Part 5

arthropods

myiasis

Definition:

Myiasis is the infestation of the organs or tissues of host animals by the larval stages of dipterous flies, usually known as maggots or grubs. The fly larvae feed directly on the host's necrotic or living tissue. The hosts are usually mammals, occasionally birds and, less commonly, amphibians or reptiles.

Classification:

1- Bishopp's classification/clinical classification: Myiases are often classified according to the anatomical position in, or on, the animal that the larvae infest.

2-patton's classification: Myiases are often classified according to the relationships between host and parasite.

1- Bishopp's classification

- Myiases are often classified according to the anatomical position in, or on, the animal that the larvae infest include:

dermal, sub-dermal or cutaneous: in skin

Nasopharyngeal: in nasal passages,sinuses and pharyngeal cavity

ocular: in eye

intestinal/enteric/gastric: in GIT

Urinogenital: in U.B,urethra ,scrotum,vulva.

traumatic : When open wounds are involved

Furuncular: when boil-like.

2-patton's classification

Myiases are often classified according to the relationships between host and parasite include:

A-Obligatory/primary/specefic myiasis: in which Obligatory ectoparasites must have a living host to complete their development and are unable to survive in the absence of the host.

As ***hypoderma spp , oestrus ovis***

B-Facultative/secondary/semi-specefic myiasis: in which facultative parasites can develop in both living and dead organic matter ,In case of decaying matter they attract to foul smell of discharge from tissue. As **lucilia spp ,calliphora spp**

C-Accidental/miscellaneous/non-specefic myiasis: in which These species that are only rare or chance agents of myiasis, which may invade an inappropriate host or which may cause a myiasis when fly eggs are accidentally ingested.As ***M.domestica, fannia spp***

A- obligatory myiasis

Flies of obligatory myiasis :

1-hypoderma spp (cattle grubs/warble flies):belong to family Oestridae and sub –family Hypodermatinae.

2-*Gasterophilus* ***spp (horse bot flies):belong to family*** Oestridae and sub –family Gasterophilinae.

3-*Oestrus* ***spp (nasal/sheep bot flies):belong to family*** Oestridae and sub –family Oestrinae.

4-*Cochliomyia hominivorax* ***(screw worm):belong to family*** Calliphoridae.

5-*Chrysomya bezziana* ***(***blow flies***):belong to family*** Calliphoridae.

1-hypoderma spp (cattle grubs/warble or heel flies)

- 2most important species of cattle are:

  1-H. bovis *2-H. lineatum*

Host:cattle

habitat:*H. bovis:* L1: epidural fat/ L3:subcutaneous skin

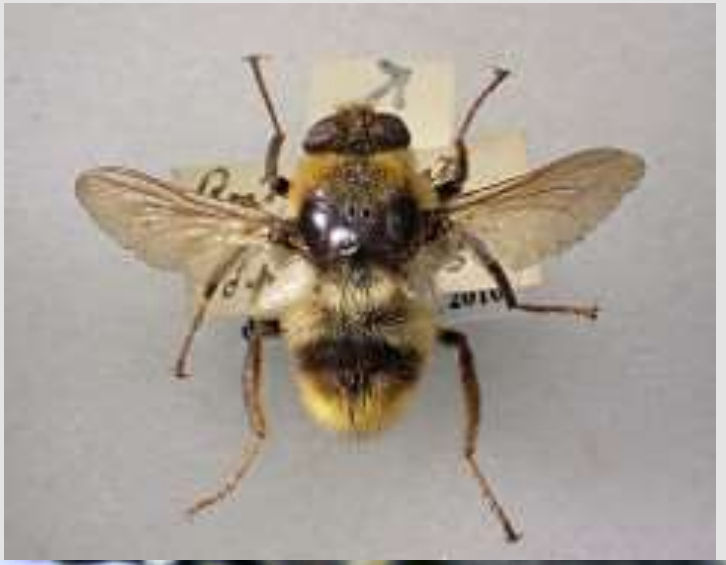
H. lineatum :L1: oesophagus/ L3:subcutaneous skin

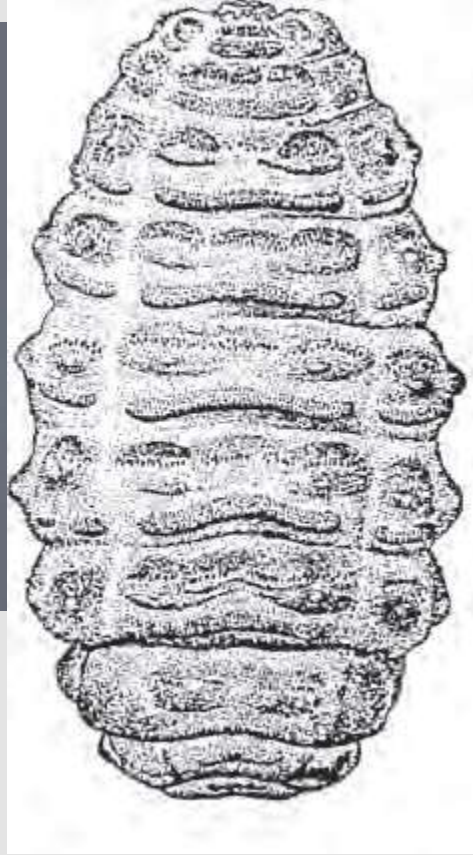
Description of A)adult:

- The adults are large in size , 13mm(*H. lineatum)* , 15mm(*H. bovis)*
- hairy bee-like flies (abdomen covered with yellow –orange hairs with a light-dark colour band of hair arround the middle).
- The adults have small no functioning mouthparts.
- In H.bovis thorax is more hairy than that of H.lineatum.

Description of B)larva:

- When mature they are 25–30 mm long.
- The colour is dirty white when newly emerged from the host, but rapidly turns to dark brown.
- thick and somewhat barrel shaped,tapering anteriorly.
- Segmented and most segments bear short spines.
- The third-stage larvae may be distinguished from other species of *Hypoderma* by examination of the posterior spiracular plate which, in these species, is completely surrounded by small spines.
- The two species may be distinguished from each other by the observation that:
  - in *H. bovis* the posterior spiracular plate surrounding the button has a narrow funnel-like channel .
  - in *H. lineatum*, it has a broad channel.



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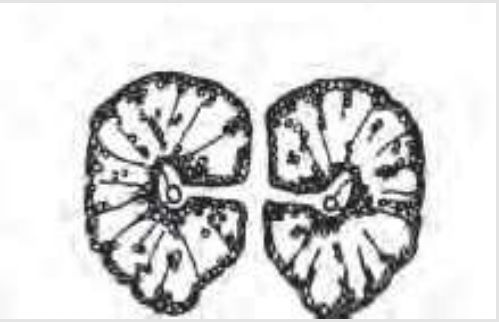
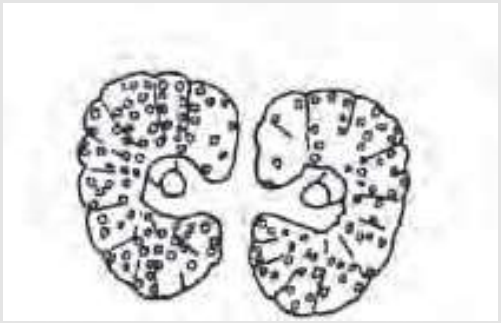




Life cycle

- Mating takes place off the host at aggregation points where female are intercepted in flight.
- A single female may lay as many as 300-600 eggs during its
- life of only a few days.
- Eggs hatch within a week and the first-instar larvae, which are less than 1 mm in length, crawl down the hairs and either burrow directly into the skin or into the hair follicles.
- *Hypoderma bovis* migrates below the skin along nerves to the spinal cord, while *H. lineatum* migrates between the fascial planes of muscles and along connective tissue.

- Clinical signs:
- Nodules with an opening are usually seen in the skin of the back. These cysts contain a larva.
- When the adult flies attack cattle, stampeding may occur.
- Paralysis may occur, if reach spinal cord .

Treatment:

- Ivermectin is highly effective against cattle grub.
- Attacks by adult warble flies are avoided by use of insecticides.

2-Gasterophilus spp (horse bot flies)

- most important species of are: *Gasterophilus nasalis*, G. *haemorrhoidalis* and G. *intestinalis(*most common syn. G. equi)

Host:equine(horse,donkey,mule)

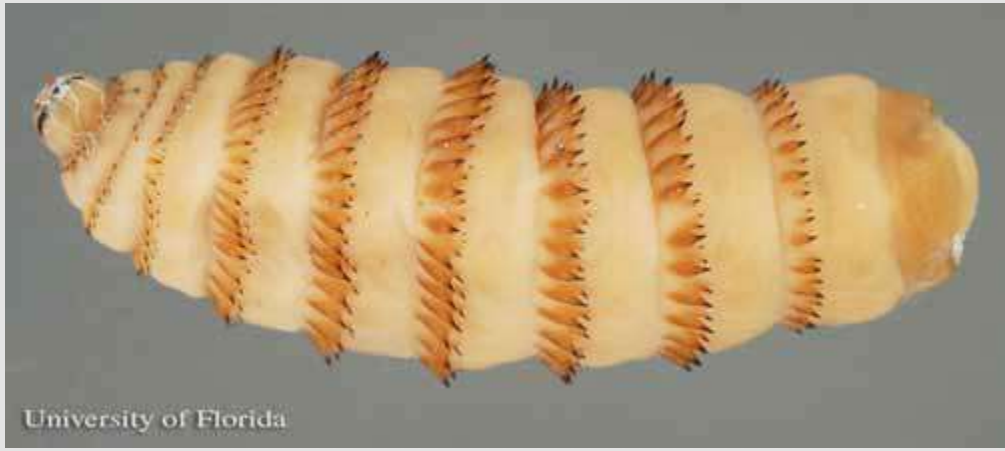
habitat:*stomach*

Description of A)adult:

- they are robust large dark flies, 11-15 mm in length .
- body is densely covered with yellowish hairs, In most species, the hairs of the mesonotum are dark, producing the appearance of a transverse dark band or dark patches.
- In the female the ovipositor is strong and protruded.
- The wings characteristically have no cross-vein dm-cu.

Description of B)larva:

- When mature they are 16–20 mm long.
- They are reddish-orange or yellowish in colour .
- They are cylindrical or ribbon –like in shape.
- Anteriorly, The mouth hooks are not uniformly curved dorsally, and have a shallow depression.
- Posteriorly,They have posterior spiracles.
- on the ventral surface of each larval segment, there is spines with blunt tips arranged in 2 rows .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1 cm

Life cycle

- all the species of *Gasterophilus* have a similar general life cycle. Adults are short lived, with an effective adult life span of only a few days.
- The eggs are usually laid directly on the host, attached to the hairs in particular body regions, most commonly on the head.
- After hatching the larvae burrow into the tissues of the host, eventually moving, by a variety of routes, into the alimentary tract of the host.
- The larvae feed on tissue exudates and do not imbibe blood. When mature, the larvae detach and are voided from the host in the faeces.
- The larvae then burrow into the ground and pupariate.

- Clinical signs:
- 1) The adult flies distress their equine host markedly up to the point of causing stampeding.
- 2) Irritation by the larvae du ring migration, e.g. dermatitis, inflammation of the pharynx, oesophagus, stornach or rectum (rectum prolapse).
- 3) Large numbers in the pyloric region may interfere with the sphincter function.
- **Treatment:**
- Ivermectin is highly effective against gasterophilus spp.

3-Oestrus spp (nasal/sheep bot flies)

- most important species are: ***Oestrus ovis***

Host: Sheep and goat

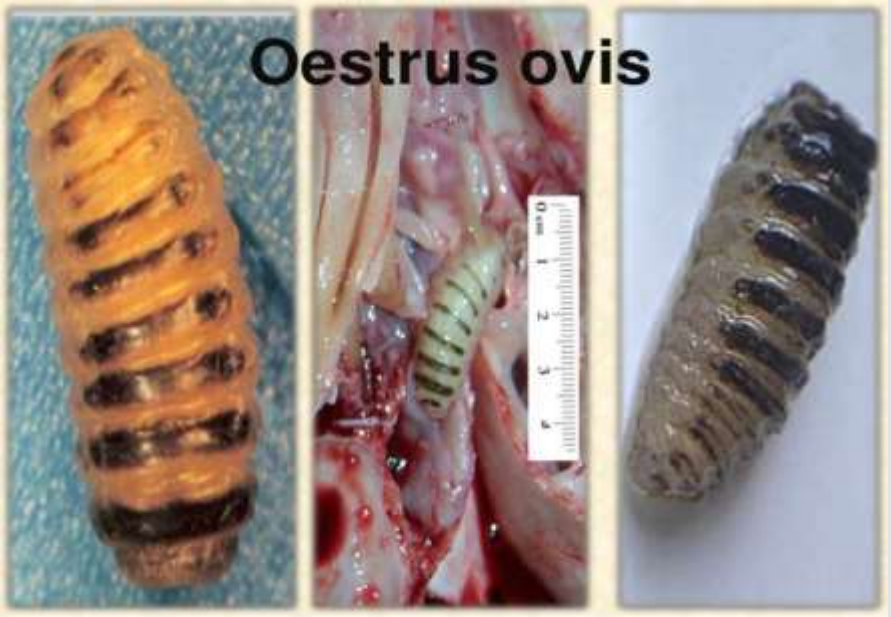
- **habitat:** head sinuses and *nasal passages.*

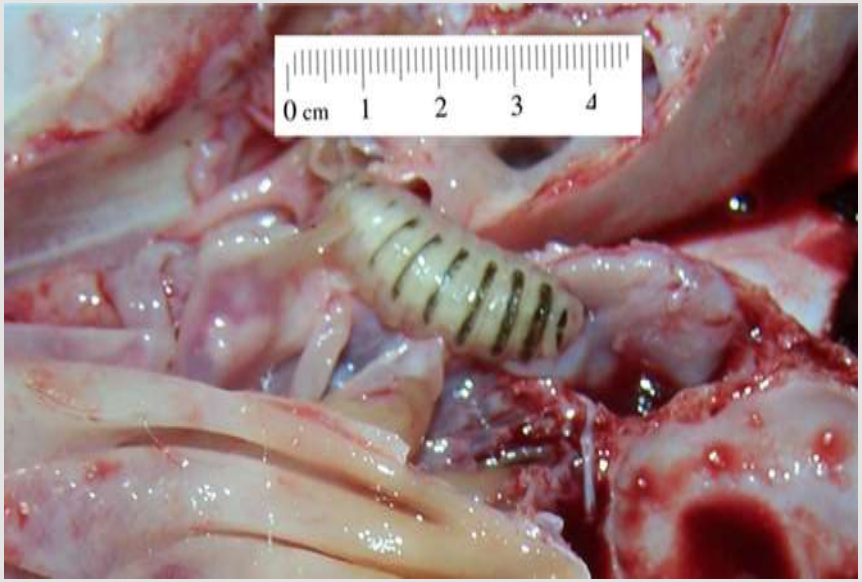
Description of A)adult:

- They are 10-12 mm in length.
- They are grayish in colour.
- it's abdomen with small black spots and a covering of short brown hairs .
- The head is broad, with small eyes.
- The segments of the antennae are small and the arista bare.
- The mouthparts are reduced to small knobs.

Description of B)larva:

- They are about 30 mm long.
- They are yellowish-white in colour .
- They are elongated and tapering anteriorly.
- Each segment has a **dark transverse band dorsally**, The ventral surface bears rows of small spines.
- Anteriorly , they have large black oral hooks.


Oestrus ovis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Life cycle

- females are oviviparous, depositing up to 25 live first stage larvae at a time, in or on the nostrils of the host.
- Firs,-stage larvae are about 1 mm long and crawl up the nasal cavity and attach to the mucous membranes. Here they feed on mucus and desquamated cells.
- The first-stage larvae enter the frontal sinuses via the ethmoid process before moulting.
- Second-stage larvae then pass into the frontal sinuses where they moult for the final time.
- When mature, at up to 20 mm in length, the third-stage larvae re-enter the nasal cavities where they are sneezed out. On reaching the ground the larvae pupariate.

- Clinical signs:
- Sneezing and nasal discharges and fly worry are the consequences of O. *avis* infestations.
- Decreased appetite, restlessness and poor gains are the results of nasal bot fly strikes.
- Respiration may be impaired by the larvae and the thickening of the nasal mucosa.
- Occasionally the larvae may penetrate the bones of the skull and enter the cerebra I cavity. These sheep show a characteristic behavior (stagger).

Treatment:

- Ivermectin is highly effective against oestrus ovis.
- Fly repellents may be used but are not very effective.

B- facultative myiasis

Flies of facultative myiasis :

1-sarcophaga spp (flesh flies):*belong to family* Sarcophagidae

2-Wohlfahrtia spp (flesh flies):*belong to family* Sarcophagidae

3- lucilia spp (green bottle flies):*belong to family* Calliphoridae.

4-calliphora spp (blue bottle flies):*belong to family* Calliphoridae.

5-Chrysomya spp (blow flies):*belong to family* Calliphoridae.

- Most of facultative agents of myiasis have broadly similar life cycles. All are oviparous and, eggs are laid in wounded, infected or faecally soiled skin of warm-blooded vertebrate hosts or flesh of dead bodies .
- The larvae pass through three instars while feeding on the host tissues, causing cutaneous or traumatic myiasis.
- When mature, the larvae enter a wandering stagein which they migrate away from the strike focus and drop to the ground.
- After a period of dispersal they pupate in the substrate, to emerge eventually as adults.

1-sarcophaga spp (flesh flies)

- One of the more widely distributed species is *Sarcophaga haemorrhoidalis*.

