Life Cycle: Unusual Aspects

a. Adults inhabit intestine, females embed in intestinal wall.
b. Eggs mature in female uterus, larvae (J1) enter blood and lymph, travel to vascularized muscle.
c. J3 larvae encyst in muscle, wait to be eaten.
d. J4 hatch and mature into adults.
**Necator americanus**

1. American hookworm, cause of anemia, lethargy, retardation.
   a. Common in warm humid areas - killed by frost.
   b. A good reason to wear shoes.
   c. Probably came over in slave trade - also found in Old world.

**Necator americanus**

Recognizable by:
1. dorsal tooth
2. fused spicules
**Necator americanus**

Life Cycle:

a. Eggs in feces, develop in soil,
b. Rhabditiform larva (J1) hatches, molts,
c. Filariform (J3) penetrates skin, enters circulation.
d. Moves to lungs, coughed up, swallowed, matures in intestine.
Rhabditiform larva of a hookworm

Necator americanus

Other Related Genera:

* Ancylostoma duodenale
  1. Commonly called old world hookworm
  2. Tends to be larger; nastier because it feeds on more blood.
Ancylostoma duodenale

Recognizable by:

a. 2 ventral teeth
b. Unfused spicules
3. Other old world species exist
Ancylostoma caninum
cuticular larval migrans

Syngamus trachea
• Gapeworm in fowl
1. Similar life cycle - intermediate stages in worms
   2. Adults live in trachea of birds

Syngamus trachea – Life Cycle
• In the preparasitic phase, J3s develop inside the eggs at which time they may hatch.
• Earthworms serve as transport (paratenic) hosts. Larvae have been shown to remain viable for more than three years encapsulated in earthworm muscles.
• Other invertebrates serve as paratenic hosts; terrestrial snails and slugs as well as the larvae of Musca domestica (the house fly) and Lucilia sericata (the greenbottle fly).
• The parasitic phase involves substantial migration in the definitive host.
Trichostrongylines

Hairworms in Horses

Eggs hatch when eaten by the horse. Larvae migrate to the stomach and mature. Adult worms in the stomach and in the small intestine irritate and erode the villi, or finger-like projections, of the gut, damaging the capillaries and lymph vessels. Eggs are laid and passed in the manure.
Metastrongylus – Life Cycle

Life Cycle: The eggs are laid in the bronchi and are coughed up, swallowed, and passed in the feces. The ova hatch after being ingested by earthworms. Infective third-stage larvae develop in 10 days and accumulate in the circulatory system, where they may overwinter. Pigs become infected by ingesting these worms. The lungworm larvae then penetrate the intestines and proceed via the lymph and blood vessels to the lungs. The prepatent period is about 2 weeks.

Disclaimer: The stunts described on this web site were designed and supervised by trained professionals. They are extremely dangerous and should not be attempted by anyone, anywhere, anytime. Some episodes contain graphic scenes. Viewer discretion advised.
**Order Ascarida**

A. Stout worms with 3 distinct lips
   1. Muscular esophagus
   2. Often with caudal bulb (ventriculus).
   3. Spicules, males often with curved tail

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**Order Ascarida**

B. Eggs are distinctive.
   1. Shed unembryonated, often in early stages of development.
   2. Outer surface is mammillated - covered with bumps.

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**Ascaris lumbricoides**

a. Parasite of humans
   b. Appears very closely related to *Ascaris suum*.
      1. Recently distinguished by mtDNA analyses
      2. Some gene flow, but seems to be dependent on location and frequency of transfer.
**Ascaris lumbricoides**

*Life Cycle*

1. Eggs in feces, swallowed in contaminated water, food.
2. J1 hatches in gut.
3. J2 migrates to lungs.
4. J3 is coughed up, swallowed, J4 into gut.
5. Adult develops there.
**Ascaris lumbricoides**

Other Notes:
1. Long standing infectivity of eggs
2. Migrating larvae - immune reactions

**Toxocara canis**
**Toxocara canis**

Visceral Larval Migrans

a. Similar life cycle to *Ascaris*.
b. Larvae migrate in wrong host.

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**Toxocara catti**

*Toxocara cati* eggs were found in the faeces of 42.5% of house cats in Mexico City. 20.7% of apartment cats and 49.1% of house cats were infected.

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**Anisakis spp.**

a. Several intermediate hosts:
   1. Usually marine mammals.
   2. Also bears and humans.
b. Larvae have a tendency to migrate and imbed in tissue.
   1. Especially stomach and gums.
THE LIFE CYCLE OF THE ANISAKIDAE

Eggs are passed in host's feces
Ingested by another host
Juvenile ate in the intermediate host
Definitive host (negative worm diet) infective stage passed in feces
Larval stage in host's intestine
Infective stage in host's feces

Parasites and Pathological Reactions: