

## CHORIOPTES

Chorioptes and otodectes feed only superficially unlike psoroptes they have mouthparts which do not pierce the skin, but are adapted solely for chewing, feeding on shed scales and other skin debris.

Hosts

Cattle, sheep, goats, and equines

Distribution

Worldwide

Species

Although specific names have been given to chorioptes found in C, S and equines (*C. bovis*, *C. ovis*, *C. equi*) they are now all considered to belong to the single sp *C. bovis*.

Morphology

Mouthparts are distinctly rounder abdominal tubercles of the Male are noticeably truncate and the pedicels are short and unjointed, with cup-shaped suckers.

LIFE CYCLE

Similar to psoroptes except that this mite feeds only on the skin surface.

Cattle

Chorioptic mange occurs most often in housed animals. Affecting mainly the neck, tail-head, udder and legs and usually only a few animals in a group are clinically affected. It is a mild condition and lesions tend to remain localized with slow spread.

It's economic importance – damage to hide due to pruritus by the mites that results in rubbing and scratching.

TREATMENT : same as for sarcoptic mange of cattle.

Sheep

Mites are found mainly on legs, although very common little harm is caused. Lambs are thought to be infected by contact with ewe's leg. At times there may be spread from the limbs

to face and other regions and in occasional severe cases pustular dermatitis with wrinkling and thickening of the skin may occur.

Rams infected have impaired reproductive ability/sterility (testicular atrophy and caesation of spermatogenesis due to increase in temperature) though their general health is not affected condition is not irreversible and semen production and fertility return to normal after successful treatment of of mange.

#### TREATMENT

Dipping in acaricide

Local treatment with suitable acaricide.

#### Equine

Choriopic mange occurs as crusty lesions with thickened skin on the legs below the knees and hocks. It is most prevalent in rough-legged animals and in those with heavy feather (long-hair).

These make the horses to rub, stamp, scratch and bite the legs and kick frequently, especially at night (seen at fetlock region, pasterns etc.) the disease is called **foot mange/itching leg**.

#### TREATMENT

Suitable acaricidal wash scrubbed on the lesion on two occasion 14 days apart is effective.

#### **OTODECTES**

##### Feed Superficially

- Commonest range mite of cats and dogs through the world.
- Hosts :Cat and Dog (ferret and redfox)
- Spp: Otodectes cynotis

Resembles Psoroptes and chorioptes in general confirmation having an ovoid body with projecting legs.

Site: External ear of the host

Distinguishing features:

- (a) Preferred location in the host's external ear.
  - (b) Closed apodemes adjacent to the first and second pairs of legs.
- © Pedicels, like those of chorioptes are not jointed.

#### LIFE CYCLE

Feed superficially complete cycle takes about 3 weeks.

## PATHOGENESIS

### Cat

Most cats harbour this mite, and in adult animals it has almost a commensal association with the host, signs and irritation appearing only sporadically with the transient activity of the mites.

It is assumed that the majority of infection are acquired by suckling kittens from their carrier dams and being highly contagious they are entirely affected.

In the early stage of the infection there is brownish waxy exudates in the ear canal, this become crusty, with the mites living deep in the crust, next to the skin. Secondary bacteria infection may result in purulent otitis.

### Signs

- (a) Frequent head shaking.
- (b) Scratching of the ears from the pruritus.
- (c) Presence of foetid waxy masses in the auditory canal.
- (d) Otorrhoea and Ulceration of the auditory canal (seen on inspection of severe cases).

Scratching may be present resulting in excoriation of the posterior surface of ear pinna this with head shaking causes haematoma of ear flap.

### DOG

Otodectes – a common cause of dog otitis externa

Changes and Sign: Similar to those in cats (exudates in ear canal is brownish to black, pruritus is intense).

Resultant violent head shaking = aural haematoma of dogs.

With time severe purulent otitis is a common sequel.

### Diagnosis

- Tentatively on animal behaviour.
- Presence of dark, waxy deposits and exudates in ear canal.

- Confirmatorily: Presence of mites in ear canal with the aid of an auroscope or Removal of the waxy deposit and placing on dark surface, view with an handlens mites are seen as white moving speck.

#### TREATMENT

Ear, dogs, acaricide, Antibiotics, fungicides, corticosteroids and local analgesics. Clean the ear canal thoroughly before instilling the ear drop, massage the ear base to disperse the oily preparation.