Description of A)adult:

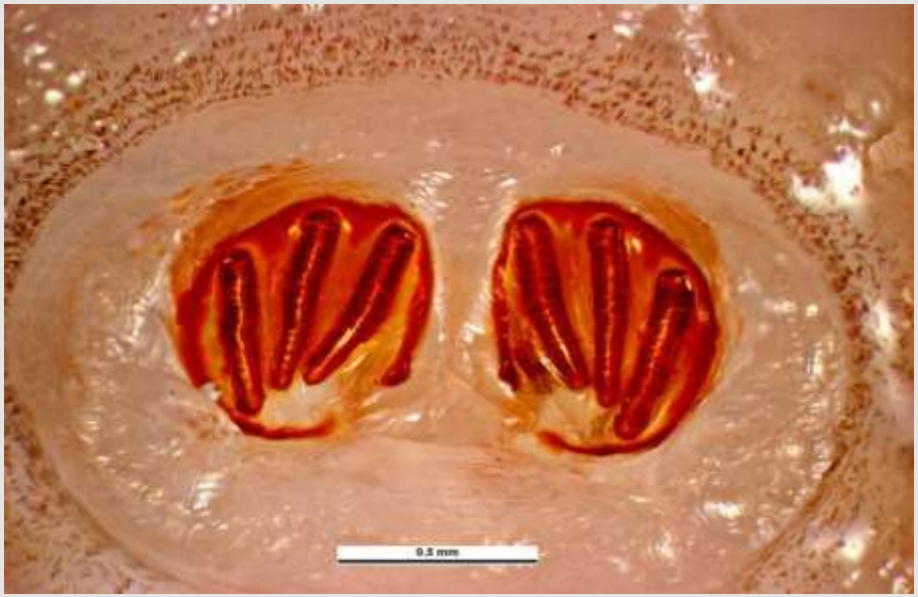
- The adults are medium to large in size.
- they are non-metallic grey-black in colour.
- They have a prominent stripes on the thorax.
- They have chess board abdominal pattern(light &dark squars), and abdomen divided into 4 segments.
- Wings are like that of M.domestica ,but bigger.
- Antanna similar to that of M.domestica , but hairs are only at 2/3 of length of arista.


Sarcophaga haemorrhoidalis

Description of B)larva:

- Anteriorly , It has 2 equal oral hooks.
- Posteriorly, 2 posterior spiracles are embedded in the last abdominal segment.
- Each peritreme is narrowly opened with 3 straight spircular slits.

Sarcophaga **Larva (Posterior Respiratory Spiracles).**



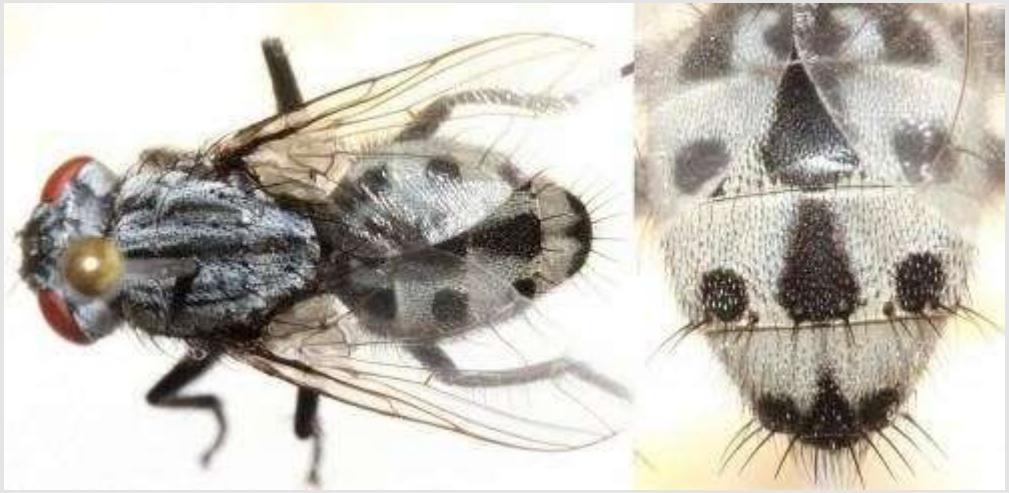
***Sarcophaga* Antenna**

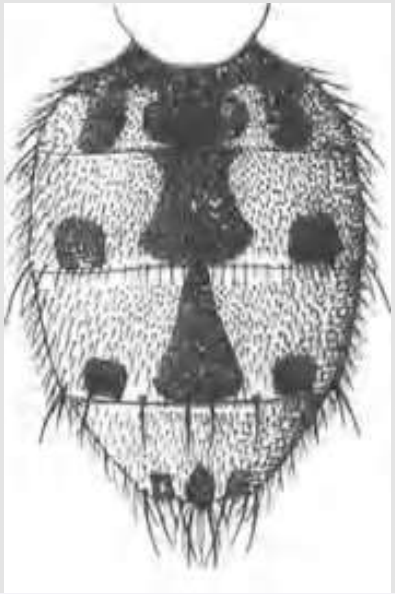
2-Wohlfertia spp (flesh flies)

- The most economically important species is *Wohlfahrtia magnifica*.

Description of A)adult:

- They are large 8–14 mm in length , with elongated bodies .
- They are grey in colour.
- They have a 3 distinct longitudinal thoracic stripes.
- They have a number of distinct, separate , rounded, dark patches on the abdomen arranged in 3 rows.
- **Antanna with bare arista , but contain sensory hairs**.
- They have numerous bristles covering the body and long black legs.
- Larvae possess strongly developed oral hooks.



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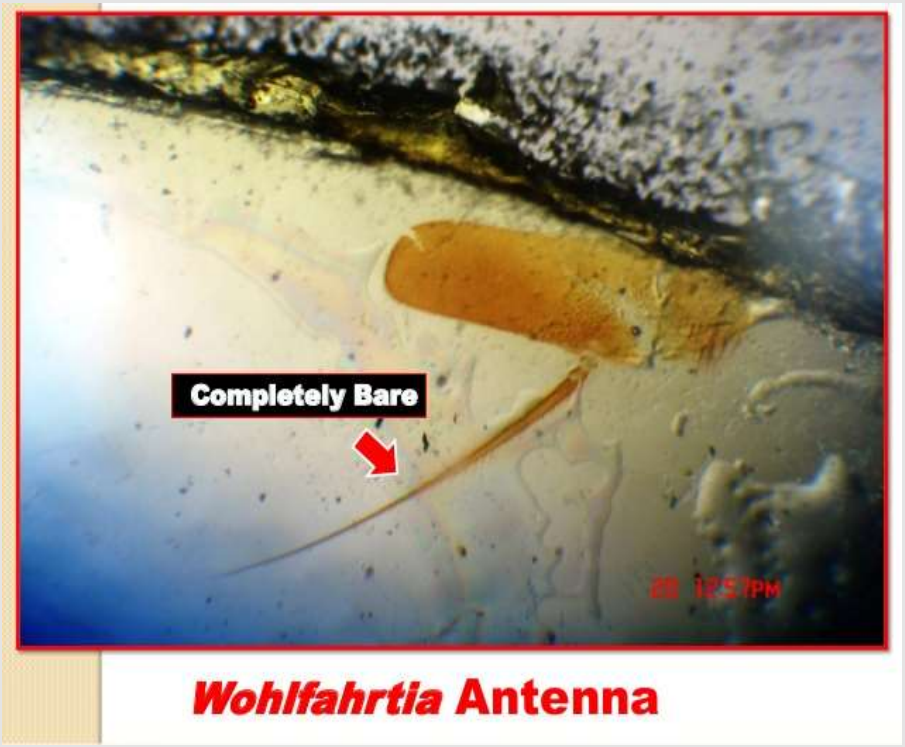
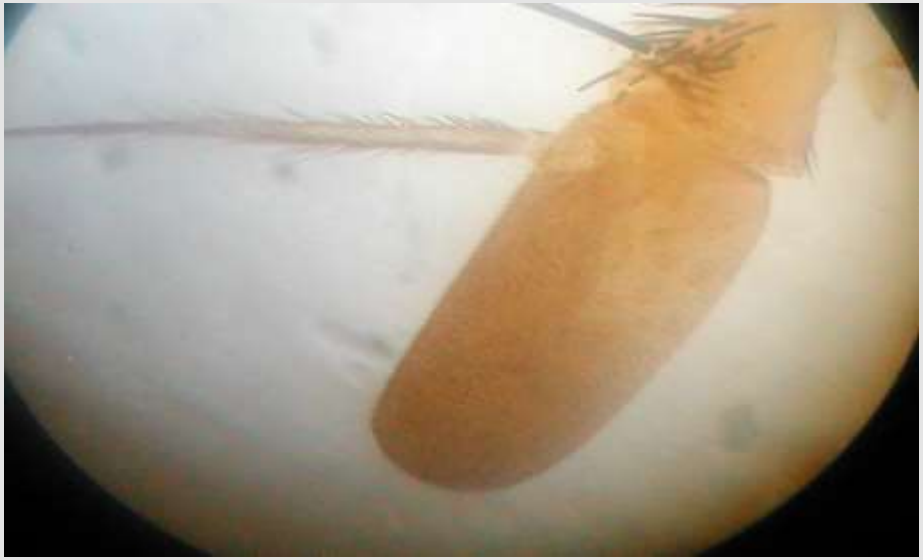


***Wohlfahrtia* Antenna**

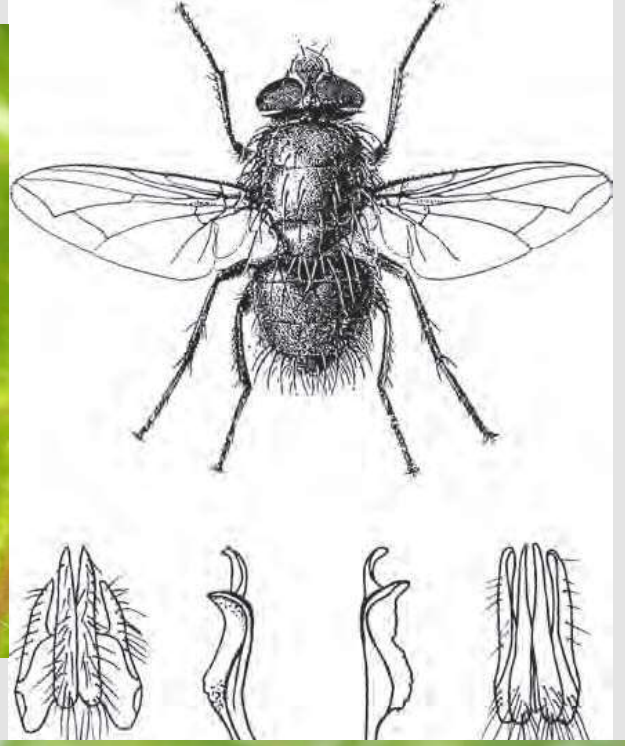


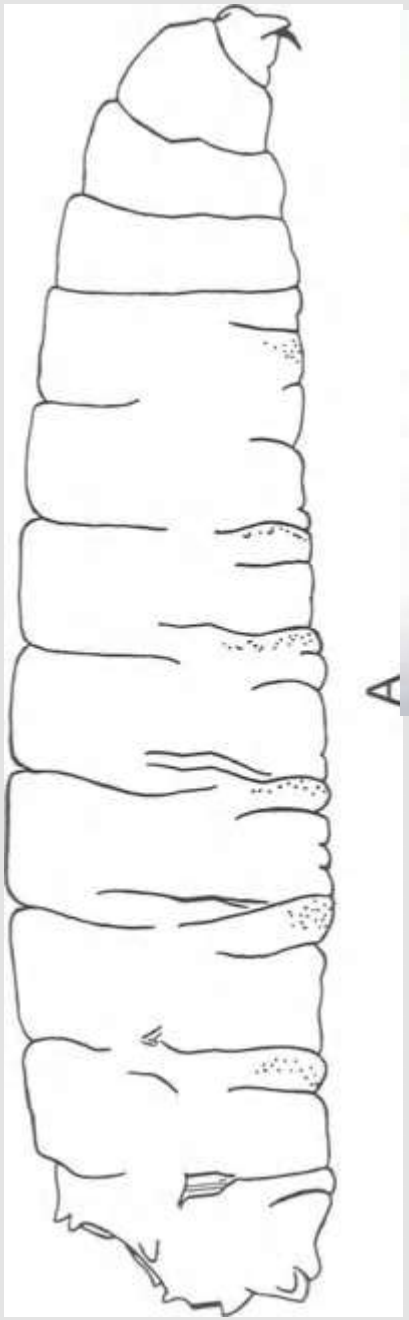
4-lucilia spp (green bottle flies)

- only two species are of major clinical significance as primary agents of cutaneous myiasis particularly in sheep, *Lucilia sericata* and *Lucilia cuprina*

Description of A)adult:

- Adult measure up to 10 mm in length,smaller than calliphora.
- They have a metallic greenish to bronze sheen colour.
- They characterised by the presence 3 pairs of long dorso-central bristles on the thorax .
- Antanna with bare arista.
- **Description of B)larva:**
- Smooth,segmented
- Anteriorly,has pair of oral hooks.
- Posteriorly,has a posterior spiracles.



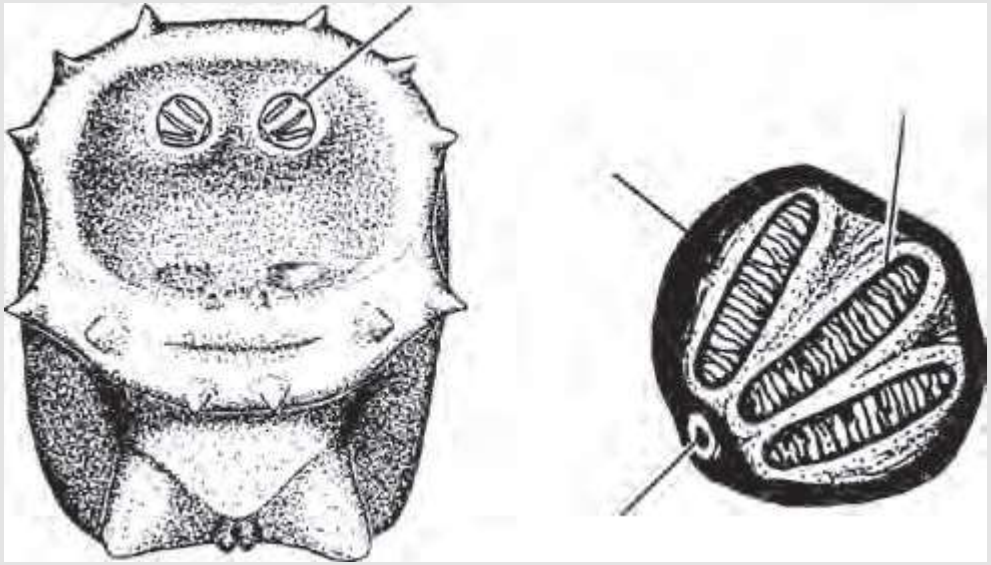


4-calliphora spp (blue bottle flies)

- two species are of major clinical significance *Calliphora vicina* and *Calliphora vomitoria*
- **Description of A)adult:**
- Adult measure 8-14 mm in length.
- They have a metallic blue sheen colour on the body.
- *Calliphora vicina* has yellow–orange jowls with black hairs.
- *Calliphora vomitoria* has black jowls with reddish hairs.
- **Description of B)larva:**
- Measure 10–14 mm in length.
- Smooth,segmented
- The posterior spiracles are in a closed thick peritreme with straight spiracular slits inside.


alamy stock photo


Calliphoridae
Calliphora vicina
0.5 mm

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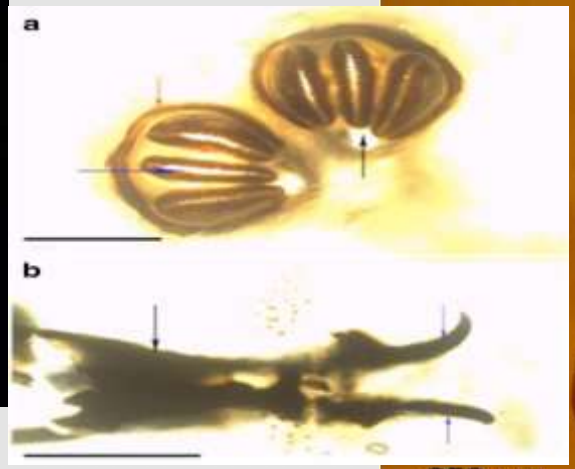
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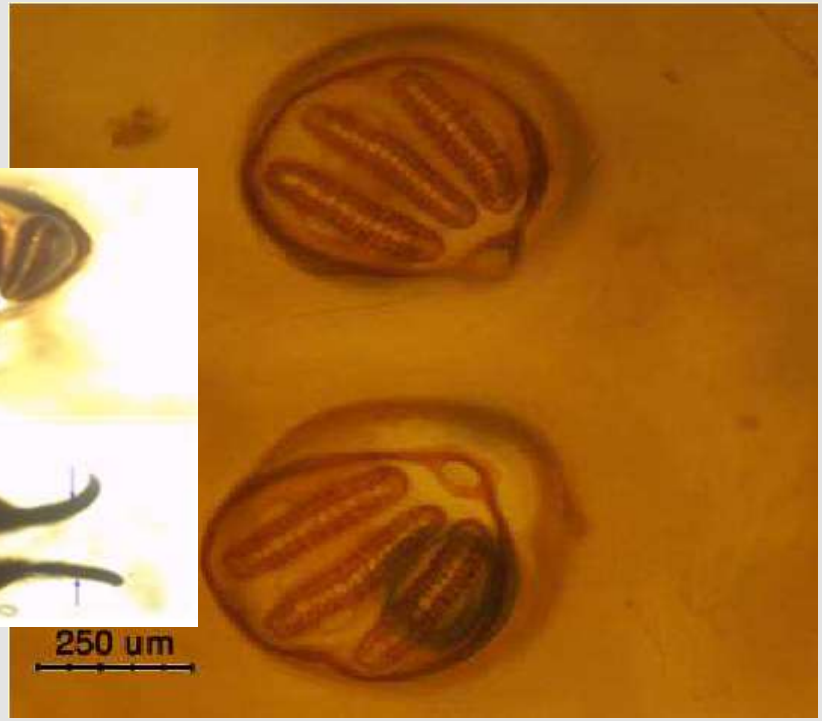
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5-Chrysomya spp (hairy maggot blow flies*)*

- The most important species in the genus is the obligate ectoparasite, *Chrysomya bezziana.* However, *Chrysomya megacephala, Chrysomya rufifaces* and *Chrysomya albiceps* are secondary invaders.
- **Description of A)adult:**
- Adult measure 8-10 mm in length.
- They are green or blue in colour.
- They have a narrow dark bands along the posterior margins of the abdominal segments.
- They has a2faint dark stripes on the thorax.
- The adults have a pale-coloured face with orange brown eyes.
- **Description of B)larva:**
- Measure 18 mm in length.
- each segment carrying a broad, encircling belt of strongly developed fleshy spines.(so take name ***hairy maggot*** **blow flies)**


Calliphoridae
Sarcophagidae
Muscidae

Order Phthiraptera (Lice)

The order is divided into four sub-orders:

1-Anoplura: described as" **sucking lice"**

2-Amblycera:

3- Ischnocera :

- The Amblycera and Ischnocera are usually discussed together and described as the Mallophaga ,and known as "**chewing lice"**.

4- Rhynchophthirina:is a very small sub-order, including just two African species, one of which is a parasite of elephants and the other a parasite of warthogs.

