LECTURE #11: TICKS

Ticks
Superfamily Ixodoidea.
Family Ixodidae - hard ticks
General Life Cycle
- There are 4 life stages - egg, larva, nymph, adult
- After feeding and mating, females lay eggs. Eggs covered with waxy coating to resist desiccation and keep egg mass in clump. Several thousand eggs. Maximum = 22,891, H. nuttal. Female hard tick dies after laying eggs
- 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
- Have a dorsal scutum that nearly covers the back of the male’s but only the anterior part of female’s back.
- The gnathostome projects anteriorally.

Life cycle and epidemiology
3-host tick
- Adult females mate and engorge only once and drop off to lay batches of eggs
- The newly hatched larvae wait for a host to come by (questing)
- Larva feeds, drops off, molts to a nymph
- Nymph waits for another host to come by, feeds, drops off, molts to an adult
- Adult waits for a host to come by, feeds for third time, mates; 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

2-host tick
- Feed on 2 separate hosts as larvae and adults
- Adults mate and female lays eggs without feeding a third time.

Example
*Rhipicephalus evertsi* sub-Saharan Africa

1-host tick
- Feeds in all 3 stages of life on the same host.
- Only recently hatched larvae need look for a host

Examples
*Rhipicephalus (Boophilus) microplus*
*R. (B.) annulatus* eradicated from USA, reportable vector of bovine piroplasmosis (*Babesia*)
*Dermacentor albipictus*
Economic Importance

- 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.
- In the U.S., annual losses to the cattle industry due to the reintroduction of bovine babesiosis is estimated at > 1 billion dollars/year. Losses may result from several factors.

Disease transmission -- 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.

Protozoal diseases

- Bovine piroplasmosis (bovine babesiosis, cattle tick fever, Texas cattle fever), Equine piroplasmosis (equine babesiosis, horse tick fever), Theilerioses (East Coast fever in Africa)

Rickettsial diseases

- Canine, equine, bovine, ovine, human ehrlichiosis, Heartwater (Cowdria), Bovine anaplasmosis.

Other bacterial diseases

- Lyme disease, Tularemia (rabbit fever), Spirochetosis of livestock and poultry, Brucellosis

Viral diseases

- Nairobi sheep disease, Louping ill, African swine fever

Other Pathology

- Tick paralysis, tick toxicosis
- Blood loss (may result in severe anemia or death)
- Wound production
  i) Secondary bacterial infection.  ii) Invasion sites for screwworms or other blow flies
- “Tick worry”
  i) Decreased grazing  ii) Weight loss
- Damage to hides

Tick Behavior

- Wooded-brushy habitat. (exception is the brown dog tick which will breed indoors)
- Host acquisition - odor, vibration, air currents, heat, moisture, shadows.
- Immature stages generally feed on small animals; adults on large animals.
- Survival - availability of host; humidity of 85%+

Control

- Large scale – difficult. Feeding habits, Developmental habits, Reproductive potential
- Chemical -- Dips or dip-vat, Whole body spray, Topicals, dusts, Insecticide impregnated ear tags. Injectants and insecticide - acaricide boluses
- Nonchemical
  o Brush or vegetation removal. Most effective on large scale. Time, labor, equipment and money needed; if combined with pasture management, is attractive.
  o Resistant cattle breeds (Hereford most susceptible, Brahman least susceptible)
  o Vaccines against tick -- Australian tick vaccine
  o Predators and parasites -- Naturally present but have little impact