mites (bird treatment)	Tetrachlorvinphos 4F	<ul style="list-style-type: none"> ⚠ Do not treat within 10 days of vaccination or other stress mites
	Tetrachlorvinphos	<ul style="list-style-type: none"> ⚠ For cage birds, spray no less than 100 to 125 psi to the vent area from below (high pressure). ⚠ For floor birds, spray lightly. ⚠ Do not treat more often than every 14 days
	Tetrachlorvinphos (Rabon) 50% WP	<ul style="list-style-type: none"> ⚠ For cage birds, spray no less than 100 to 125 psi to the vent area from below (high pressure). ⚠ For floor birds, spray lightly. ⚠ Do not treat more often than every 14 days.
	Permethrin (Atroban, Expar) (Permethrin) 25% WP	<ul style="list-style-type: none"> ⚠ Pay particular attention to vent. ⚠ One application should eliminate an infestation.

DUSTS

Lice

Permethrin




- ✚ Apply with shaker or hand duster.
- ✚ Treat vent area thoroughly.

Fleas

carbaryl (Sevin)
5%

- ✚ Do not treat eggs, feed or water.
- ✚ Apply evenly to litter and repeat treatment in 28 days if needed.



SPRAYS

Chicken mites	Permethrin	 Spray ceilings, walls, empty cages or nests to runoff.
Lice	Permethrin 25% WP	
Northern fowl mites (house and litter treatment)	Tetrachlorvinphos and dichlorvos 28.7% EC	 Apply thoroughly to litter, walls, roosts, cracks and
	Tetrachlorvinphos 50% WP	 Apply thoroughly to litter, walls, roosts, cracks, crevices and interiors.

Bed bugs

Tetrachlorvinphos


50% WP

-  **Thoroughly spray walls bedding, litter and roost surfaces.**
-  **Force spray into cracks and crevices. Ventilate while spraying. Do not apply directly to poultry, nests or eggs.**

**Darkling beetle
(lesser mealworm)**

Tetrachlorvinphos

50% WP

-  **Apply thoroughly to litter, walls, roosts, cracks, crevices (Rabon) and interiors.**

Current Practices of Pest Control in Poultry

- **Factors including housing type and management, waste management, are involved in poultry production and shaped the fundamentals of the abiotic and biotic factors.**
- **It should be emphasized that these factors are interrelated (Carey *et al.*, 2004).**

HOUSING TYPE AND MANAGEMENT

- ❖ **Appropriate air flow is necessary to dry the manure and litter to reduce fly breeding and ammonia production (Arends and Robertson, 1986; Kathiresan, 2007; Harrington *et al.*, 2011).**
- ❖ **Open sided houses- air flow could be significantly improved by cutting grasses and weeds around the houses.**
- ❖ **It also reduces rodent invasion due to reduced harborage.**
- ❖ **Houses should be built on graded land to facilitate easy drainage of rainwater.**

- ❖ **Poor drainage system around the poultry houses causes fly and other pest problems and structural damage of the foundations.**
- ❖ **Proper housing and management can reduce the production cost and control pest invasion significantly (Arends and Robertson, 1986; Kathiresan, 2007; Harrington *et al.*, 2011).**

Waste management

- ❖ **Waste management refers to the strategy of handling manure, litter, and dead birds.**
- ❖ **Appropriate housing is the best way to dry the manure and to reduce fly invasion.**
- ❖ **Common disposal method is to flush the manure to a lagoon and recycle the lagoon water for flushing.**
- ❖ **Proper design and management of a lagoon is crucial in preventing mosquito breeding (Scovill, 1963).**

- ❖ **Excess spilled feed- not only economically undesirable, but also creates a favorable environment for beetle production.**
- ❖ **Dead birds- should not be left in the house or piled just outside the houses, promotes pest production such as blow flies.**
- ❖ **Currently, accepted popular methods of disposal of dead birds are incineration, composting, and burial (Sander *et al.*, 2002; Blake, 2004).**



THANK YOU