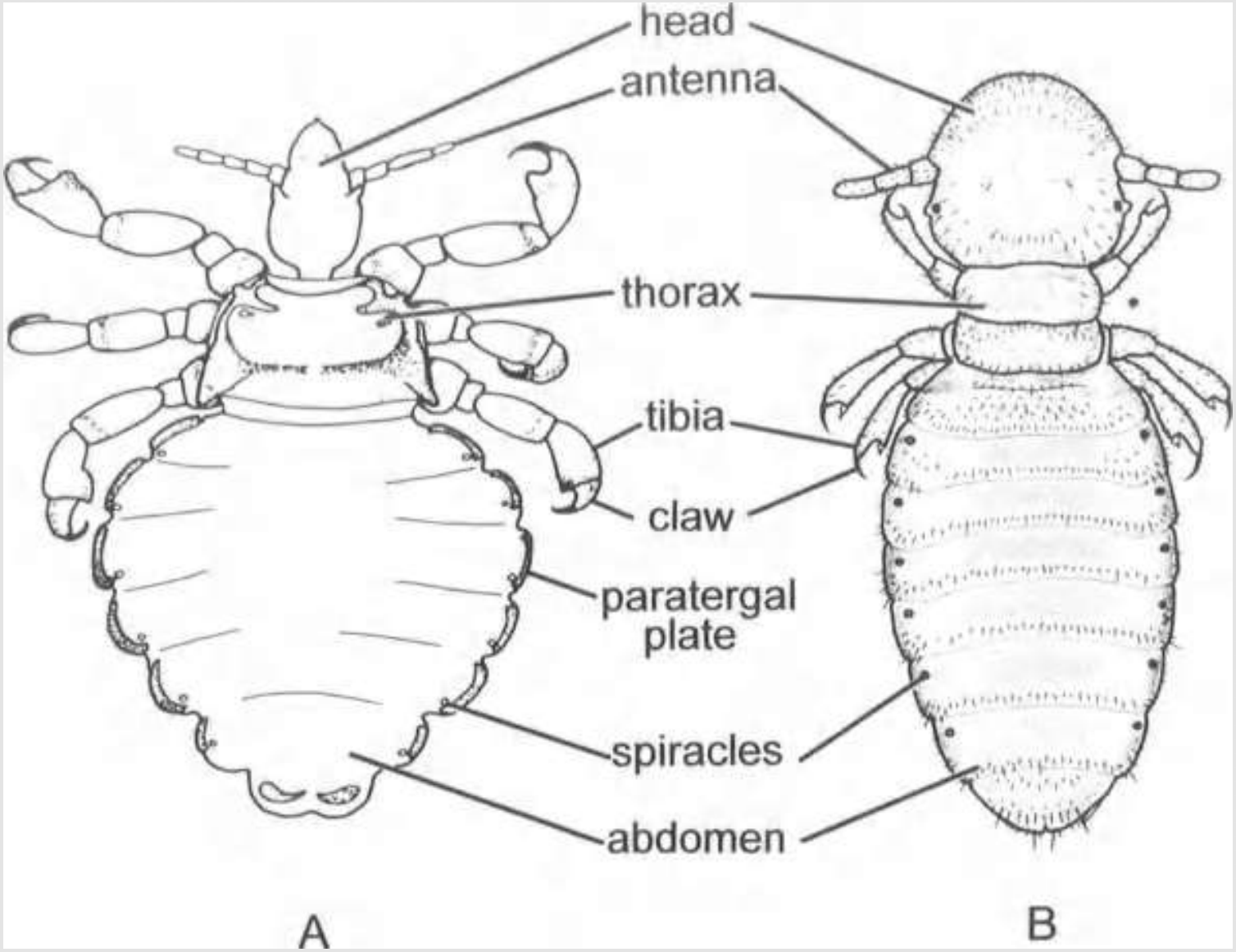
Traditionally the Phthiaptera has usually been divided into 2 main sub-orders, the Anoplura and the Mallophaga.

N.B:'biting lice', sometimes used to describe the Anoplura, is a misnomer, because all lice bite.

General characters:

1-The lice are permanent obligate ectoparasites.
2-thay are highly host-specific, many species even being localised on specific anatomical areas of their host.
3-All lice are dorsoventrally flattened
4-They have a segmented body (head, thorax and abdomen).
5- they possess 3 pairs of jointed stout legs end by claws for clinging tightly to fur, hair and feathers.
6-They usually vary in colour from pale beige to dark grey, but they
7-They feed on epidermal tissue debris, parts of feathers, sebaceous secretions and blood.
8- sensory organs are poorly developed; a pair of short antennae and the eyes are vestigial or absent,if present(photosensitive eye spots).
9-they have no wings (wingless).

10-The female lays batches of 50-100 eggs on the host, usually cementing(glued) them firmly to individual hairs or feathers.
11-Transfer between hosts is ~ost commonly brought about by close physical contact between individuals or by legs of flies.
12-they are hemimetabolus(incompelete life cycle).
13-Some species of lice may act as intermediate hosts to the tapeworm, *Dipylidium caninum*, and the pig louse, *Haematopinus suis*, may spread swine pox.
14-Heavy louse infestation is generally known as **pediculosis.**
15- Heavy louse infestations may cause pruritus, alopecia, excoriation and self-wounding. The disturbance caused may result in lethargy and loss of weight gain or reduced egg production. Severe infestation with sucking lice may cause anaemia.



A- sucking lice
B-chewing lice

Life cycle of lice

- The female lays batches of 50-100 eggs on the host cementing them firmly to individual hairs or feathers.
- The nymph, which closely resembles a smaller version of the adult, hatches from the egg within 1-2 weeks of oviposition.
- Over the course of between 1 and 3 weeks the nymphs feed
- and moult through 3-5 stages, eventually moulting to become a sexually mature adult.
- The entire egg-to-adult life cycle can be completed in as little as 4-6 weeks.
- Adults probably live for up to a month, during which they produce small numbers of eggs, probably in the region of one every 1 or 2 days.

Sub-Order Anoplura
(sucking Lice)

- It include 2 families contain species of major veterinary importance, **Haematopinidae** and **Linognathidae.**
- The family Haematopinidae contains a single genus of veterinary importance, ***Haematopinus.***
- species of veterinary importance in the genus ***Haematopinus:***

1-Haematopinus suis*(* hog louse)
2-Haematopinus aSini *(*horse sucking louse)
3-Haematopinus eurysternus*(*short-nosed cattle louse)
4-Haematopinus quadripertusus *(*tail louse)
5-Haematopinus tuberculatus *(*buffalo louse)

Haematopinus eurysternus (short-nosed cattle louse)

- It is one of the largest lice of domestic mammals.

Host: cattle

habitat: Skin, poll, base of horns,ears, eyes and nostrils, occasionally tail switch.

- **Description of A)adult:** It is broad in shape.

Size:measuring 3.4–4.8 mm in length.

Colour:they vary in colour from dark grey to grayish black.

thorax: yellow or greyish-brown in colour ,with well developed dark thoracic sternal plate .

abdomen: the abdomen blue–grey with a dark stripe on each side and lateral margins of 3rd to 8th segment has swollen ,pad like,strongly chitinised area(paratergal plates).

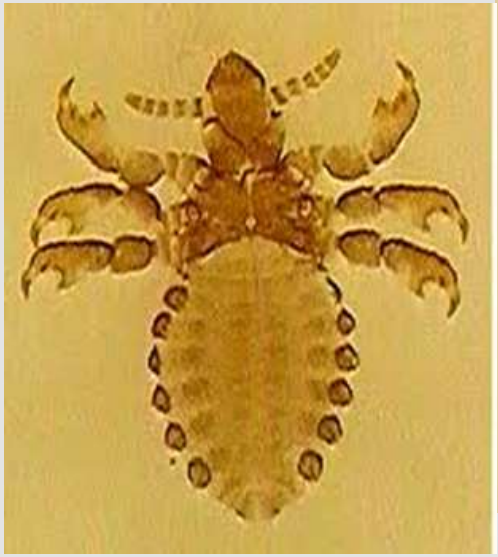
eyes:they are absent

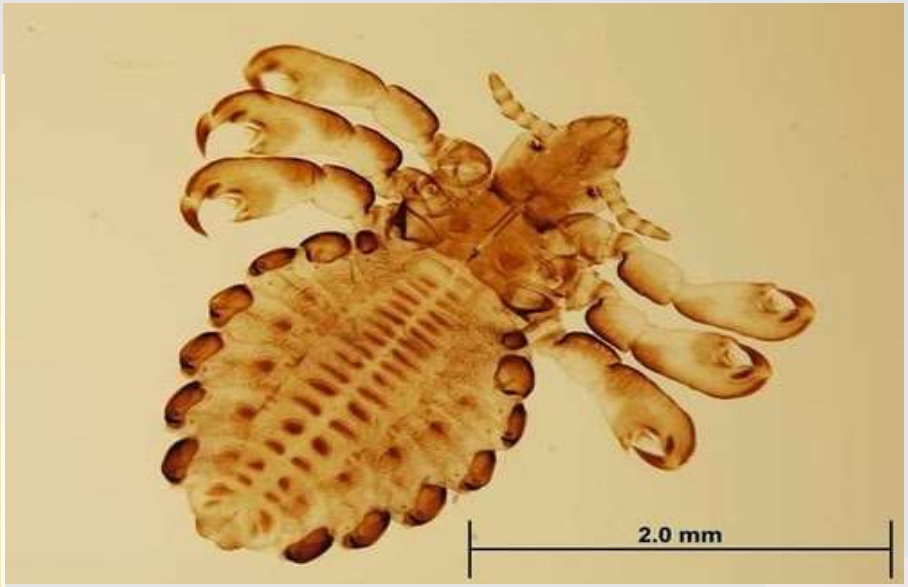
Head: they have a short pointed head.

antanna : 5 segments ,with Distinct ocular points present behind each one

Legs: They are of similar sizes each terminating in a single large claw

Mouthparts: adapted for piercing and sucking

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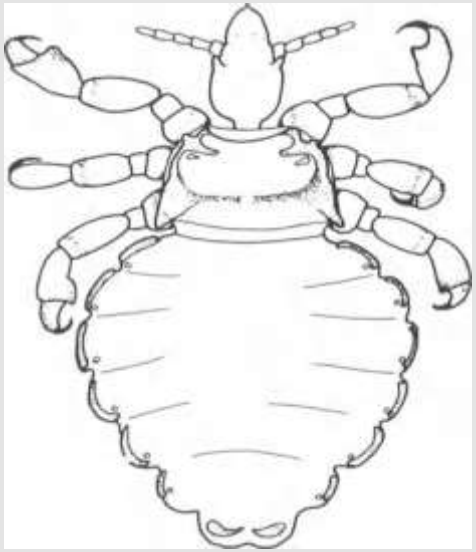


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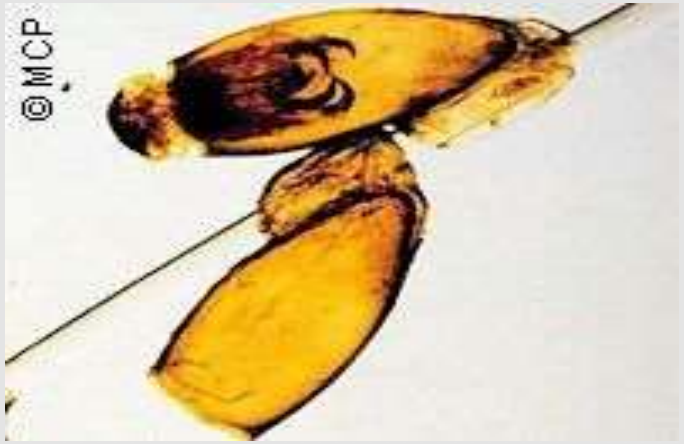
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Sub-Order Amblycera
(chewing Lice)

- They are ectoparasites of birds, marsupials.
- Adults are medium-sized or relatively large.
- Mouthparts adapted for chewing consisting of distinct mandibles on the ventral surface and a pair of 2- to 4-segmented maxillary palps.
- antennae are 4-segmented and protected in antennal grooves, so that only the last segment is visible.
- in birds ,The family of major veterinary importance is family **Menoponidae**, which containing the important species ***Menopon gallinae*** *and* ***Menacanthus stramineus.***

1- Menopon gallinae
(shaft louse)

- They are rapidly moving louse.

Host: Chicken, turkey, duck,pigeon.

habitat: Thigh and breast feathers.

Description of A)adult:

Size: It is a small louse; adults measure 2 mm in length.

Colour: they are Pale yellow in colour.

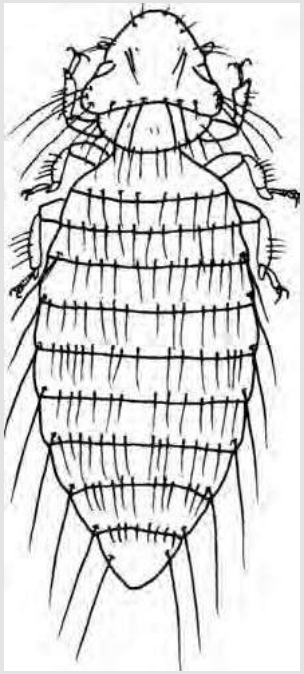
abdomen: it is tapered posteriorly in the female but rounded in the male and has a sparse covering of small to medium-length setae on its dorsal surface.

Head: they have a broad head.

antanna : a pair of 4-segmented antennae,folded into grooves in the head

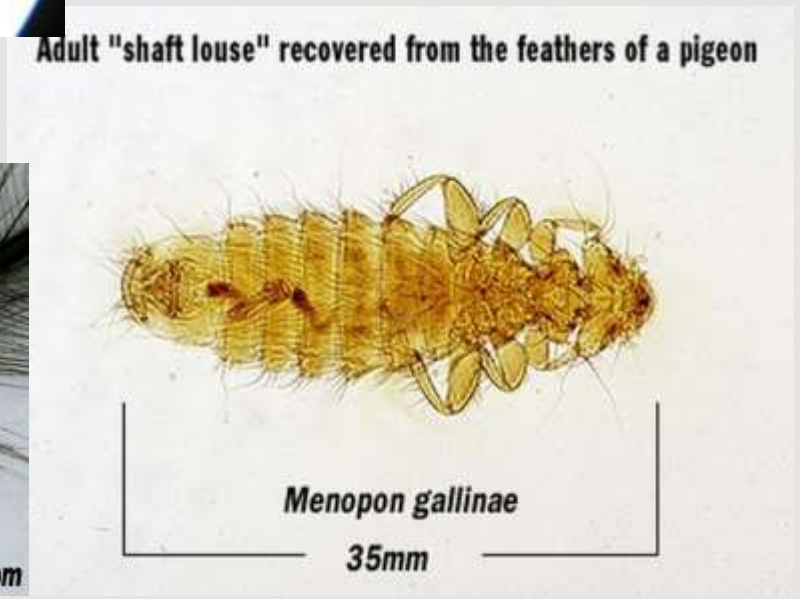
Legs: There have 3 pairs of short, two-clawed legs.

Mouthparts: adapted for chewing, with small M. palps.




Osc


poultrykeeper.com


Adult "shaft louse" recovered from the feathers of a pigeon
Menopon gallinae
35mm

2-Menacanthus stramineus
(chicken body louse or yellow body louse)

Host: Chicken, turkey, guinea fowl, peafowl, pheasant, quail, cage birds(canary)

habitat: Skin, breast, thighs, vent, wings and head

Description of A)adult:

Size: Adult males measure 2.8 mm in length and the female 3.3 mm.

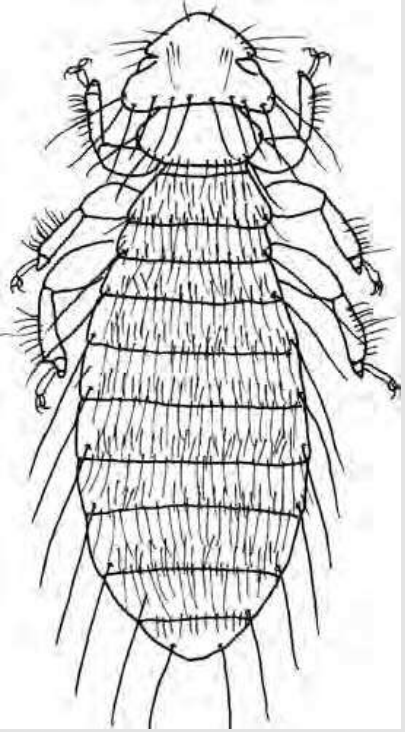
abdomen: flattened, elongated and broadly rounded posteriorly with two dorsal rows of setae on each abdominal segment.

Head: The head is almost triangular in shape.

antanna : 4 segments and club-shaped.

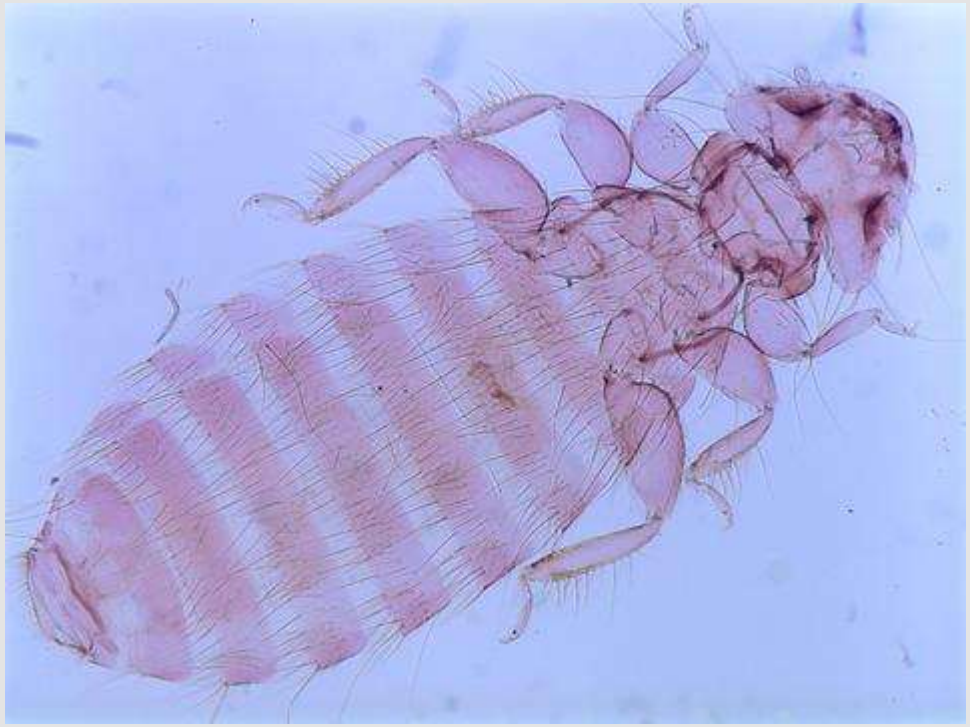
Legs: There have 3 pairs of short, two-clawed legs.