Repeat TREATMENT 10-14 days to kill newly hatched mites.

Treat in-contact animal at the same time as clinically affected animals.

#### **PSORERGATES**

- "itch mite" of sheep
- *P.ovis*
- Small mite
- Roughly circular in form and less than 0.2mm in diameter.
- Short legs with their bases adjacent and are directed radially, giving the mite a crude star shape.

#### LIFE CYCLE

Similar to Psoroptes, the mites feeding on the skin itself.

- Common in fine wool breed, acquired by contact when the wool is short although a non-burrowing mite, Psorergates attacks the skin itself, living in superficial layers and causing chronic irritation and skin thickening.

#### CLINICAL SIGNS

- Pale areas of wool on shoulder, body and flanks which gradually extend over the rest of the fleece, irritation increasing as the mite population grows.
- Sheep rub, bite and chew their wool which becomes ragged with loose strands trailing from the sides of the body. In long standing cases the patches of wool may be lost.
- Fleece contains scurf and has a slightly yellowish hue while the staple is very dry and easily broken.

#### Diagnosis

Scrape until capillary blood oozes out.

### **CHEYLETIELLA (Walking Dandruff)**

**C.parasitivorax** (rabbit, can be transmitted to man)

C.yasguri (dogs), C. blackei (cats)

- Surface dwelling mites that reside in the Keratin layer of the skin and in the hair coat of various definite hosts (dogs, cats/rabbits).
- Ingest keratin debris and tissue fluids and are often referred to as "walking dandruff" because the mobile mites resemble large, moving flakes of dandruff.
- Have unique morphologic features. (386 by 266 um) visible to the naked eye.
- Hook like accessory mouthparts (palpi) assist in attaching to the host as it feeds on tissue fluids.
- Body shape: a silhouette resembling a shield, a bell pepper, the acorn of an oak tree, or a western horse saddle when viewed from above. Key feature of active infestation: moving, white, dandruff flakes along the dorsal midline and head of the host. \*No scrapping for Diagnosis.

Quick Diagnosis: A hand-held magnifying lens to view questionable dandruff flake/ hair. (Cheyletiellosis).

A fine toothed flea comb may be used to collect mites, combing dandruff debris onto black paper often facilitates visualization of these highly motile mites.

### **ORNITHONYSSUS SYVIARIUM (Northern Mite of Poultry)**

- 1mm, elongate to oval mite usually found on birds, it also may be found on nests or within poultry houses. Legs relatively long can be seen with naked eyes. Color may vary from red to black depending on recent feeding.
- Feeds intermittently on birds, produces irritation, weight loss, decrease egg pox, anaemia and even death.
- Known to bite humans.
- Anus on the anterior half of the ventral anal plate.

### **LIFE CYCLE**

They lay eggs in masses at the base of the feathers especially in the vent area. Maturation from egg to adult 5-12 days.

White or off white egg sacs occurs in bundles on the shaft.

May help in the spread of NCD and chlamydiosis.

### **DERMANYSSUS GALLINAE (Red mite of poultry)**

- Similar in appearance to *Ornithonyssus syriacus*. 1mm in length, elongate to oval whitish grayish/black and feeds on birds.
- Has distinct red colour when it has recently fed on its host's blood (red mite of poultry).
- Lays eggs in the cracks in the wall of poultry houses.
- Nymphal stage and adults are periodic parasites hiding in cracks and crevices of the poultry houses and making frequent visits to the host to feed.
- Because of their blood-feeding activity, these mites may produce significant anaemia and much irritation to the host.
- Birds are listless, decrease egg pox. Loss of blood may result in death.
- Anus of *D. gallinae* is on the posterior half of the ventral anal plate.
- \* Vector of *Borrelia anserina* (avian spirochaetosis).

## **DIPTERA**

**Class: Insecta**

**Order: Diptera**

Large complex order of insects.

As adult all members have a single functional membranous wing (2wings). As adult, they may feed intermittently on vertebrate blood, saliva, tears and mucus: as larvae may develop in the subcutaneous tissue or internal organs of the host.

When adult dipterans make frequent visits to the vertebrate host's blood, they are referred to as **periodic parasites**. When dipteran larvae develop in the tissue or organs of vertebrate hosts, they produce a condition known as **myiasis**.

