

Entomology 156:
Biology Of
Parasites

The Arthropod
Parasites
Lecture 9
RB Kimsey

Arachnids: The
Mites

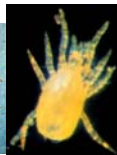
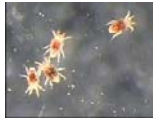


I. Mites or Acari Introduction



A. Wide spread, common, diverse, largely unknown fauna

B. Morphology



C. Generalized life histories of the parasitic forms

1. Life cycle has 6 stages (idealized), some may be absent

a. Eggs hatch into prelarva

- 1) May be brooded by female
- 2) Occasionally viviparous

b. Prelarva quiescent, nonfeeding, primitive form

1. Life cycle has 6 stages (idealized), some may be absent

c. Larva

- 1) Six legs, reduced characteristics of the adult
- 2) Non feeding, predator, or parasite

1. Life cycle has 6 stages (idealized), some may be absent

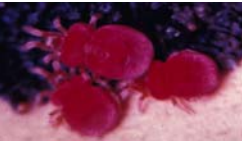
d. Three nymphal stages, usually all feed similarly

- 1) Protonymph Acquires 4 pair of legs

d. Three nymphal stages, usually all feed similarly

- 2) Deutonymph acquires all non sexual characteristics of the adult
- 3) Tritonymph rare stage only in particular groups

e. Adult, sexual stage



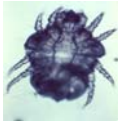
C. Generalized life histories of the parasitic forms

2. Levels of association with the host

a. Free living parasites



- 1) Most life stages free living, feed on plant material
- 2) Obligate parasites of vertebrates in particular developmental stage usually larva
- 3) Example: the Trombiculidae chigger mites



2. Levels of association with the host

b. Ectoparasitic on skin or in vestment

- 1) All stages obligate parasites of vertebrates
- 2) Associated with the nest or live on host
- 3) Example:
Laelaptidae and related families



2. Levels of association with the host

c. Within the surface of the skin

- 1) All stages obligate parasites of vertebrates
- 2) Live only within the superficial layers of skin
- 3) Responsible for numerous forms of mange and scabies

2. Levels of association with the host

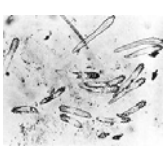
c. Within the surface of the skin

4) Examples:

a) Demodicidae the hair follicle mites



b) Sarcoptidae- Sarcoptes scabiei the mange and scabies mites



II. Trombiculidae the chigger mites

A. Characteristics: 100s of species, world wide distribution in tropics

B. Life cycle

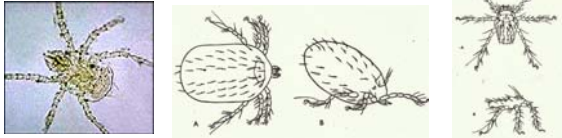
- 1. Egg larva nymph adult
- 2. Larvae active on vegetation, 0.5-1mm, yellow



B. Life cycle

2. Larvae active on vegetation

- a. Feed by piercing skin, injecting saliva
- b. Formation of a stylome feeding tube
- c. Feed for 1 day to 1 month
- d. Rarely feed on blood, mostly matrix components

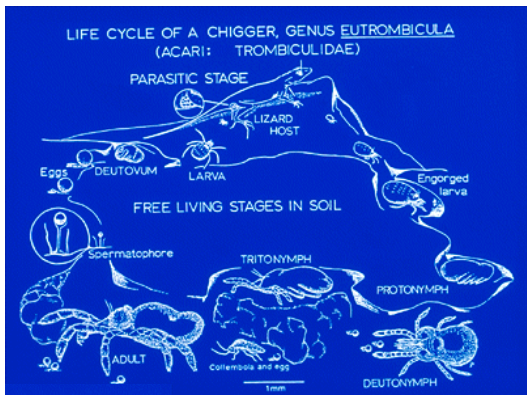


B. Life cycle

3. Nymphs and adults live in soil, rarely seen, feed on small arthropods



- C. East Asian vectors of Scrub typhus or Tsutsugamushi fever- Rickettsia tsutsugamushi
- D. Vicious biters in southern United states