Mouthparts: adapted for chewing &M.palps are distinct.




VETERINARY
PARASITOLOGY


VETERINARY
PARASITOLOGY



Sub-Order Ischnocera
(chewing Lice)

- The Ischnocera includes five families, 3 of veterinary importance:

1- Philopteridae: include lice of domestic birds and mammals .

- contains the genera ***Cuclotogaster***, ***Lipeurus***, ***Goniodes***, ***Goniocotes*** and ***Columbicola.***

2-Trichodectidae: include lice of mammals .

- contains the 3 genera **-** ***Damalinia***, ***Felicola*** and ***Trichodectes.***

3-Bovicoliidae : include lice of mammals:

- contains the genus ***Bovicola***

Family Trichodectidae

Trichodectis canis(dog biting louse)

Host: Dog, wild canids

habitat: Skin, head, neck and tail regions

Description of A)adult: they are broad louse.

Size: It is a small louse; adults measure about 1-2 mm in length.

Colour: they are yellowish in colour, with dark markings.

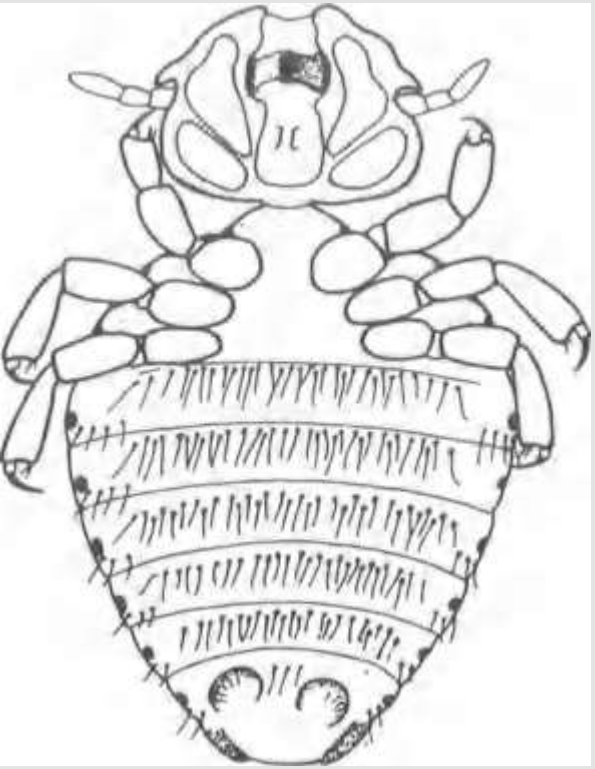
abdomen: it has 6pairs of spiracles on segments 2–6, and many rowsof large thick setae.

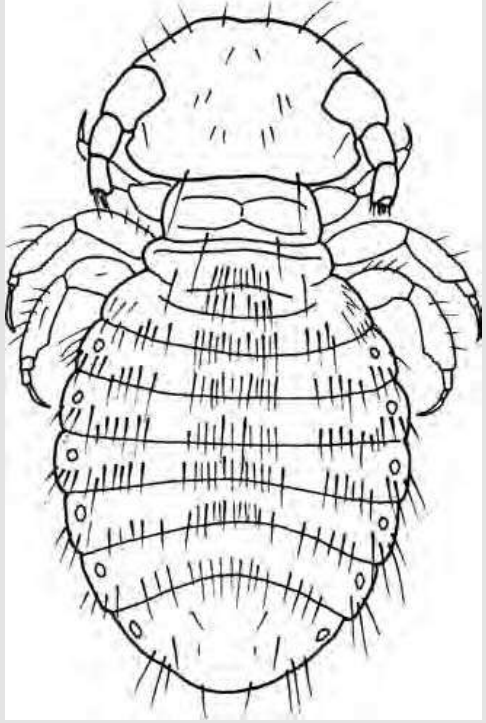
Head: head is broader than long.

antanna : antennae are 3-segmented,short and exposed

Legs: They are stout and their tarsi bear singleclaws.

Mouthparts: adapted for chewing.





Family Bovicoliidae

Bovicola equi(horse louse)

Host: Horse.

habitat: Skin, neck, flank, tail base.

Description of A)adult: they are broad louse.

Size: It They are up to 1–2 mm in length.

Colour: they are reddish-brown in colour.

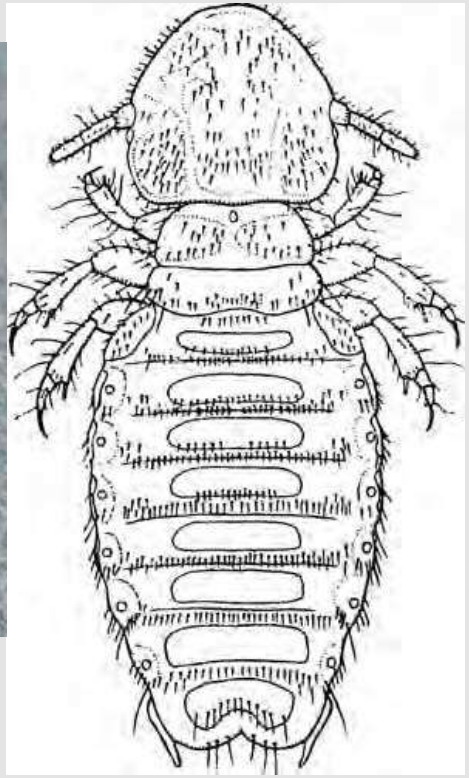
abdomen: light yellow with transeverse dark strips and bears 6pairs of spiracles on segments 2–6, and a row of very small setae on each segment.

Head: They have anteriorly rounded large head , as wide as the body of louse.

antanna : antennae are 3-segmented.

Legs: They have 3 pairs of legs and their tarsi bear singleclaws.

Mouthparts: adapted for chewing, present ventrally.




Bovicola equi
500 µm


NCVP
UF FLORIDA

Order siphonaptera (flea)

General characters:

1-obligate blood-feeding insects, both sexes are blood feeders,but female suck more blood for egg production.

2-The adult flea is the only parasitic stage of the life cycle, The egg, larva, and pupa are found in the environment.

3-Over 95% of flea species are ectoparasites of mammals, while the others are parasites of birds.

4-Most of the fleas are not host specific.

5-Fleas live a maximum of about 1½ years.

6-they are holometabolus(direct life cycle)

Egg → larva → pupa → adult

7-they act as vector for many bactarial (*Yersinia pestis[plague]), viral(*feline parvovirus),prasitic tape worm(*D. caninum).*

8-Ruminants, horses and pigs do not have their own species of fleas.

9-body:flattened laterally, wingless, with a glossy surface, allowing easy movement through hairs and feathers.

10-colour:typically medium to dark brown in color.

11-size:usually between 1 and 6 mm in length, with females being larger than males.

12-antannae:which are short and clublike, are recessed into the head.

13-legs:They have a 3 pairs of legs originate on the,the 3rd pair of legs is longer than other pairs,which facilitates the incredible jumping of flea and end by claws.

14-mouthparts:They are well developed adapted for piercing and sucking ,usually seen protruding from the ventral aspect of the head.

15-"comb/ctenidia:"

- They are rows of dark spines.
- they are important features used in identification.
- There are 2types,may both are present,or one is present or may be both absent.

1-pronotal or posterior comb:present on first segment of the thorax (pronotum).

2-genal or venteral comb: present on venteral aspect of head.

FAMILY PULICIDAE

1-Ctenocephalides felis[cat flea]:

- They act as a vectors of plague and are intermediate hosts of the tapeworm *Dipylidium caninum*.

Host: Cat, dog, human

Habitat:they can found through haircoat,but predilection seat are tailhead, neck, and flanks.

Morphology of adult:

Size:female approximately 2.5 mm,male approximately 1 mm.

Colour:dark brown/black colour

Head: In the female ,the head is twice as long as high and pointed Anteriorly, but In the male, the head is as long as wide but is also slightly elongate anteriorly.

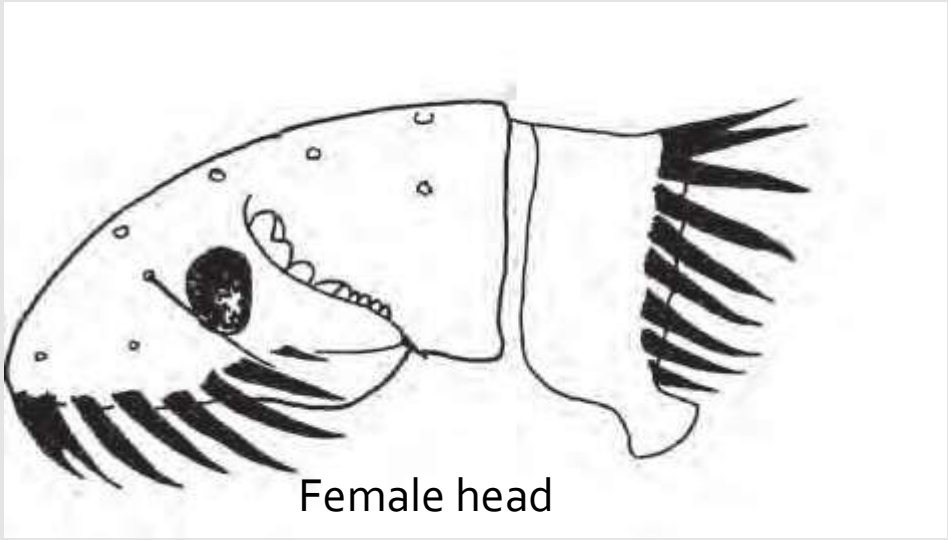
Legs: 3 rd pair of legs is much longer than the others and, coupled, provide an adaptation for jumping.

Comb:both genal and pronotal comb are present.

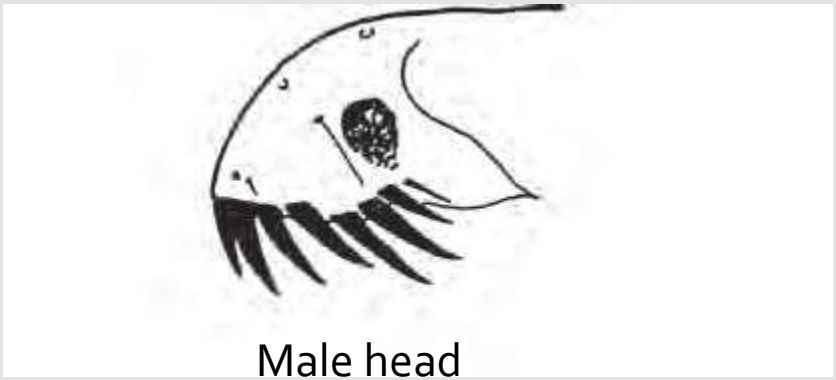
A)genal comb:*consists of 7-8spines.

*The teeth of the genal comb are all about the same length.

B) pronotalcomb :consists of about 16 spines.

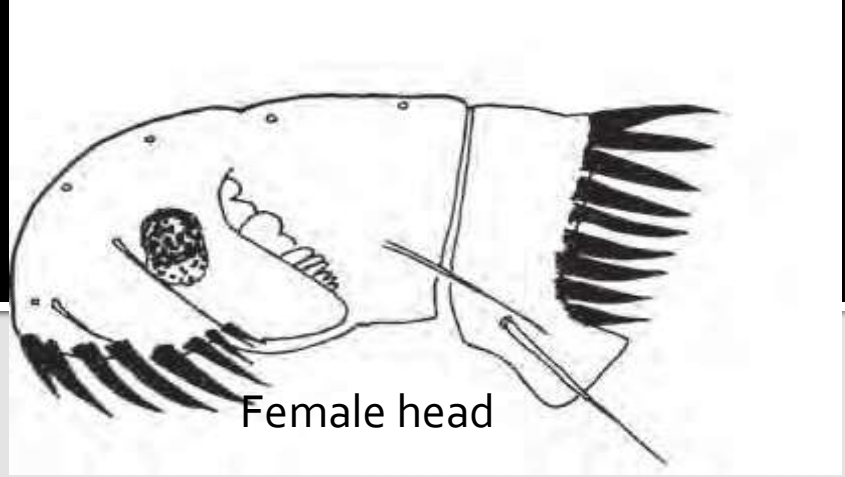


Female head



Male head

2-Ctenocephalides canis[dog flea]:


Female head

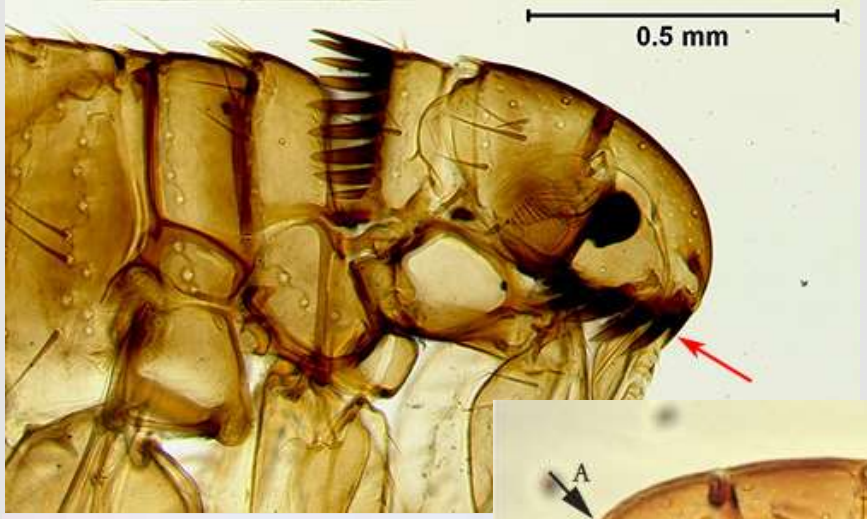
Host: Dog, cat, rat, rabbit, fox, human

Habitat:they can found through haircoat,but predilection seat are tailhead, neck, and flanks.

Morphology of adult: The dog flea, *C. canis*, is closely related and is morphologically very similar to the cat flea *C. felis but differ in:*

- The head of the female dog flea is more rounded on its upper and anterior surface than that of the cat flea and less than twice as long as high.
- has both genal and pronotal combs with the same number, However, in both female and male *C. canis* the first spine of the genal comb is shorter than the rest.


male head



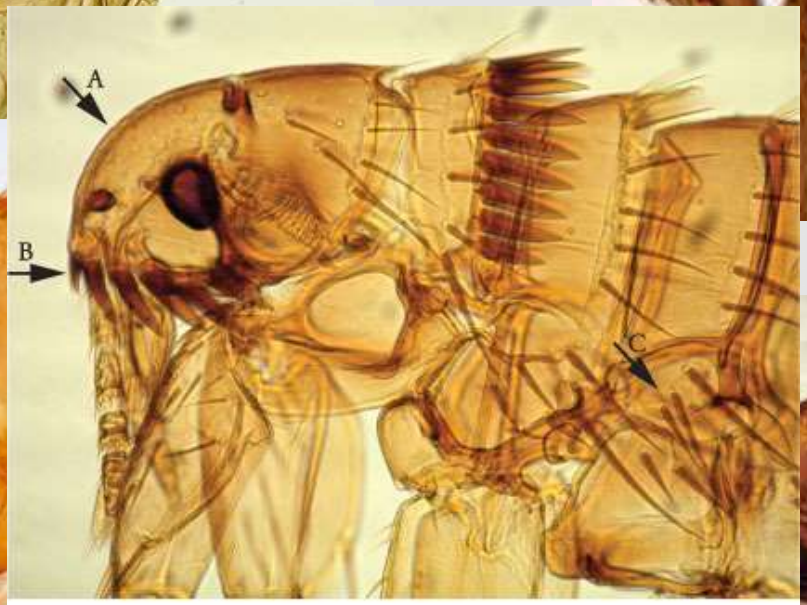
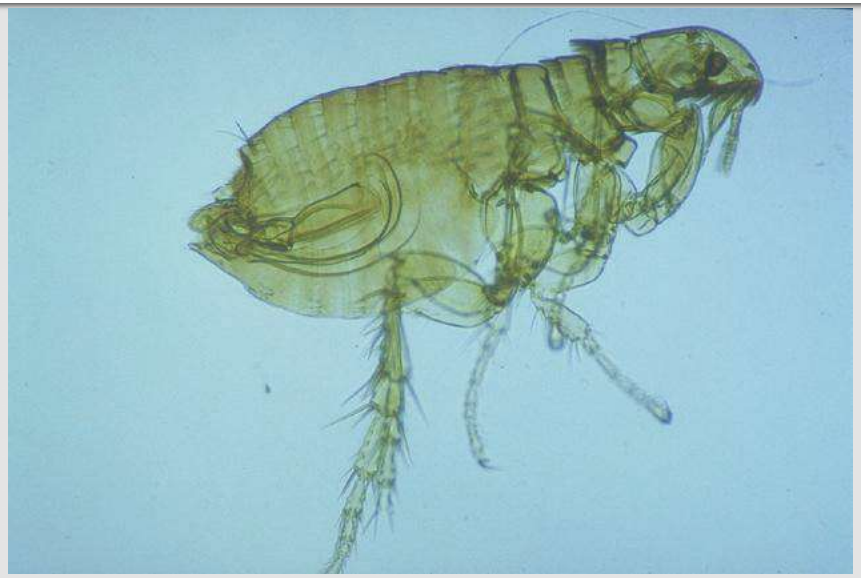


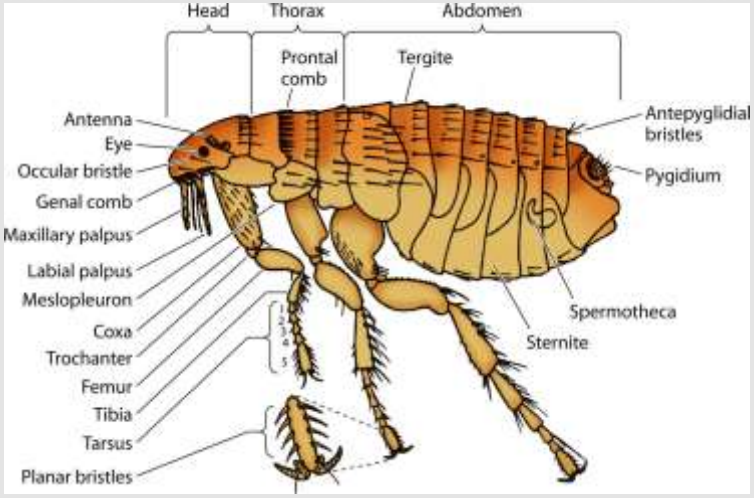
Figure 1. Female of *C. canis*. A. shape of the head; B. length of the first spine of the genal comb; C. number of bristles on the lateral metanotal area (LMA).