SUBORDER: **NEMATOCERA.**

Small in Size Antennal Adult: Antennae longer than the head and thorax.

They have 8/more segments which are all alike except the first 2 segments that are next to the head. No arista. Mouth part and proboscis are usually pendulous. Larvae and pupae are aquatic.

Larvae have a well - developed head and mandibles that bite horizontally.

Families:      Ceratopogonidae      (biting midges)  
                 Simuliidae                      (black flies).

Psychodidae (sandflies)  
Culicidae (mosquitoes)

Family: Culicidae

Comprises of mosquitoes

MORPHOLOGY - (slender nematocera) 2- 10mm in length. Head - small and spherical. Leg - long. Antennae 14 - 15 segments, pilose in female plumose in male, proboscis:- long and slender. Abdomen; elongate, thorax in characteristically wedge - shaped with the broad end covered with scale. Wings are long, narrow and folded flat over the abdomen during rest. They bear elongate, leaf - like scales along the margin and on the veins. Wing venation is characteristic costa, subcosta (Those that do not reach the margin). Those that reach margin Longitudinal veins (LV), LV<sub>1</sub> is not branched, LV<sub>2</sub> in branched, LV<sub>3</sub> in straight, LV<sub>4</sub> - branched, LV<sub>5</sub> and LV<sub>6</sub> are straight. Mouthparts consist of a conspicuous, forward projecting, elongated proboscis adapted for piercing and sucking. Labium is long, U-shape and fleshy, contain paired maxillae, mandible and hypopharynx which carries a salivary duct which delivers anticoagulant into the host's tissues. A pair of kidney shaped compound eye which occupy the large part of the head.

Subfamily: (a) Culex (b) Anopheles (c) Aedes.

**Spp: Contains over 300spp belonging to 34genera.**

#### LIFE CYCLE

After a blood meal, the adult Female lays up to 300ggg on the surface of water or on floating vegetable matter either singly (aedes and anopheles) or in masses called "egg rafts as in the case of culex. The eggs are dark colored, elongate/ovoid and boat shaped in the Anopheles; they don't survive desiccation. Hatching is Temperature dependent, takes several days to weeks.

All four larvae in star are aquatic. Larvae maturation can take about 1week to several months.

All mosquito pupae are aquatic, motile and comma shaped. The pupa stage is short (only a few days). Adult emerge through a dorsal split on the pupa tegument life span of adult flies is usually short.

#### PATHOGENIC IMPORTANCE

Most spp of mosquitoes are nocturnal feeders and may cause considerable annoyance by biting species of Anopheles, Culex the Aedes transmit *Diofilaria immitis* (Dog heart worm) and one form of avian malaria caused by plasmodium.

Transmission of arboviruses (arthropod borne) causing Eastern, Western, and Venezuelan encephalitis in horses.

Anopheles transmits human malaria while aedes transmit yellow fever.

Aedes, Culex and Anopheles transmit human filarial nematodes *wucheraria* and *burgia*.

- CONTROL
- directed mainly against the Developing larvae or adults or at times against both simultaneously
- Removal / Reduction of available breeding site

- Repeated application to breeding sites of toxic chemicals mineral oil / insecticides  
Destruction of breeding site

### **FAMILY: CERATOPOGONIDAE**

Consists of very small flies which are commonly known as **biting midges**

Female - feed on man and animals they are known to transmit viruses, protozoan and helminths Important Genus: Culicoides (No - see uns, punkies / sand flies).

Length: 1 - 3mm, humped thorax, head small, mottled wing which are held @ rest like a close pair of scissors over the grey / brownish - black abdomen.

Prominent antennae are feathery in the male (plumose) but have short hairs in the Female (pilose antennae)

The short piercing proboscis consists of a sharp labrum, 2 maxillae, 2 mandibles, a hypopharynx and a fleshy labium which don't enter the skin during feeding by Female.

Active @ dusk and @ dawn, they inflict painful bites and suck the blood of their host.

### **LIFE CYCLE**

Egg (brown / black), cylindrical\ banana - shape and 0.5mm in L are laid in damp marshy ground / in decaying vegetable matter close to water. Hatching occurs in 2 -9days varying with spp and Temperature.

(4) larval stage which are characterised by having small dark heads, segmented bodies and terminal anal gill. Larval development is complete in 14 - 25days.

