

Dr.Omaima

## Tick

### General Characters

The body of ticks is oval in shape and consist of cephalothorax and abdomen. The capitulum (false head) projects forward beyond the body out line and is visible from above. They have four pairs of legs which terminate in a pair of claws. Tick have no antenna. The palps are swollen and three segmented. Hard ticks have a dorsal scutum. In the male it covers the entire body while in female it is much smaller. In adult female the genital opening is present near the second pairs of legs and one pair of eyes are present.

### Habit of Ticks

Distribution: Hard ticks have world-wide distribution.

Feeding Habits: Both male and female suck blood from their host and feed during night and day.

Dispersal: Ticks are wingless, they may be dispersed up to several kilometers on their host or by crawling.

Life Period: Hard ticks may live up to several years.

### Family Ixodidae - hard ticks

#### General Life Cycle

(a) There are 4 life stages - egg, larva, nymph, adult

(b) After feeding and mating, females lay eggs. Eggs covered with waxy coating to resist desiccation and keep eggmass in clump. Several thousand eggs. Maximum = 22,891, *H. nuttall*. Female hard tick dies after laying eggs

(c) Larvae hatch in ~ 2 weeks to 7 months. Larvae feed for 3 to 10 days, detach and molt to nymphs. Nymphs feed for 3 to 10 days detach and molt to adults. Adults attach to host; females feed for 1 to 3 weeks; males feed but do not engorge. Mate on host; males die. Females detach and drop to ground to lay eggs.

### **Morphology**

(a) Have a dorsal scutum that nearly covers the back of the male's but only the anterior part of female's back.

(b) The gnathostome projects anteriorly.

### **Life cycle and epidemiology**

#### **(a) 3-host tick**

1) Adult females mate and engorge only once and drop off to lay batches of eggs

2) The newly hatched larvae wait for a host to come by (questing)

3) Larva feeds, drops off, molts to a nymph

4) Nymph waits for another host to come by, feeds, drops off, molts to an adult

5) Adult waits for a host to come by, feeds for third time, mates and female drops off to lay eggs Examples *Amblyomma americanum* -- lone star tick; *Rhipicephalus sanguineus* – brown dog tick; *Dermacentor variabilis* – American dog tick; *Ixodes scapularis* – black legged tick, deer tick

#### **(b) 2-host tick**

1) Feed on 2 separate hosts as larvae and adults

2) Adults mate and female lays eggs without feeding a third time. Only larvae and nymphs are parasitic Example *Rhipicephalus evertsi*

#### **(c) 1-host tick**

1) Feeds in all 3 stages of life on the same host.

2) Only recently hatched larvae need look for a host Examples

Rhipicephalus (Boophilus) microplus R.( B.) annulatus Dermacentor albipictus

## **ECONOMIC IMPORTANCE**

1. Of all external parasites of livestock, from a worldwide view, ticks are the most important in terms of effect on the well being of man's domesticated animals, especially cattle.

2. In the U.S., annual losses to the cattle industry due to the reintroduction of bovine babesiosis is estimated at > 1 billion dollars/year.

3. Losses may result from several factors

### **(a) Disease transmission**

1) Ticks are the most important transmitters of a variety of disease agents to domestic animals and are second to mosquitoes as transmitters of diseases to man.

2) Protozoal diseases

a) Bovine piroplasmiasis (bovine babesiosis, cattle tick fever, Texas fever)

b) Equine piroplasmiasis (equine babesiosis, horse tick fever)

c) Theileriosis (East Coast fever)

3) Rickettsial diseases

a) Canine, equine, bovine, ovine and human ehrlichiosis

b) Heartwater (Cowdria)

c) Bovine anaplasmosis

4) Other bacterial diseases

a) Tularemia (rabbit fever)

b) Spirochetosis of livestock and poultry

c) Brucellosis

5) Viral diseases

a) Nairobi sheep disease

- b) Louping ill
- c) African swine fever
- (b) Other Pathology
  - 1) Tick paralysis, tick toxicosis
  - 2) Blood loss (may result in severe anemia or death)
  - 3) Wound production
    - i) Secondary bacterial infection
    - ii) Invasion sites for screwworms or other blow flies
  - 4) Tick worry”
    - i) Decreased grazing
    - ii) Weight loss
  - 5) Damage to hides

### **Types of harm directly caused to domestic animals by feeding of ticks**

#### **1- Biting stress and lost production**



*Rhipicephalus appendiculatus* adults feeding at their favourite site on a calf: Each engorging female reduces gain of weight of calf by 4 g.