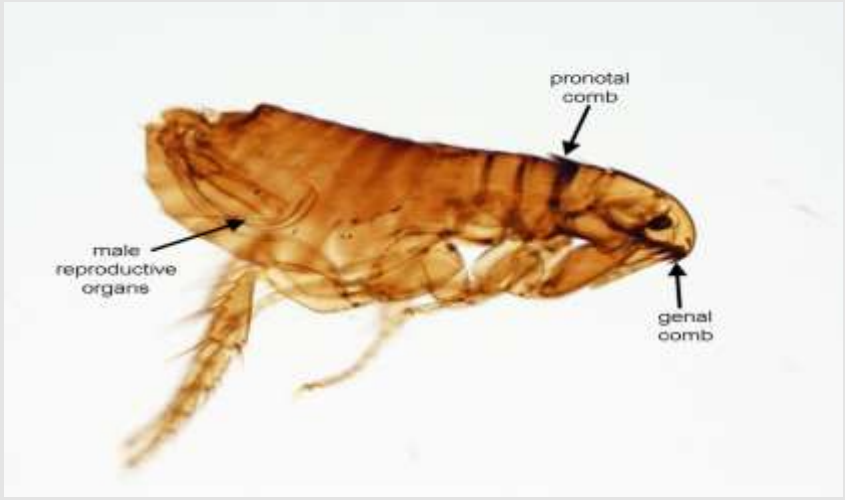
Figure 2. Female of *C. f. felis*. A'. shape of the head; B'. length of the first spine of the genal comb; C'. number of bristles on the lateral metanotal area (LMA).

**differantiation between male and female **

- Male characterised by prescence of coiled penis in the abdomen called aedugus,while in female genital organ called spermatheca.







- **Clinical signs of flea infestation:**
- Flea-bite dermatitis is one of the most common canine dermatoses.
- Clinical signs include papules, crusts, pruritus, excoriations and secondary alopecia.
- The lesions mostly occur on the dorsum, around the tail base, the ventral abdomen and the neck.

Diagnosis:

- diagnosis is based on history, clinical signs and identification of fleas or flea faeces on the dog.

3-Xenopsylla cheopis (Oriental rat flea):

- They act as vector of yersinia pestis (causative agent of plague).

Host: Rodents, primates, human

Habitat:skin

Morphology of adult:

Colour:has a light amber coloration.

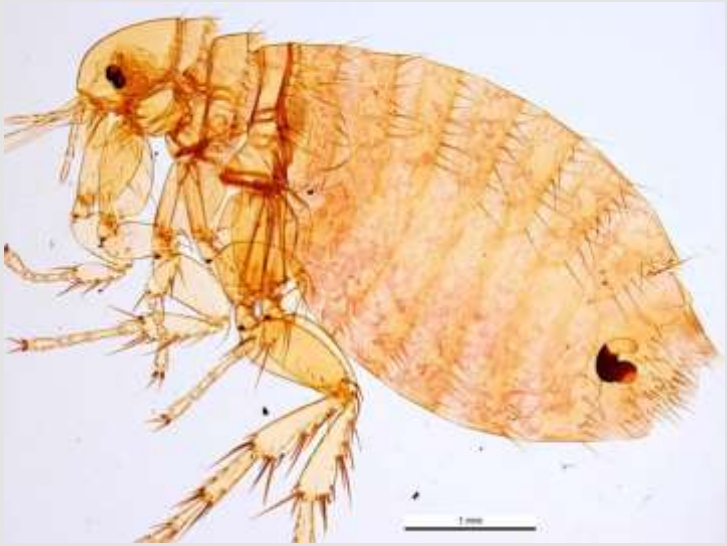
Head:smoothly rounded anteriorly with a conspicuous row of bristles along the rear margin of the head

Legs: 3 rd pair of legs is much longer than the others and, coupled, provide an adaptation for jumping.

Eye:they are present, yet it can only see very bright light,there is a stout ocular bristle in front of the eye.

Comb:both genal and pronotal comb are absent.

Thorax: The segments of the thorax appearrelatively large



Class Arachnida

- In this class there is only one group of major veterinary importance, the subclass **Acari (sometimes also called Acarina),** containing **mites** and **ticks**.

General characters:

1-Segmentation is inconspicuous or absent and the sections of the body are broadly fused,we can having the body divided into two parts, the **gnathosoma** and the **idiosoma.**

A- gnathosoma: it present anteriorly ,consisting of:

1- The first pair of appendages, called **chelicerae**, is positioned in front of the mouth and is used in feeding.

2- The second pair of appendages appears behind the mouth and is composed of short **palps,**has sensory function**.**

B- idiosoma : The part of body posterior to the gnathosoma .

In adults, it is subdivided into the region that carries legs, **podosoma** and the area behind the last pair of legs, the **opisthosoma**.

2-They don’t possess antennae or wings and they have only simple eyes.

3-they have 4 pairs of legs,each leg has 6-segmented and each is attached to the podosoma at the **coxa** and ending in a pair of claws and a pad-like pulvillus.

4- The Acari are divided into7orders, of which only 4 include parasitic forms:

A- order Metastigmata,:the **ticks**, also known as the Ixodida.

B-order Mesostigmata, Prostigmata and Astigmata: collectively forming the group known as **mites.**

1-mites(acri)

1-They are permenant ectoparasitic of mammals and birds largely inhabit the skin, where they feed on blood, lymph, skin debris or sebaceous Secretions.
2-It include order Mesostigmata, Prostigmata and Astigmata.
[according to gas exchange way (through the integument it called Astigmata , in other mites, gas exchange takes place through 1-4 pairs of stigmata, found on the idiosoma)
4-Infestation by mites is called **acariasis** and can result in severe dermatitis, known as **mange.**
3-transmission from host to host is primarily by physical contact.
5-medical importance : Some mites may be intermediate hosts of anoplocephalid cestodes, including *Anoplocephala*,*Moniezia* and *Stilesia*.

General characters:

1- they are small, most being less than 0.5 mm long, may attain several millimetres after blood feeding.

2-The body is divided into two sections, the gnathosoma and idiosoma can show various sutures and grooves.

3- gnathosoma is a highly specialised feeding apparatus bearing

A-a pair of **sensory palps**:

- 1or 2 segments in most astigmatic and prostigmatic mites
- 5or 6segments in the Mesostigmata
- last segment of the palps usually carries a **palpal claw** or **apotele**.

B-a pair of **chelicerae**, sometimes bearing claw-like, or stylet-like **chelae** at their tips

C-buccal cone between the chelicerae.

D- In the mesostigmatic mites, there is a **hypostome** protrudes from a structure at the base of the gnathosoma , known as the **basal capituli.**

4-The idiosoma may be soft, wrinkled and unsclerotised.

- many mites may provided with 2 or more sclerotised dorsal shields
- 2 or 3 ventral shields: the **sternal**, **genitoventral** and **anal** shields
- These may be important features for mite identification.

5- **legs :** ⦿Nymphal and adult mites have 4 pairs of legs arranged in 2 sets of anterior and posterior legs and Larval mites have3 pairs of legs.

⦿ 1 st pairs of legs are often modified to form sensory structures and are frequently longer and slender.

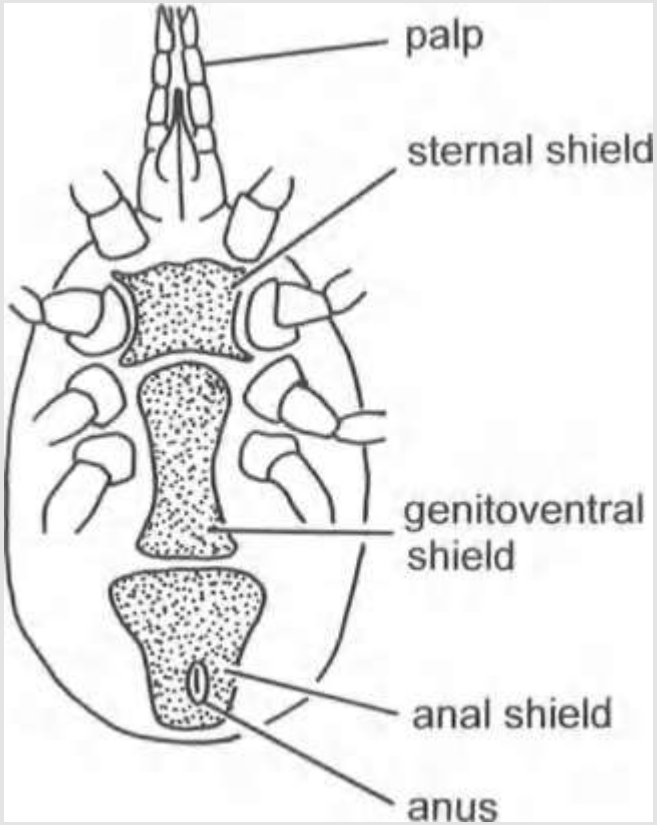
⦿ At the end of the tarsus may be present **ambulacrum**, usually composed of paired claws, and an **empodium**, which is variable in form and may resemble a pad, sucker, claw or filamentous hair.

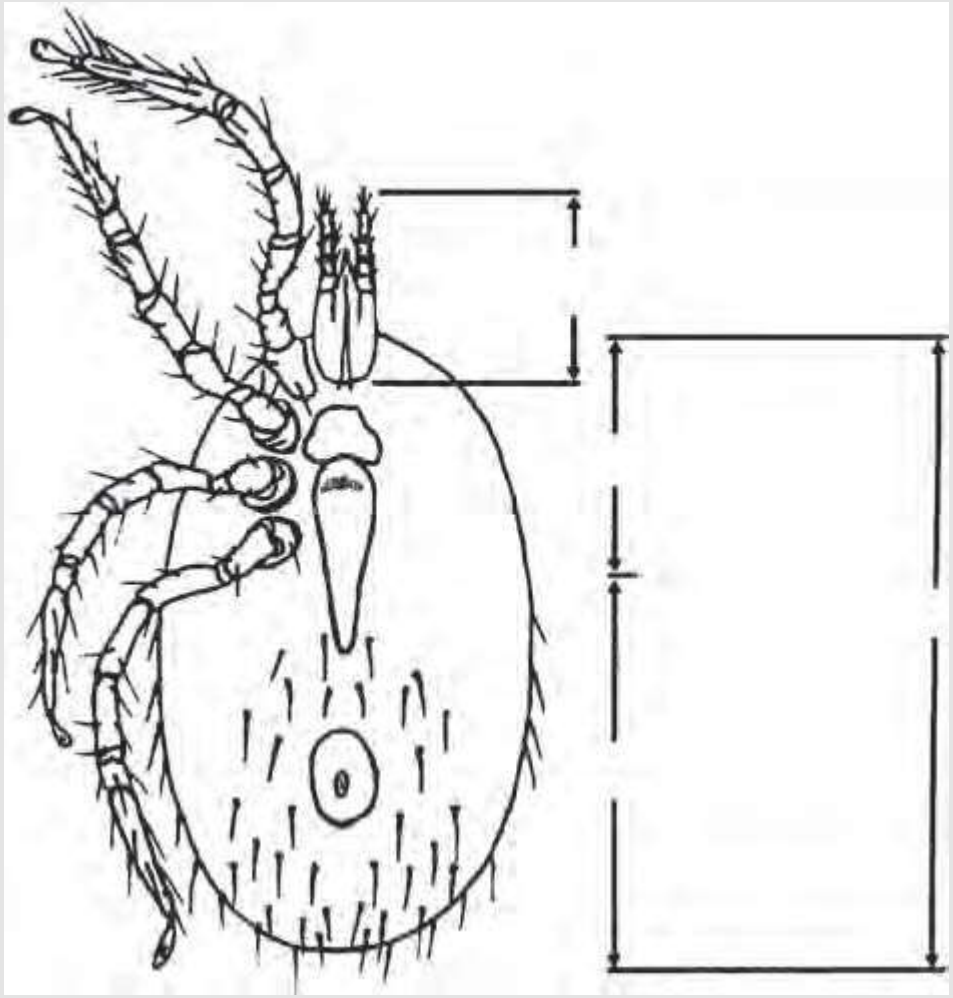
⦿ In some astigmatic mites, the claws may be absent and replaced by stalked **pretarsi**, which may be expanded into bell or sucker-like **pulvilli** .

6-Hairs, or setae, have sensory in function, cover the idiosoma of many species of mite, important in the identification of mite species.

7-Eyes are usually absent and most mites are blind but In some groups such as the trombidiformes, there are simple eyes.

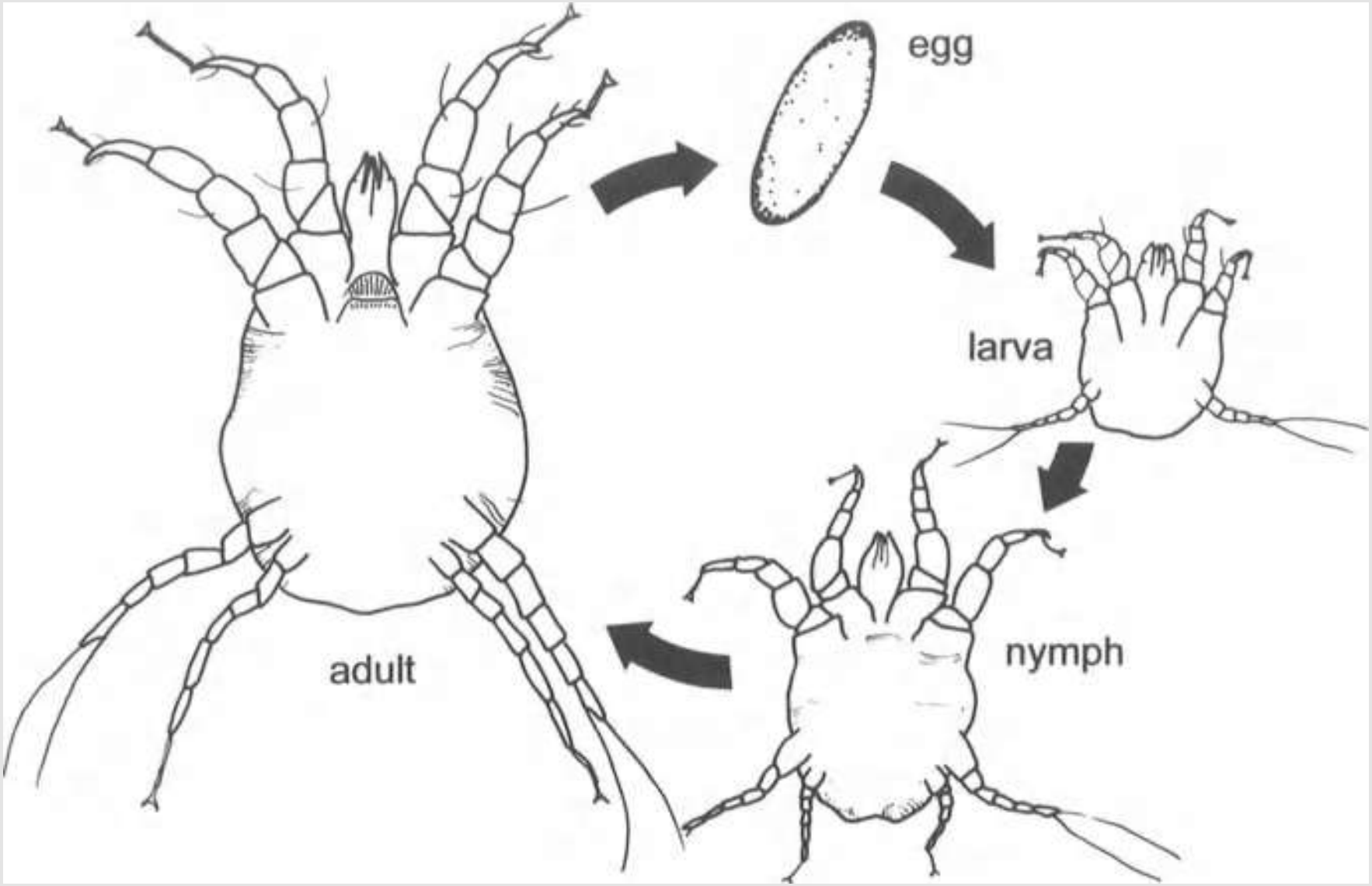
8-they have incompelete metamorphosis (hemimetabolus).


palp
sternal shield
genitoventral shield
anal shield
anus



Life cycle

- Female mites produce relatively large eggs, from which a small, sixlegged larva hatches
- The larva moults to become an eight-legged
- nymph.
- There may be between one and three nymphal stages,known respectively as the **protonymph, deutonymph** and **tritonymph**, at least one of these nymphal stages is usually inactive and development proceeds without feeding.
- The nymph then moults to become an eight-legged adult.
- The life cycle of many parasitic species may be completed in less than 4 weeks and in some species may be as short as 8 days.



Life cycle of mite

- **Mites of farm animals** :

1-*Sarcoptes spp.*

2- Psoroptes spp.

3- Chorioptes spp.

1- Family Sarcoptidae

- The members of the family Sarcoptidae are burrowing mites:
- They have circular bodies with the ventral surface somewhat flattened
- The coxae are sunk into the body, creating a characteristic 'short-legged' appearance; from a dorsal view, the legs only just project beyond the edge of the body and the posterior two pairs may not be visible at all.
- The chelicerae are usually adapted for cutting or sucking.
- The cuticle may be covered by fine striations.
- Paired claws on the tarsus are absent and empodium is claw-like and the pulvillus is borne on a stalklike pretarsus.
- There are three genera of veterinary importance: *Sarcoptes*, *Notoedres* and *Trixicarus.*

Sarcoptes scabiei (sarcoptic mangemite, itch mite)

- *Sarcoptes scabiei* is responsible for sarcoptic mange in a wide range of wild and domestic animals throughout the world.