III. Laelaptidae

A. Numerous species all ectoparasites of vertebrates

1. Host specific but will bite other hosts when preferred host is absent
2. 1mm, oval, white, or red or brown when fed

III. Laelaptidae

B. Life history: egg, larva, two nymphs, adult

1. Egg hatches, larva does not feed
2. Molts to protonymph, requires blood meal
3. Molts to deutonymph which may or may not feed
4. Adult takes multiple blood meals and long lived

III. Laelaptidae

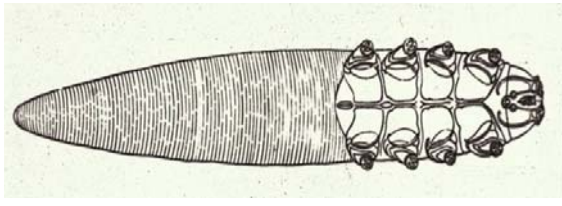
C. Found on hosts or in nests sometimes in enormous numbers



IV. Demodicidae, the hair follicle mites, Demodex folliculorum

A. Probably at least 1 species per warm blooded vertebrate

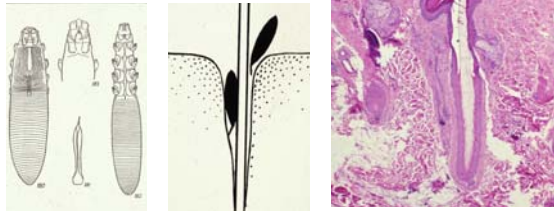
B. Characteristics: elongate, 0.25-0.5 mm long, stumpy legs



B. Characteristics:

1. Reside in hair follicles and sebaceous glands and ducts

2. Most every human infected, eye lashes, oil glands along nose



B. Characteristics:

3. Life history poorly known

4. Demodectic mange

V. Sarcoptidae Sarcoptes scabiei- the scabies mites

A. Minute burrowing mites in the skin of humans and domestic animals

B. Characteristics: flattened, disc-shaped, suckers on appendages, white, 150-250 microns long



V. Sarcoptidae Sarcoptes scabiei- the scabies mites

C. Life history

1. Female enters skin, burrows 2-3 mm at night

a. superficial not below the stratum corneum

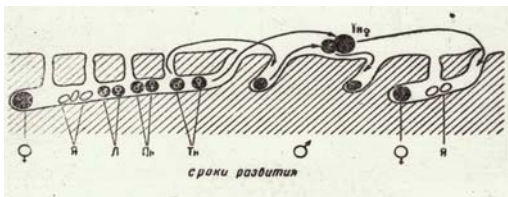
b. Thin wrinkled skin preferred

c. Lays 25-30 large eggs 150 microns along burrow

C. Life history

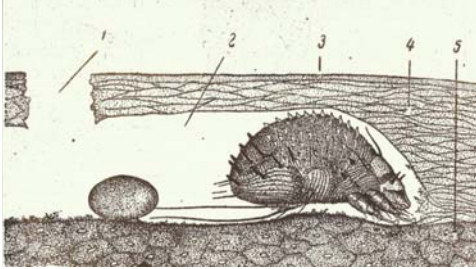
2. Larva hatch and feed in burrow

3. Two nymphal stages extend their own burrows



C. Life history

- 4. Adult female waits for nomadic male
- 5. Two- three week life cycle



Tyroglyphidae- Grocers itch mites

Free living detritivores

Pyemotes the Straw itch mite

Free living predator



Trombiculidae- chigger mites

Free living parasites



Macronyssidae and Dermanyssidae

Nest and ectoparasites