Less active pupae 2 - 4mm long are found @ the surface / edges of water, they have a pair of respiratory trumpet on the cephalothorax and a pair of terminal horn that enable the movement.

Adult emerge from pupae in 3 - 10days and the Females suck bld.

### **SIGNIFICANCE**

- Serious source of annoyance
- Transmit viral diseases e.g. blue tongue fever and African horse sickness
- Vector of Queensland itch / sweet itch / sweat itch
- Intermediate host for *Onchocerca cervocalis* O.gibsoni, Dipetalonema spp.

### **CONTROL**

Difficult because of their usually extensive breeding habitat but destruction of breeding site by drainage / spraying with insecticide

Repellant or screen may be used

Sweat itch – Antihistamine Treatment.

### **FAMILY PSYCHODIDAE**

sandflies / phlebotomine flies.

### **PHLEBOTOMUS**

Hosts: many mammals, reptiles, birds and man.

spp; over 600.

### **MORPHOLOGY**



Small flies up to 5mm long, are characterized by their hairy appearance, large black eyes the long stilt - like legs.

The wings are larceolate in outline and are also covered in hairs and are held erect over the body at rest.

Mouthpart are of short to medium length, hang downwards are adapted for piercing and sucking. Antennae in long bearing up to 16sgt which short hairs.

#### **LIFE CYCLE**

Up to 100 ovoid, 0.3-0.4mm long, brown / black eggs may be laid at each oviposition in small cracks / holes in the ground, the floor of animal houses / in leaf litter. Although not laid in water. the egg need moist condtion for survival as do the larvae and pupae. Egg hatch in 1-2days, the larvae which resemble small caterpillar scavenge on organic matter and can survive flooding 4 larvae instars maturing 3months to several months depending on the spp; temperature and food availability. Larvae is characteristic: 4-6mm long, black head and a segmenetd greyish body covered in bristle.

Adult emerge from pupa after about 1-2weeks.

Whole life cycle 30 - 100days / longer in cold weather.

#### **PARASITOLOGICAL SIGNIFICANCE**

Only FEMALE sucks blood, Prefer feeding at night

Seasonal activity: high number during raining season

Important as the sole known vector y Leishmama tropica and L: Donovanii which cause cutaneous and visceral leishmanosis in man , dog being important reservoir host in some areas.

#### **CONTROL**

Inseciticide, Sprays, Repellants etc.

#### **FAMILY SIMULIDAE**

12 genera in the family

Small flies. Simulium is the most important, called 'blackflies/' buffalo gnats,'

#### **SIMULIUM**

Host: all domestic animals and man.

Pp: Numerous and often divided into subsp.

Morphology: 1-6mm in length.Their thorax humps over their head giving the appearance of a buffalo humps (hence their name). They have broad, unspotted wings that have prominent veins along the anterior margin. They have serratted,scissor-like mouth part and thus their bites are painful. Antennae are short and segmented with no hairs. Adult male and female are similar but can be distinguish in that in Female eyes are distintcly separated whereas in Male they are close together (F= dichoptic , M= holoptic)

#### **LIFE CYCLE**

Egg (0.1-0.4mmlong are laid in sticky masses of several hundred on partially sub-merged stones/ vegetation in flowing water. Hatching takes a few days. The mature larvae is about 5-13 long, light-colored and poorly segmented being distinguished by a blackish head which bears a prominent pair of feeding bushes. Larval maturation takes several weeks to months. Mature

Larval pupate in a slipper – shaped brownish cocoon fixed to submerged objects and pupa has prominent respiratory gills projecting from the cocoon. Pupation period is usually 2- 6days and a characteristic feature of many spp is that there is simultaneous mass emergence of the adult flies which gain access to the water surface and take a flight.

#### PARASITOLOGICAL SIGNIFICANCE

Only adult female sucks bld. preferred feeding sites, legs, abdomen, head.

Cause great annoyance due to their painful bites.

Vector of Onchocerca volulus (River blindness) and *O. gutturosa* in cattle

Transmit Eastern equine encephalitis and vesicular stomatitis and Avian protozoa; Lecucocytozoon.

#### CONTROL

Application of insecticide to breeding sites to kill larvae

Bush clearing (remove adult resting place)

Insecticides / repellent in horses

Insecticidal dusting of poultry.