Host: All domestic mammals and humans

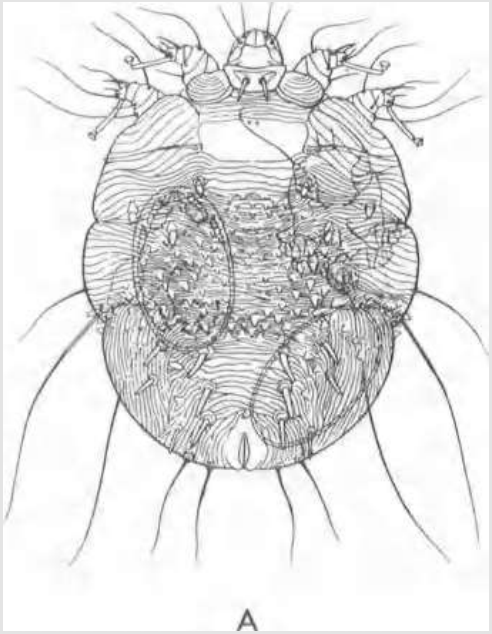
habitat: Skin

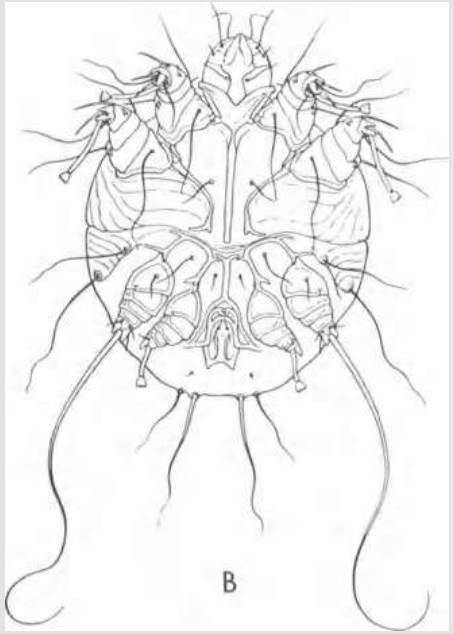
Description of A)adult:

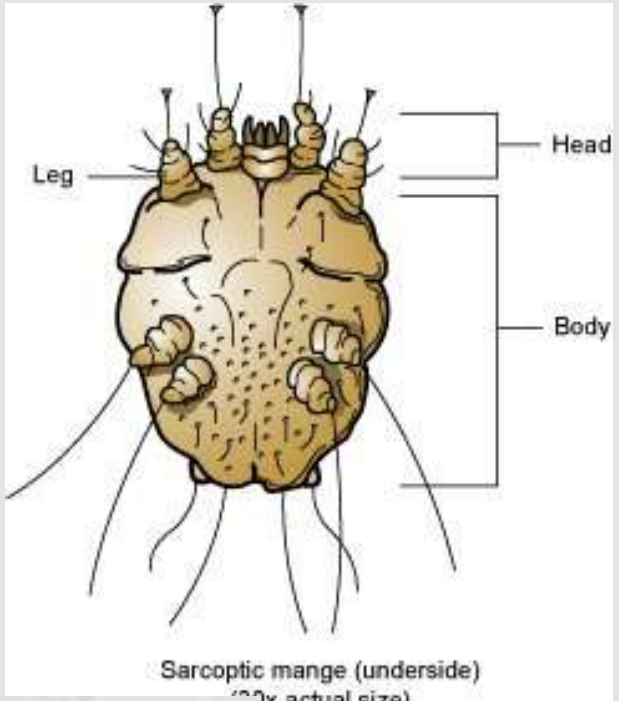
- Adult females are 0.3–0.6mm long, while males are smaller, typically up to 0.3 mm long .
- They have a round, ventrally flattened,dorsally convex body .
- The dorsal surface of the body is covered with transverse ridges but also bears acentral patch of triangular scales and dorsal setae which are strong and spine-like.
- These mites have no eyes or stigmata.
- The mouthparts have a rounded appearance.
- has a characteristic 'short-legged‘ appearance; from a dorsal view, the legs only just project beyond the edge of the body and the posterior two pairs may not be visible at all.

To differantiate between male &female by legs:

- In both sexes, the pretarsi of the first two pairs of legs bear empodial claws and a sucker-like pulvillus, borne on a long stalk-like pretarsus.
- **In female:** The 3rd and 4th pairs of legs end in long setae and lack stalked pulvilli.
- **In male:** 3rd pair of legs end in long setae and lack stalked pulvilli.
- 4th pair of legs end in stalked pulvilli.

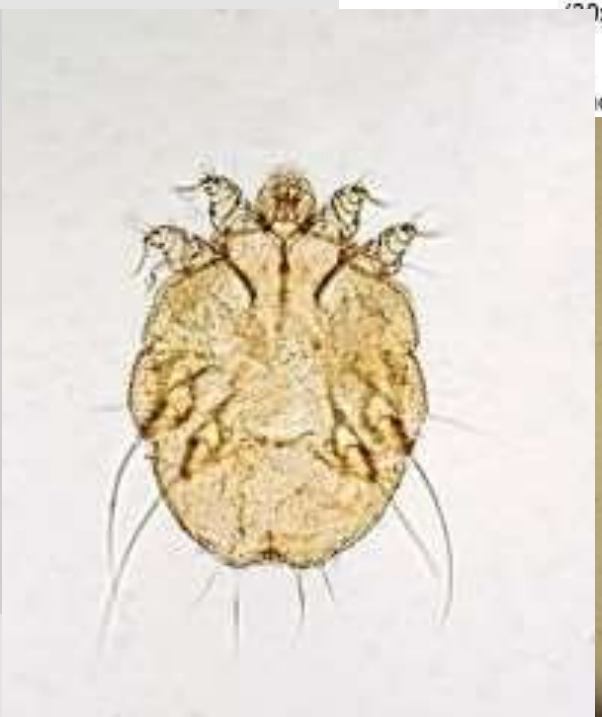






Sarcoptic mange (underside)
x actual size)

c.



2-family Psoroptidae

- They are non-burrowing, astigmatid mites.
- They feed superficially and do not need to burrow into the skin, Some feed on skin scales while others suck tissue fluid.
- They are generally larger than the burrowing sarcoptid mites.
- The legs are longer than those of the burrowing mites.
- 3 genera of Psoroptidae are of veterinary importance: *Psoroptes*,
- *Chorioptes* and *Otodectes.*

a- *Psoroptes ovis* (Sheep scab mite)

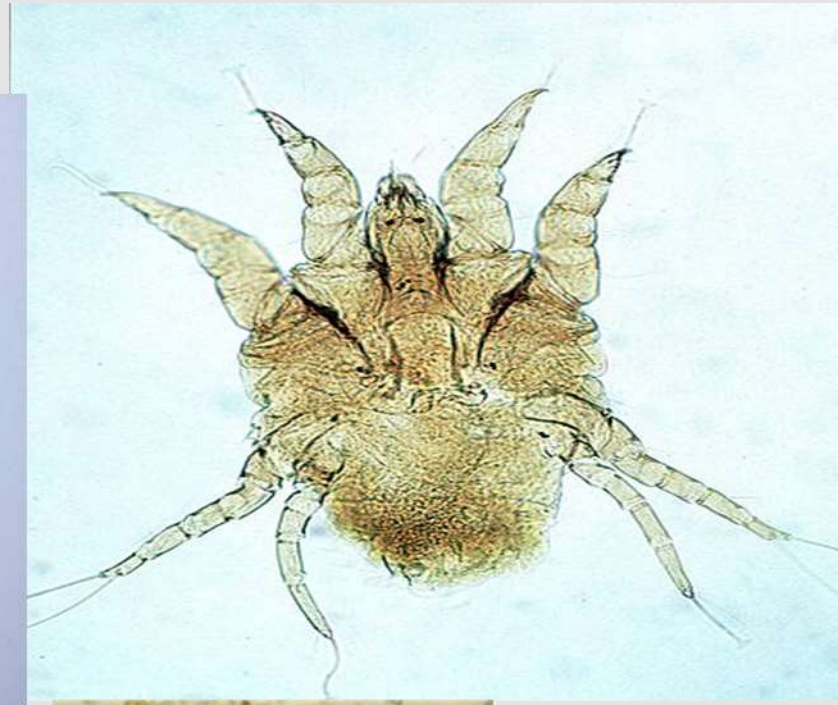
- **Host:** Sheep, cattle,goat, horse, rabbit,camelids
- **habitat:** Skin,body,neck,shoulder,flanks ,ears and axilla

Description of A)adult:

- oval in shape
- up to 0.75 mm in length and male is smaller than female.
- All the legs project beyond the body margin with three-jointed pretarsi (pedicels) bearing funnel-shaped suckers (pulvilli).
- Its most important recognition features are the pointed mouthparts .
- *Psoroptes cuniculi (ear mite)*
- **Host:** rabbit, sheep,horses
- **habitat:**ears and ear canal.

To differantiate between male &female by legs:

- **In female:** all legs are of the same length
- The 1st ,2nd and 4th have jointed pretarsi and pulvilli
- 3rd pair has long whiplike setae
- **In male:** **4th** pair is extremely short,while other pairs of the same length.
- The 1st ,2nd and 3rd pair have pulvilli.
- 4th pair of legs end in setae.



b- *Chorioptes bovis* (chorioptic mange mite,barn itch mite)

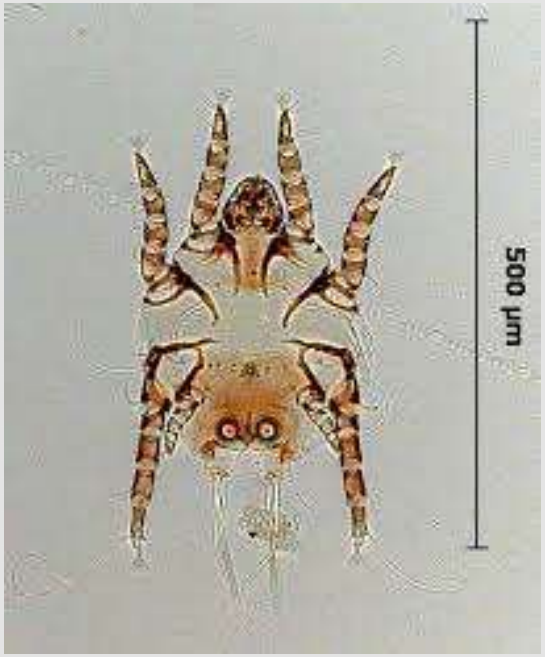
- it is the commonest form of mange in horses and cattle.
- **Host:** cattle, Sheep, horse
- **habitat:** Skin,udder,legs ,base of tail.

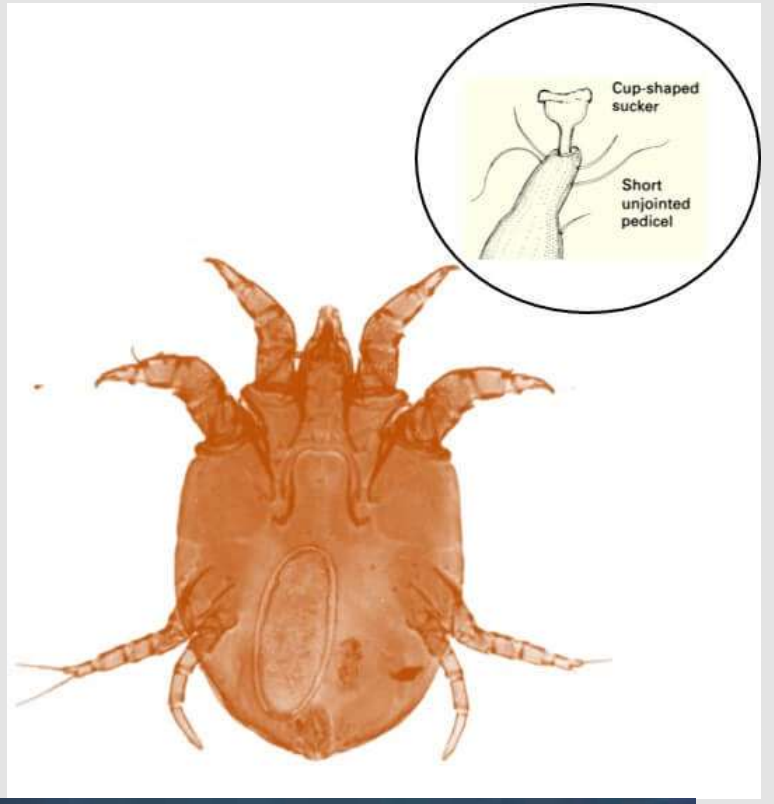
Description of A)adult:

- male is smaller than female.
- All the legs project beyond the body margin with three-jointed pretarsi (pedicels) bearing cup-shaped suckers (pulvilli).
- Its most important recognition features are the rounded mouthparts .

To differantiate between male &female by legs:

- **In female:** The 1st and 2nd pairs of legs are stronger than the others.
- The 1st ,2nd and 4th pair have have short-stalked pretarsi
- 3rd have a pair of long, terminal, whip-like setae.
- **In male:** the fourth pair is extremely short, not extending beyond the body margin
- all legs possess shortstalked pretarsi and pulvilli.


500 µm


Cup-shaped sucker
Short unjointed pedicel

- **Mites of dog and cats**:

1-Demodex canis.

2-*Otodectes cynotis .*

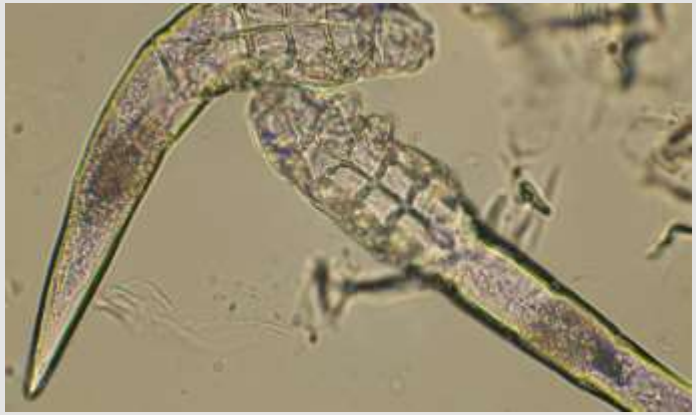
2-Notoedres cati.

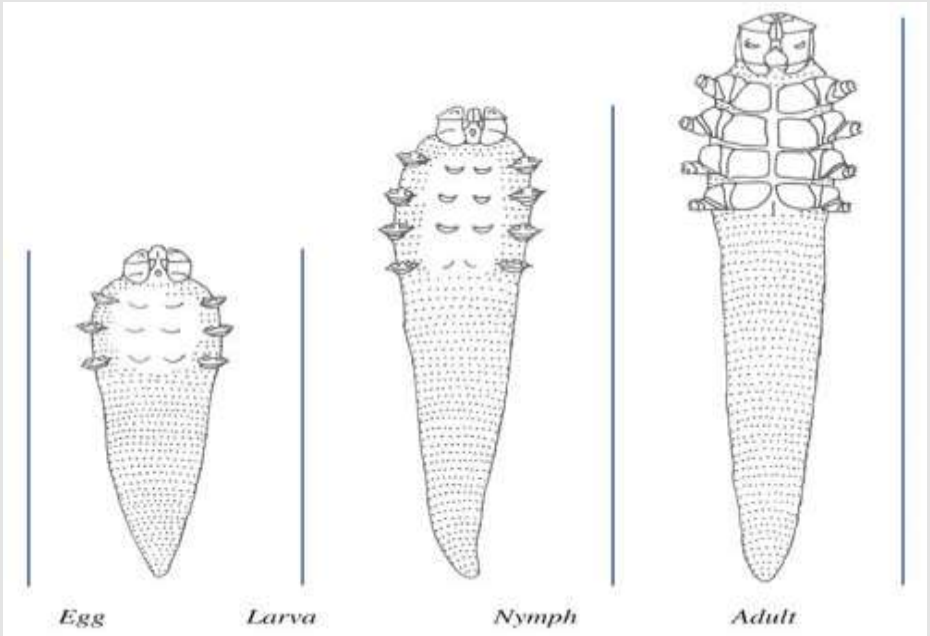
1-Demodex canis(follicle mite)

Host :Dog
Habitat:skin
Morophology:

- These are small mites with an elongated cigar-shaped body, up to 0.1–0.4 mm in length.
- has four pairs of stumpy legs ending in small blunt claws in the adult
- Setae are absent from the legs and body.
- The legs are located at the front of the body, and as such the striated opisthosoma forms at least half the body length.

Demodex canis(follicle mite)

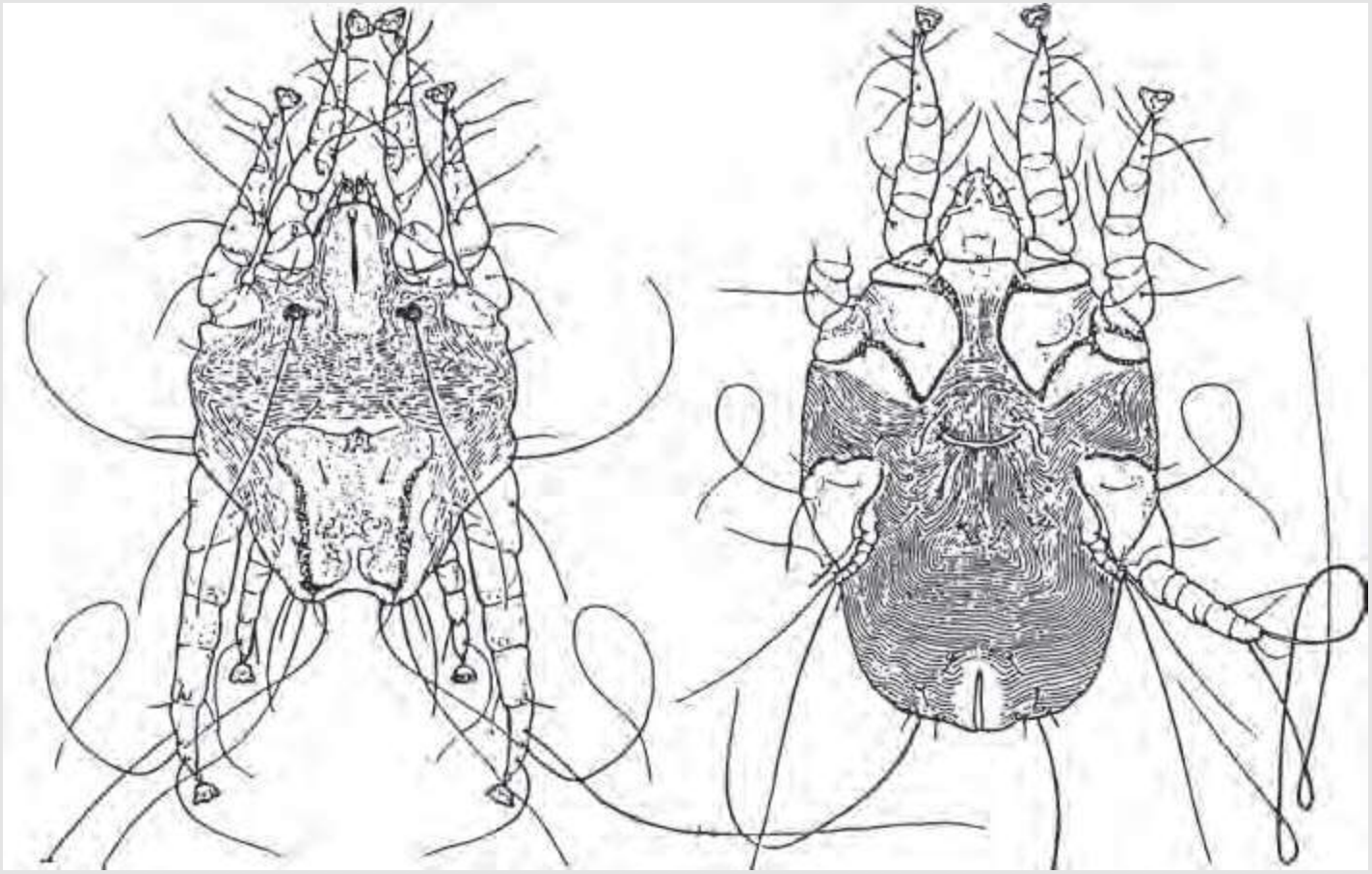




2-Otodectes cynotis(ear mite)

- **Hosts:** Cat, dog, ferret, fox, small mammals.
- ***Habitat:***External ear canal, occasionally head, back, tip of tail and feet.
- ***Morophology:***
- *Otodectes cynotis* is similar in appearance to *Chorioptes;* it is of similar size and does not have jointed pretarsi.
- The sucker-like pulvillus is cup-shaped, as opposed to trumpetshaped in *Psoroptes.*
- In the adult female, the first two pairs of legs carry short, stalked pretarsi, while the third and fourth pairs of legs have a pair of terminal whip-like setae. The fourth pair is much reduced.
- The genital opening is transverse.
- In males all four pairs of legs carry short, stalked pretarsi and pulvilli but the posterior processes are small.