When a hard tick pierces the skin of its host, initially little or no pain is caused. Later, during the prolonged feeding of ticks, inflammation is caused at the wound,

followed by acquired immune reactions in the skin (dermal hypersensitivities types 1 and 4) to the foreign proteins in tick saliva. This defense by the host is generally effective, but at the cost of pruritus (itch) and pain at the feeding site. Infestations of ticks on domestic and wild animals can build up to very high levels. This occurs on a minor proportion of individuals in the herd whilst most individual animals have low infestations (an aggregated or overdispersed distribution). On a herd basis, the accumulated effect of this biting stress can cause loss of appetite (anorexia) and loss of blood. These two losses result in reduced feed intake and anemia; combined, they cause a lower rate of growth or of milk production compared to hosts without tick infestation. The feeding of soft ticks can cause severe biting stress because of the pain whilst they feed; *Ornithodoros savignyi* is one notorious example.

## 2- Physical damage



*Amplyomma variegatum* adults feeding at udder of a heifer

At each feeding site of hard ticks, granuloma and wound healing produce a scar that remains for years after the tick has detached. When the skin of livestock animals is made into leather, these scars remain as blemishes that reduce the value of the leather. Larger ticks cause obstructive and painful damage, such as

*Amblyomma variegatum* adults which often feed on udders of cattle and reduce suckling by the calves. *Hyalomma truncatum* adults feed on the feet of sheep and goats, causing lameness. Wounds caused by dense clusters of adult ticks can make the host susceptible to infestation with larvae of flesh-eating myiasis flies, such as the screw-worm, *Cochliomyia hominivorax*.

### 3- Poisoning



Calf showing signs of sweating sickness

When ticks feed, they secrete saliva containing powerful enzymes and substances with strong pharmacological properties to maintain flow of blood and reduce host immunity. Sometimes, this causes a poisoning of the host. This is not because of a functional toxin in the sense that snake poison is functional for the snake. However, the result can be various forms of toxaemia caused by a variety of ticks. A moist eczema, sometimes with hair loss (alopecia) known as sweating sickness in cattle is caused by *Hyalomma truncatum*. Tick paralysis can be life-threatening and is caused in sheep by feeding of *Ixodes rubicundus* of South Africa; in cattle caused by *Dermacentor andersoni* in North America; in cattle, dogs and humans caused by the Australian paralysis tick, *Ixodes holocyclus*.

## **Control Measures**

Environmental Control: Cracks and crevices in ground particularly near building should be filled up. Animal hosts such as wild rodents and dogs should be reduced.

Insecticidal control: Recommended treatments include solution of 0.5% malathian. 0.1% dichorvos or alternatively dust of 5% carbaryl and 3-5% malathian can be applied to the coats of pets.

Repellent: Suitable repellents such as dimethyle pathalate and benzyle benzoate can be used on the skin or alternatively clothing can be impregnated with these to prevent tick infestation.

## ***Argasidae***

### **Soft ticks**

Soft ticks are a group of ticks that belong to the tick family called **Argasids**. They are less abundant than hard ticks and are usually not a major issue for livestock, horses or pets, but can be a problem in traditional or outdoor **poultry** operations in endemic regions. There are about 185 soft tick species worldwide.

### ***Argas persicus*, fowl tick or poultry tick**

Is a small soft-bodied tick that is found primarily on chickens and other domestic fowl.

## **Description**

*A. persicus* is a dark red tick, turning blue when fully fed. Adult *Argas persicus* are 5 to 10 mm long. The female is larger than the male at around 8mm in length. The outer surface of the tick is irregular and creased appearance.

## **Hosts**

Chicken, turkeys and wild birds.

## **Life Cycle**

*A. persicus* breeds in cracks in poultry sheds. It is active at night, feeding on the stock. The female is capable of producing large numbers of eggs. These eggs quickly hatch and the larvae attach to a host, where they feed. They draw several large blood meals, and then leave the host, returning to cracks in the poultry sheds.

The larvae then undergo three further transformations through the nymphal stages, before becoming an adult.

The complete life cycle should be done in around a month. However, under sub-optimal conditions it may be longer.

## **Veterinary important**

Fowl ticks produce anemia (most important), weight loss, depression, toxemia, and paralysis. Egg production decreases. Red spots can be seen on the skin where the ticks have fed. Because the ticks are nocturnal, the birds may show some uneasiness when roosting. Death is rare, but production may be severely depressed.



## **Control**

Soft ticks remain most of the time hidden in cracks and crevices in floors and walls in poultry houses, stables, huts, etc. If possible such hiding places should be consequently avoided or eliminated.

Otherwise, high pressure spraying of tickicides is usually the most effective approach to ensure that the tickicides reach the cracks and crevices. They contain mainly veteran active ingredients such as organophosphates (e.g. coumaphos, chlorpyrifos). There is no indication that the *Boophilus* **tick vaccine** for cattle may work against soft ticks, neither on cattle nor on any other domestic animal.

No **biological control** methods are available against soft ticks. There are **no repellents**, chemical or natural, that effectively prevent soft ticks from attaching to livestock, or that cause already attached ticks to detach.

There are **no** traps that effectively reduce soft tick populations: whatever domestic or wild animals are much more attractive for soft ticks than any possible trap.

