Order Spirurida - general features

• Who is in this Order?
  
  * * *  
  * Dracunculus insignus – subcutaneous.  
  * Physaloptera - stomach worm of dogs, cats.  
  * Habronema & Drashia - found in stomach of horses.  
  * Onchocerca - found in ligaments of horses.  
  * Dipetalonema - subcutaneous in dogs.  
  * Dirofilaria - dog heartworm.  
  
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Order Spirurida - general features

• Require arthropods as intermediate host.
• Routes of infection:
  1. ingestion of arthropod, or ingestion of a paratenic host that ate the infected arthropod.
  2. infective larvae delivered to host when arthropod feeds on the host.
Order Spirurida

- *Dracunculus insignus* – occurs in North Carolina in dogs, raccoon reservoir (also, reported in 2 cats)
• *Dracunculus insignus* life cycle: adult female opens skin lesion to release $L_1$ that are eaten by copepod intermediate host. Copepod or paratenic host frog eaten by raccoon/dog. Prepatent time in dog = 300-400 days.
Physaloptera sp.

- Thick-bodied up to 40 mm long with anterior collar, don’t confuse with *Toxocara* or *Toxascaris*. Adults in stomach of raccoons (reservoir host), dogs and cats.
Physaloptera sp.

- Beetles are the intermediate hosts, but rodents can be paratenic hosts.
- Pathogenesis: gastritis, bleeding, ulcers.
Physaloptera sp.

- Diagnosis: difficult due to few and hard to float eggs. Vomited worm - don’t assume it is Toxocara. Endoscopic exam.
- Treatment: Pyrantel at 20mg/kg, repeated if vomiting persists. Other anthelmintics effective as well.
Habronema and Drashia

- Up to 20 mm long, thicker than *Trichostrongyulus axei*, found in the stomach of horses.
Habronema and Drashia

- larvated egg, passed in feces, hatches and L₁ ingested by maggot of Stomoxys or Musca flies, L₃ deposited on horse by fly when feeding around lips, eye or wounds.
**Habronema and Drashia**

- Pathogenesis:
  1. Internal - gastritis and ulcers from *Habronema* adults, fibrous “tumors” in stomach wall containing adult *Drashia*. 
Habronema and Drashia

- 2. External - cutaneous habronemiasis occurs when larval stages remain in skin and cause eosinophil/granulomatous lesion.
Habronema and Drashia
Habronema and Drashia

- Diagnosis: anorexia and/cutaneous lesions, response to anthelmintics.
- Treatment and control:
  1. systemic fenbendazole or ivermectin, also topical application.
  2. compost manure and fly control if indoors. Repellant on abrasions.
Dipetalonema
(Acanthocheilonema)

• Adults in subcutaneous tissue cause no signs, but microfilariae in blood can be confused with *Dirofilaria immitis*. 
**Onchocerca sp.**

- Species in horses very common before ivermectin, now see in horses under minimal management.
- Adult worm in ligaments of neck cause no pathology there.
- Microfilariae produced by adults congregate in skin of ventral abdomen where intermediate host, *Culicoides* (midge) bite.
Onchocerca sp.

- Pathogenesis: summer sores develop on ventral abdomen, microfilariae found in skin snip. This localized dermatitis is very itchy (pruritic).
- Treatment: systemic ivermectin clears skin lesions. May precipitate transient edema.
Dirofilaria immitis

• Read American Heartworm Society Guidelines for Dogs.
• Read American Heartworm Society Guidelines for Cats.
• Come ready to discuss in class Monday, October 28th.
• These Guidelines are published “Best Practice Guidelines” viewed by your clients
• http://heartwormsociety.org