Otodectes cynotis(ear mite)



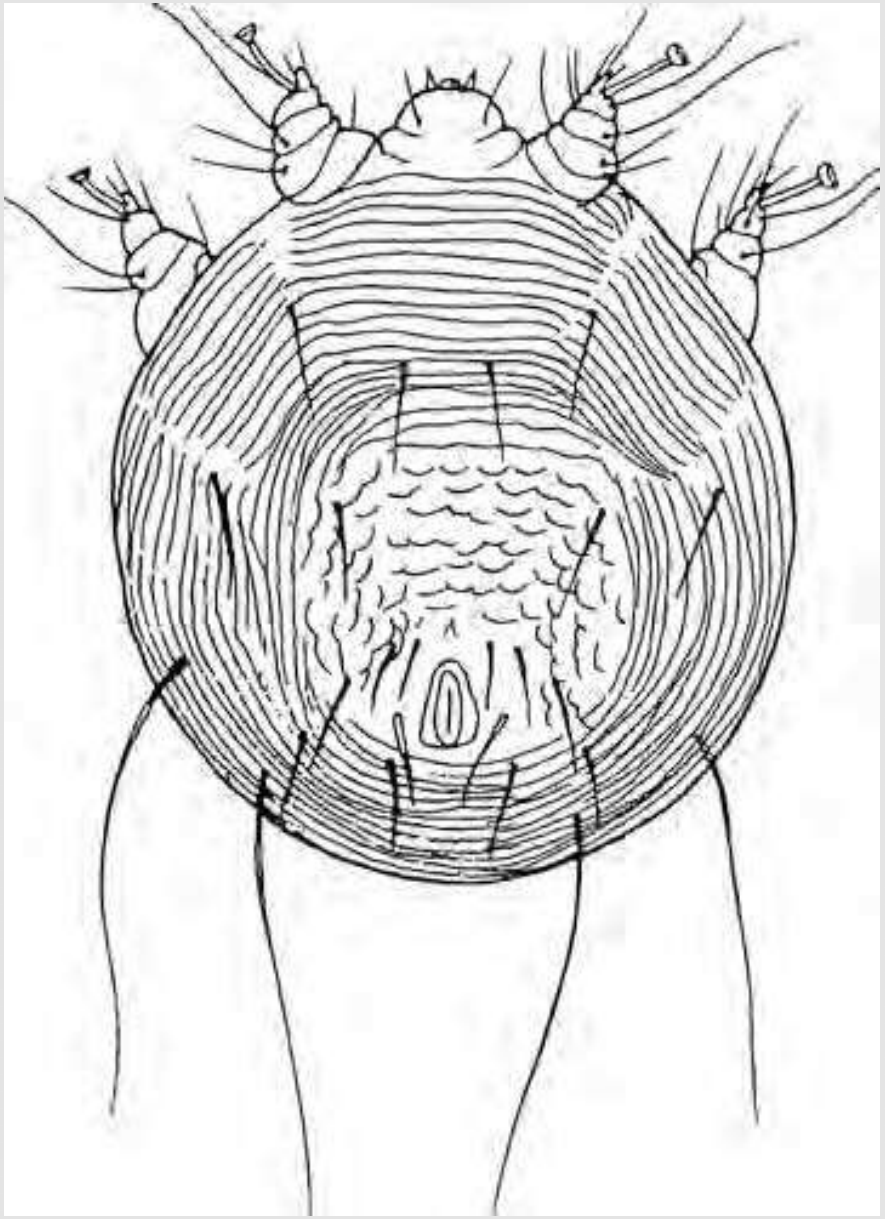
3-Notoedres cati (notoedric mange mite)

Hosts: Cat, rabbit, but may infest dogs, wild cats, foxes, canids and civets, human.

Habitat: ears

Morophology:

- *Notoedres* closely resembles *Sarcoptes*, with a circular outline and short legs with long unjointed pedicels, but it is distinguished
- by its concentric 'thumbprint' striations and absence of spines
- The dorsal scales are rounded and arranged transversely.
- This species is also smaller than *S. scabiei*; females are about 225 µm in length and males about 150 µm, with a short square rostrum.
- The anal opening is distinctly dorsal and not posterior.
- Females have suckers on legs 1 and 2.



- **Mites of poultry**:

1-Ornithonyssus sylvarium

2-Dermanyssus gallinae.

3-Knemidocoptes spp.

1-Ornithonyssus sylviarum (northern fowl mite)

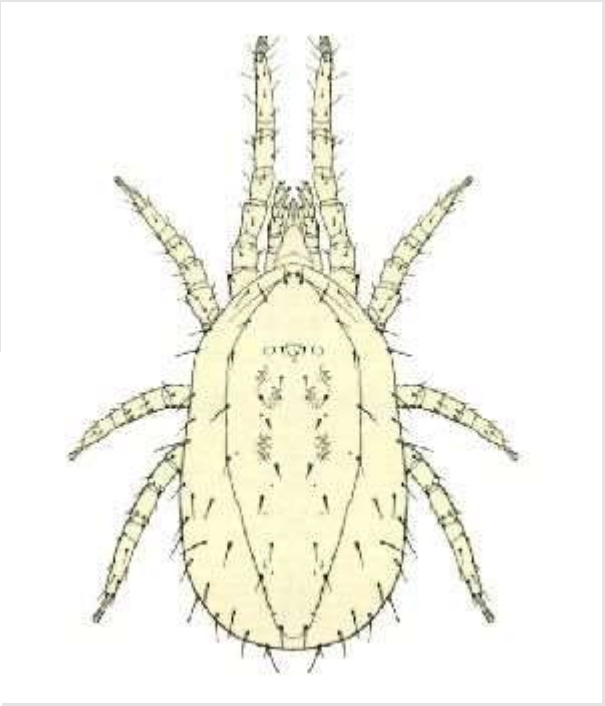
Hosts: Chicken, poultry, pigeon, wild birds, occasionally mammals, human

Habitat: Base of feathers, particularly vent.

Morophology:

- The adults are relatively large, oval-shaped and
- 0.75–1 mm in length with long legs that allow it to move rapidly.
- The body is usually greyish-white, becoming red to black when engorged.
- A single dorsal shield is wide for two-thirds of its length, then tapers posteriorly to become about half as wide, and is truncated at its posterior margin.
- The female typically has only two pairs of setae on the sternal shield.
- Three anal setae are present.
- The chelicerae are elongate and stylet-like. The body carries many long setae and is much more hairy than *Dermanyssus*.

Ornithonyssus sylvarium(nourthen fowl mite)



2-Dermanyssus gallinae(red mite or chicken mite)

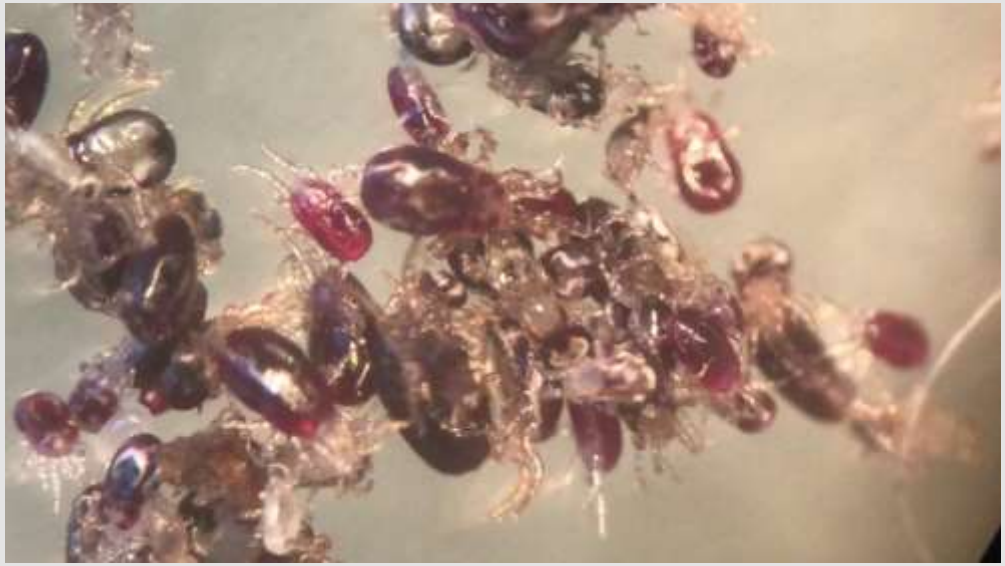
Hosts: Chicken, turkey, duck, pigeon, canary, wild birds; occasionally
mammals, human

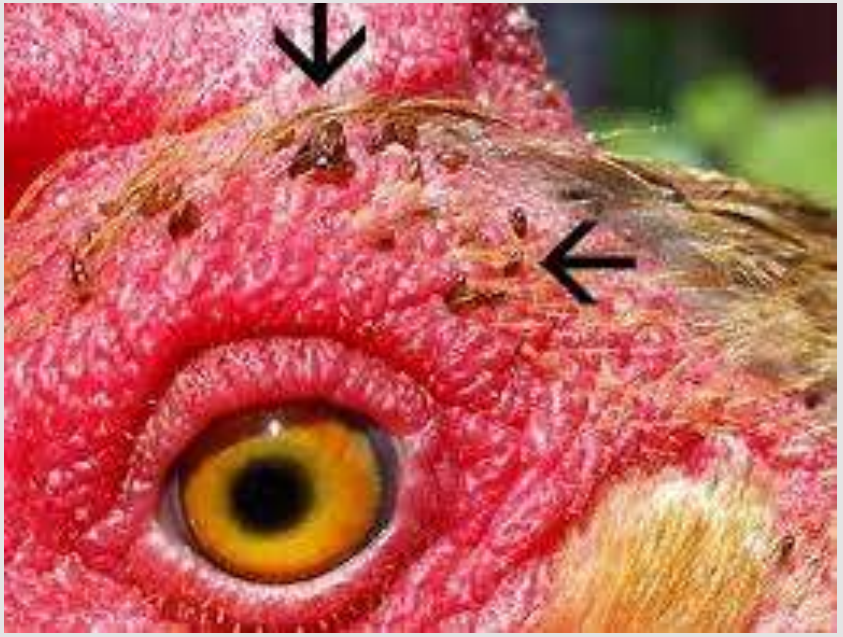
Habitat: skin.

Morophology:

- Adult mites are relatively large at 0.75–1 mm in length,with long legs.
- The body is usually greyish-white, becoming red to black when engorged.
- The chelicerae are elongate and stylet-like, and the middle segment in female mites is very slender.
- A single dorsal shield is present, which tapers posteriorly but is truncated at its posterior margin.
- Three anal setae are present.
- In the male, there are small sucker-like projections subterminally on tarsi III and IV.

Dermanyssus gallinae(red mite or chicken mite)





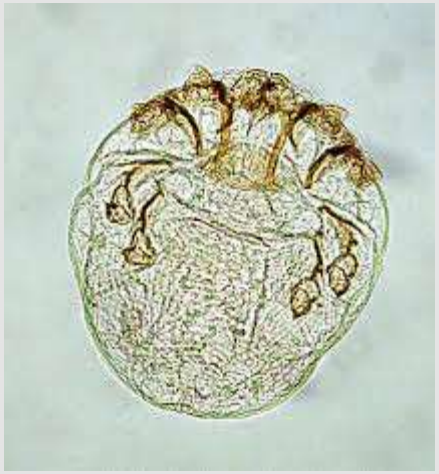
3-Knemidocoptes spp.

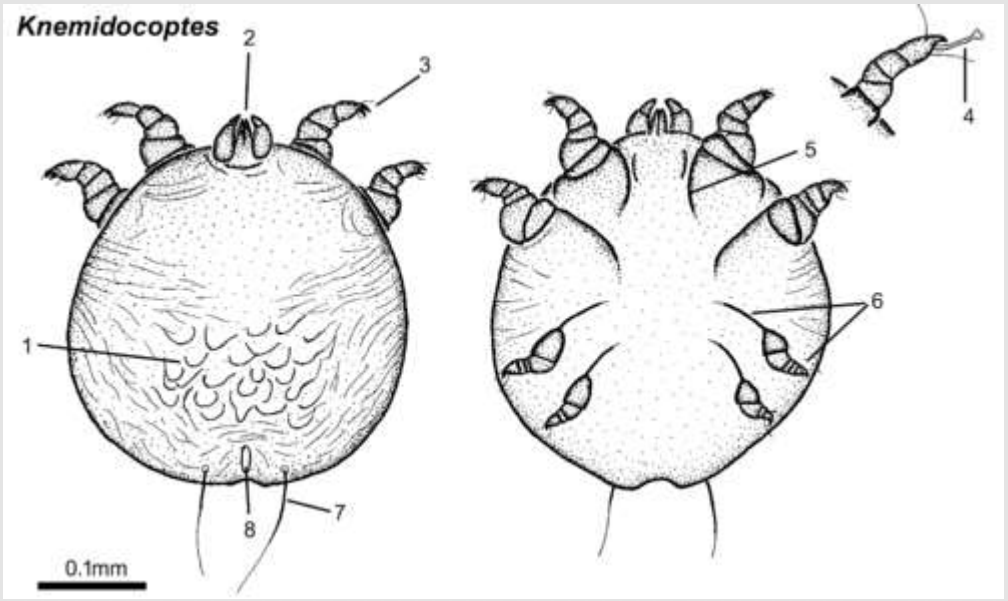
1-*Knemidocoptes gallinae:* **Hosts:** Chicken, turkey, pheasant, goose
Habitat: Feathers
2-*Knemidocoptes mutans :* **Hosts:** Chicken, Turkey
Habitat: Skin, scales of feet and legs

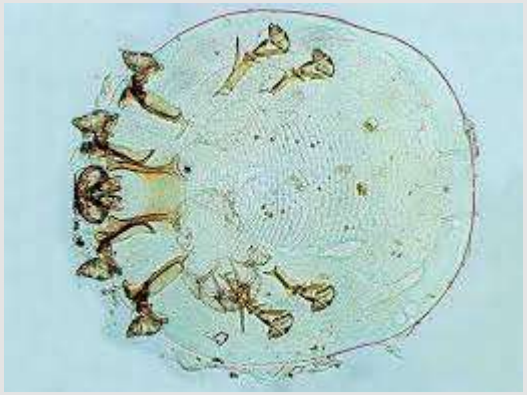
Morophology:

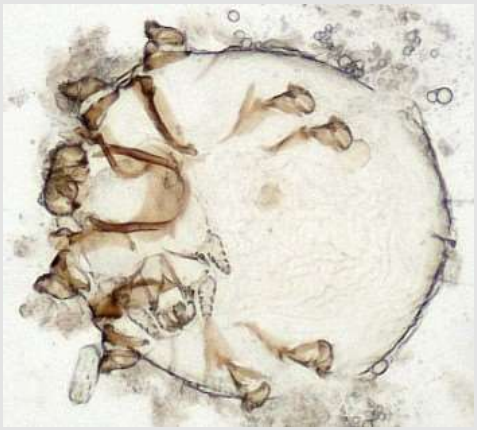
- The circular body and short stubby legs and the avian host are usually sufficient for generic diagnosis Although
- Similar in appearance to *Knemidocoptes mutans*, individuals are typically smaller, and the pattern of dorsal striations is unbroken.

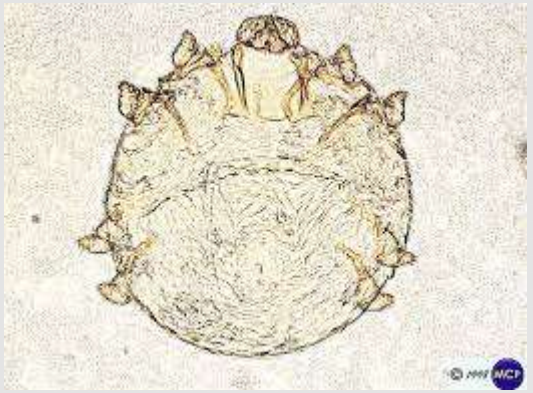
Knemidocoptes spp
Mutans (scaly leg mite)
Gallinae(depluming itch mite)











Clinical signs

- **Most common clinical signs caused by mites:**
- Direct epidermal damage leading to inflammation; this results in skin erythema, pruritus, scale formation, lichenification (thickening)and crust (inflammatory exudate) formation, this response is stimulated by feeding, burrowing or the production of antigenic material by the mite.
- production of cutaneous hypersensitivity (especially type I hypersensititivity).
- loss of blood or other tissue fluids.

