

LECTURE #12: FLEAS & LICE

FLEAS

- I. Order Siphonaptera -- fleas - 2-3mm long; wingless; laterally compressed; adapted for jumping and clinging to host; both sexes take blood meal. Rest temperature 18-27°C, 60-70% relative humidity

Ctenocephalides felis - "cat" flea

C. canis - "dog" flea

Morphology

Life cycle and epidemiology

1. Ave. life cycle = 14 - 28 days
2. After taking a blood meal and mating on host, the females lay eggs in the environment or which drop off host.
 - (a) In most species, females mate only once, poss. 500 eggs/female/lifetime.
3. Eggs hatch in 2 to 12 days
4. The larvae feed on organic matter and in 200 days they undergo 2 molts and form pupae - adults drop blood for larvae to feed on.
5. The pupae hatch in 7 days to 1 year.
6. The adult flea seeks a blood meal. Unfed fleas can survive for 2 months and fed fleas will live for a year.

Pathology

1. Fleas are an annoyance to their host.
2. Can produce anemia and death in heavy infestation.
3. The saliva of fleas contains a hapten which becomes antigenic when fixed to host protein and causes dermatitis from flea bite allergy. Also most damage to self while scratching.
4. Serve as intermediate host for *Dipylidium caninum* and *Dipetalonema reconditum*.
5. Serve as vectors of plague (*Yersinia pestis*) and typhus (*Rickettsia typhi*)

Common species

Ctenocephalides felis -- cat flea (most dog and cat fleas in NC are *C. felis*)

Ctenocephalides canis -- dog flea

Pulex irritant -- human flea

Xenopsylla cheopis -- Oriental rat flea – vector for *Yersinia pestis*

Echidnophaga gallinacea -- poultry or stick tight flea

FLEA CONTROL

1. Integrated control program should include the host and environment of the host.
2. Host has: 1) adults on body and eggs in hair or feathers
3. Environment: 1) eggs; 2) larvae; 3) pupae; 4) adults. Majority of fleas usually in environment.
4. Control: Clean up host's environment
 - (a) Remove material that can serve as larval flea food
 - (b) Remove host from normal environment
 - (c) Use chemicals to treat environment
 - (1) Residuals or knockdown, (2) Insect growth regulators
 - (d) Control on host
 - (1) Dips, (2) Sprays, (3) Powders, (4) Shampoos, (5) Flea collars, (6) Systemics
5. Comparison of currently used flea control products:
 - (a) Advantage® (Imidacloprid) is applied to the coat and kills adult fleas by inhibiting post-synaptic nerve transmission. It is effective for 1 month and kills prior to biting. It is especially useful for the allergic cat or dog, in situations where one or more animals in a household roam or come into contact with other flea infested animals. Control usually dramatic.

- (b) Frontline® (Fipronil) same as above with greater staying power on coat. Stands up well to repeat washing. Grooming activity of cats may make it necessary to shorten time between doses to three weeks for Frontline and Advantage in the case of the allergic animal.
- (c) Program® (Lufenuron) is a chitin synthesis inhibitor that lacks adulticidal activity and controls by preventing egg hatching and larval development. It is useful for the control of fleas in a totally confined situation.
- (d) Revolution® (Selamectin) topical to control heartworm, fleas, other ecto- and endoparasites.
- (e) K9 Advantix® - Imidacloprid complements the activity of permethrin. Each affects parasite nerve cells at different sites. Fleas, ticks, mosquitos. **Because it contains permethrin it is highly toxic for cats. Avoid using this produce in combination dog/cat households where cats groom dogs. Treated dog should avoid close contact with cats for 24 hr post application.**
- (f) Bravecto® - (Fluralaner) inhibits arthropod nervous system by antagonism of ligand-gated chloride channels including GABA and glutamate receptors. Topical application every 2 -3 months.

LICE

- I. Order Mallophaga – chewing lice - 1-3mm; flattened dorsoventrally; head is nearly as broad as body and rounded in front.
 - A. Morphology
 - 1. Chewing mouth parts with large mandibles feed on fur, feathers and epidermal debris and some may feed on blood.
 - 2. Head is usually as broad or broader than the thorax.
 - B. Life cycle and epidemiology
 - 1. Eggs cemented to hair or feathers as “nits”, hatch in 8 to 18 days.
 - 2. Hatch and go through a series of nymphal stages which eventually become adults in about 18 days.
 - C. Pathology
 - 1. Chief effects are due to irritation.
 - 2. Affected animals are restless, do not feed well and bite or scratch infested areas causing fur, wool or feather damage.
 - 3. Egg and milk production will decline.
 - 4. Feed conversion and irritation.
 - 5. Examples include *Trichodectes*, *Felicola*, *Damailinia*
- II. Order Anoplura - sucking lice
 - A. Morphology - piercing mouth parts; head is narrow, less than body width
 - 1. Have elongated blood sucking mouth parts and feed entirely on blood.
 - 2. Head is narrow - not wider than thorax.
 - B. Life cycle and epidemiology
 - 1. Transmitted by close contact or grooming utensils or tack.
 - 2. Usually more common in winter than summer due to crowded barn, longer coat and poor condition of host.
 - C. Pathology
 - 1. Wool may be stained by larval feces.
 - 2. Heavy lice infestation may cause anemia and death.
 - 3. Foot louse of sheep can cause lameness.
 - D. Examples include *Lignonanthus*, *Haematopinus*, *Lignonanthus*, *Solenopotes*.
 - E. Control
 - 1. For dog and cat carbaryl and dioxanthion shampoo
 - 2. Beef and non-lacting cattle
 - a. various insecticides (sprays, dips, pour-ons),
 - b. sc ivermectin 0.2mg/kg for Anoplura.