Diagnosis of mite:

- Diagnosis of mite occur by:

1-**Acetate strip examination(scotch adhesive tape)**

- Short strips of acetate tape (e.g. Sellotape or Scotch 3M tape) can be applied repeatedly to either the hair coat or clipped skin surface.
- Material and parasites in the coat or on the surface of the skin become attached to the tape
- then mounted on to glass slides and examined microscopically.

2-Superficial skin scraping (epidermal surface examination:

1-remove coat hair by gentle clipping .

2-few drops of liquid paraffin can be applied and spread over the skin-scraping site and then scraped with a blunt scalpel blade.

3-Obtained material mounted in 10% potassium hydroxide (KOH).

4-The emulsion of superficial epidermis and liquid paraffin is then spread over a microscope slide, covered with a glass cover slip and examined under the microscope.

- The material collected by dry skin scraping can be digested in 10% KOH for 20 minutes and centrifuged to concentrate mites which can be collected from the surface.

Treatment of mite infestation:

- Topical treatment with organophosphates (e.g.Dultamethrine, diazinon or malathion), usually with 2 applications covering a period equal to two life cycles, is effective.
- Traditional treatments include sulphur preparations such as lime sulphur (2%) applied every 10 days on three occasions; these can be used on lactating cattle.
- Systemic treatment with ivermectin or duramectin, single injection is effective.

2-ORDER IXODIDA (Metastagmata) Ticks

- The ticks are obligate blood-feeding ectoparasites of vertebrates, particularly mammals and birds.
- Ticks are arachnids, in sub-class Acari, closely related to mites.
- They are relatively large and long lived, surviving for several years
- feeding periodically on large blood meals
- Tick bites may be directly damaging to animals, causing irritation, inflammation or hypersensitivity and, when present in large numbers, anaemia and production losses.
- salivary secretions of some ticks may cause toxicosis and paralysis
- They capable of transmitting a number of pathogenic viral, bacterial, rickettsial and protozoal diseases(as babesia)
- Ticks belong to two main families, the **Ixodidae** and **Argasidae**.

Medical importance of ticks :

- ticks are important as vectors of animal disease, transmitting a wide range of pathogenic viruses, rickettsia, bacteria and protozoa such as the tick-borne encephalitides, Lyme borreliosis, relapsing fevers or Rocky Mountain spotted fever,rickettsial diseases ,Q-fever.
- Also act as biological vector in Babesia ,theileria, and Anaplasma.
- causing Tick paralysis in man and animal.
- causing Cutaneous effects such as inflammation and local cutaneous abscesses or pyaemia.
- Heavy tick infestation can result in significant blood loss (anemia) reduced productivity, reduced weight-gain and cause restlessness.

family Ixodidae (Hard Ticks)

- **General morphology of family Ixodidae:**
- **They have incompelete metamorphosis ,** The immature stages of ticks are very similar morphologically to the adults.
- Ixodidae are relatively large ticks, between 2 and 20 mm long (Male ixodid ticks are usually smaller than females).
- They are similar to mites, being divided into only 2 sections, the anterior **gnathosoma** (or capitulum) and posterior **idiosoma.**
- They are flattened dorsoventrally.
- The mouth part consists of : **1-basis capituli**, which vary in shape in the different genera (rectangular , hexagonal or triangular).

2-heavily sclerotised **chelicerae ,enclosed in cheliceral sheath,at** end of each chelicera is a rigid, somewhat triangular,plate bearing a number of sclerotized tooth-like digits(cut and pierce the skin of the host)

3-**hypostome**, which lies below the chelicerae ,It armed with rows of backward venteral barbs or teeth(larva,nymph and adult female)

4- pair of 4-segmented sensory **palps.**

- **Both** (4-segmented sensory **palps** and **chelicerae)**are anterior and visible from the dorsal surface.
- Ixodid ticks have a chitinous dorsal plate or **scutum**,so they called the "**hard ticks",** it extends over the whole dorsal surface of the male, but covers only a small area behind the gnathosoma in the larva, nymph or female.
- region of the idiosoma which carries the legs is called **podosoma** and the region behind the legs is called **opisthosoma.**
- Each leg is attached to the body at the coxa, and end in a pair of claws and a well-developed, pad-like pulvillus.
- The larvae, sometimes known as seed ticks, arehexapod (6 legged),Adult and nymphal ticks have octopod (8legged)

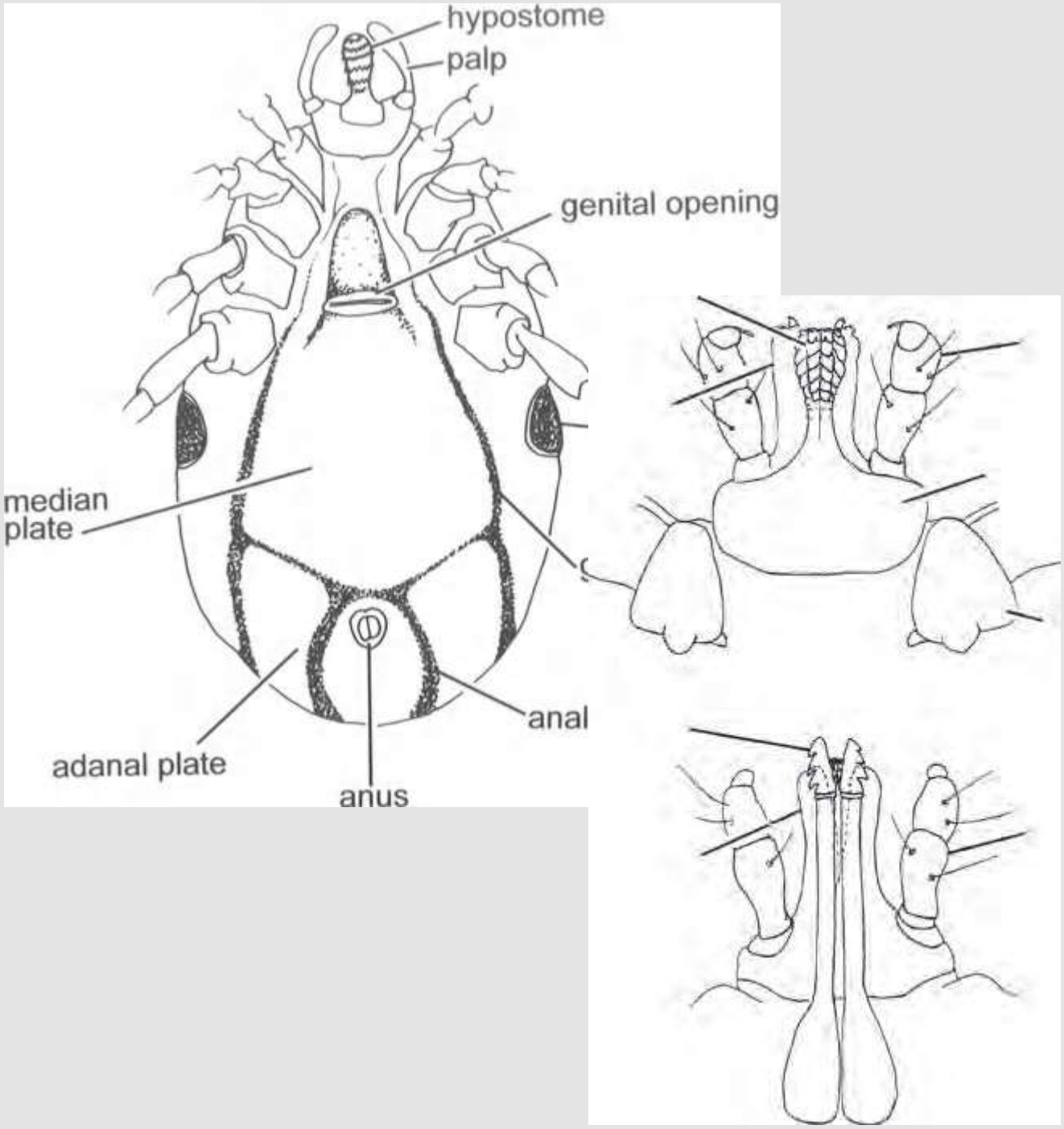
- Ticks do not possess antennae.
- Eyes are absent or present when present they are simple and are located dorsally at the sides of the scutum.
- There are a number of grooves, largely on the ventral side of ticks. (number & presence of these grooves important inidentification)
- There are Uniform rectangular regions on the posterior margins of
- the body known as **festoons** and are also separated by grooves.
- In adults the genital opening, the**gonopore,** is situated ventrally behind the gnathosoma, usually at the level of the second pair of legs and covered by **genital apron.**
- The anus is also located ventrally, posterior to the 4^{th} pair of legs,and surrounded by anal groove.
- genera of veterinary importance include *Ixodes* (largest genus) *Dermacentor*, *Haemaphysalis*, *Rhipicephalus(Boophilus*), *Hyalomma* and *Amblyomma* .

- Most hard ticks are relatively immobile so they adopt a strategy known as questing, in which they wait at the tips of vegetation for an appropriate host to brush past, Once contact is madethe ticks transfer to the host, and then move over the surface to find their preferred attachment sites, such as the ears.
- Ticks have developed a variety of complex life cycles and feeding
- Strategies ,so according to the number of hosts to which they attach during their parasitic life cycle they are classified as follows:

• **One-host ticks**, where the entire parasitic development from larva to adult takes place on the one host.

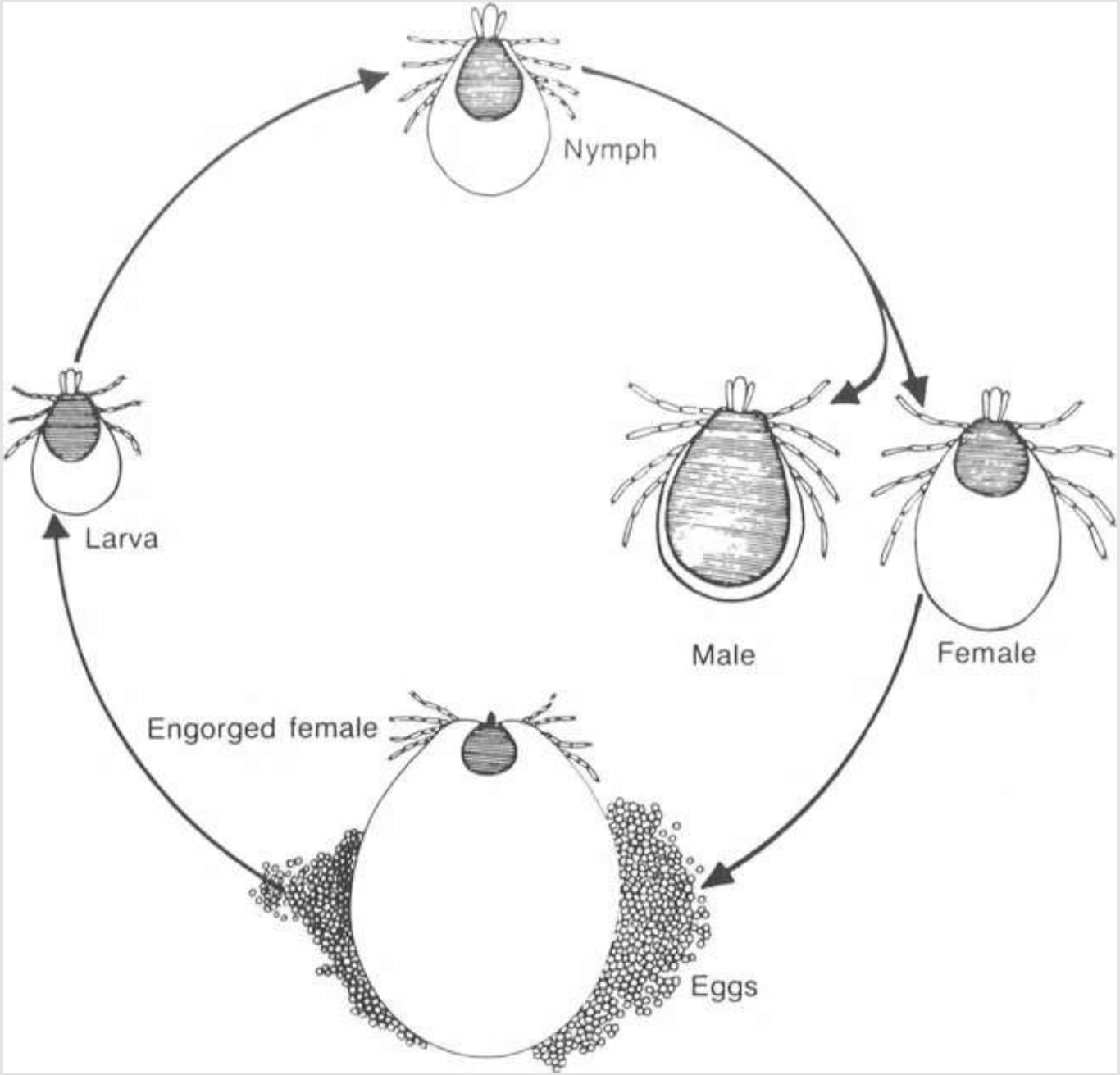
• **Two-host ticks**, where larva and nymph occur on one host and the adult on another.

• **Three-host ticks**, where each stage of development takes place on different hosts.


hypostome
palp
genital opening
median plate
anal
adanal plate
anus

Life cycle of hard ticks

- The hard ticks are temporary parasites and most species spend relatively short periods on the host.
- The life cycle pass by a single hexapod larval stage, and a single octopod nymphal stage leading to the reproductive, eight-legged adult stage During the passage through these stages ixodid ticks take a number of large blood meals, interspersed by lengthy free-living periods.
- They are relatively long-lived and each female may produce several thousand eggs.


Nymph
Larva
Male
Female
Engorged female
Eggs

Most common hard tick species in animals

1-cattle :

- Boophilus spp., ixodes spp. and hyalomma spp.

2- horse:

- hyalomma spp., *Dermacentor* spp.

3- camel:

- *Rhipicephalus,Hyalomma* and *Amblyomma* .

4- Dog:

- *Rhipicephalus,Hyalomma.*

Genus ixodes

Ixodes ricinus(sheep tick, castorbean tick)

- *Genus Ixodes* is the largest genus in the family Ixodidae, with about many species including ***Ixodes ricinus***

Host: Sheep, cattle, goat, but can feed on all mammals and birds

habitat: Skin

Description of A)adult:

- They are small inornate ticks that do not have eyes or festoons.
- *Ixodes* can be distinguished from other ixodid ticks by the anterior position of the anal groove. In other genera of the Ixodidae the anal groove is either absent or is posterior to the anus.
- The fourth segment of the palps is greatly reduced and bears chemoreceptor sensilla.

1-female:

- It is red-brown ,When engorged appear light grey in colour.
- Unfed females are about 3-4 mm in length ,when engorged become up to 1 cm in length .
- It is bean in shape.

- scutum covers only a small area on dorsal surface behind the gnathosoma.
- The mouthparts are longer than in male.
- it has a 8 legs (octopod), when engorged the legs are not visible when viewed from above.

2-male:

- it is red-brown in colour.
- They are only 2–3 mm in length.
- scutum extends over the whole dorsal surface .
- The mouthparts are smaller than in female.
- it has a 8 legs (octopod), they are readily visible from above.
- They have several ventral plates, which almost cover the ventral surface.

3-Nymph :

- Nymphs resemble the adults but are less than 2 mm in length.
- it has a 8 legs (octopod).
- scutum covers only a small area on dorsal surface behind the gnathosoma.

4-larva :

- it is yellowish in colour.
- They are less than 1 mm in length.
- scutum covers only a small area on dorsal surface behind the gnathosoma.
- it has only 6 legs (hexapod).

Diagnosis:

- diagnosis is based on clinical examination and the collection and identification of ticks from the skin.

Treatment:

- firstly topical therapy is used to reduce the tick population. The life cycle of the particular ticks involved will influence the application regime, with multiple-host ticks requiring prolonged insecticidal programmes, whereas control of one-host ticks may only require treatment for only a few weeks of the year.
- Organophosphates and pyrethroids have been used to control tick such as, coumaphos, deltamethrin, diazinon, dioxathion, malathion and permethrin present in form of various formulations including sprays, dips and slow-release ear tags.
- Systemic treatment with ivermectin every 2-4 weeks also has been shown to prevent tick engorgement and reproduction.
- Management measures include separation of cattle from infested pasture and cultivation of the infested land.

family Argasidae (soft Ticks)

- **General characters of family Ixodidae:**

1-the body is leathery and unsclerotized ,has no scutum, with a textured surface, which in unfed ticks may be characteristically marked with grooves or folds.

2-In nymphs and adults the gnathosoma is not visible from the dorsal view, being located ventrally in a recess called **camerostome.**

3-palps may appear somewhat leg-like,with the 3rdand 4th segments of the same size.

4-When present the eyes are positioned in lateral folds above the legs.

5-Pulvilli are usually absent or rudimentary in adults and nymphs, but may be well developed in larvae.

6-There is little sexual dimorphism.

Life cycle of soft ticks

- Argasids typically have a multi-host developmental cycle.
- The single larval stage feeds once, before moulting to become a first-stage nymph.
- There are between two and seven nymphal stages, each of which feeds and then leaves the host, before moulting to the next stage.
- Adults mate away from the host and feed several times.
- The adult female lays small batches of 400-500 eggs after each feed.
- In contrast to the slow-feeding ixodids, argasid ticks feed for only a few minutes.

- The family Argasidae contains four genera of veterinary importance:

A- genus Argas.

B-genus Otobius.

C-genus *Ornithodoros .*

D-genus *Antricola.*

genus Argas

Argas persicus (fowl tick, chicken tick, adobe tick, blue bug)

- *Argas persicus* is of considerable veterinary importance as the most widespread argasid tick feeding on poultry, breeds and shelters in cracks and crevices in the structure of poultry houses

Host: Chicken, turkeyand wild birds.

Habitat: Skin

Description of A)adult:

- The female is about 8 mm in length and the male about 5 mm.
- The unfed adult is pale yellow, when fed turning blue or reddish-brown
- They are ovoid or triangular in shape.
- The margin of the body appears to be composed of irregular quadrangular plates or cells(festoons).
- mouthparts are not visible when the tick is viewed from Above, and 4 segments of the pedipalps are equal in length.
- The integument is granulated, leathery and wrinkled, no scutum is present.

Description of B)larva:

- They are small size.
- Rounded in shape.
- Has no festoons.
- Legs provided with well developed Pulvilli .
- No scutum is present.

larva

adult


Thank
You