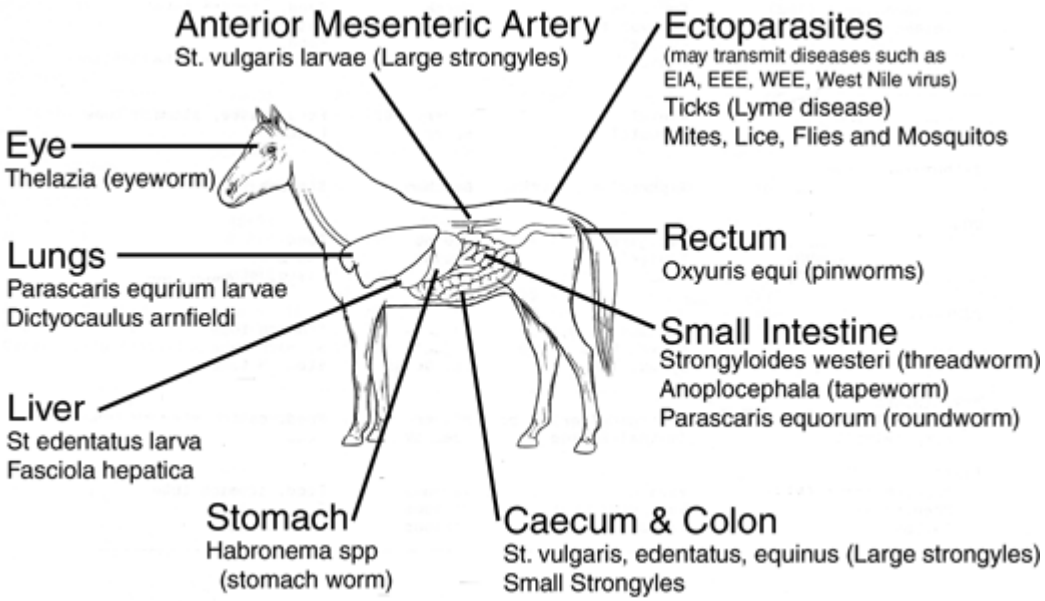
Internal Parasites of Equines

Horses are very susceptible to a wide variety of internal parasites. The type of parasites can differ with location, age of the horse, exposure to other horses, and soil conditions. Horses that are pastured or turned out in groups are constantly at risk of ingesting parasite eggs or larvae. Internal parasites can affect numerous parts of the horse. This is shown in the image below:



Many veterinarians believe that a large proportion of the colics (abdominal pain, indigestion, and possible surgery) are caused by a parasite infestation in the horse that interferes with normal intestinal blood circulation. The most serious internal parasites are large and small strongyles, ascarids, bots, and pinworms. Both these and other internal parasites will be described.

Strongyles

These are by far the most damaging and destructive of any of the internal parasites. They are often referred to as bloodworms, redworms, or palisade worms. They live mostly in the hind gut or the cecum and colon. Large strongyles attach themselves to the intestinal wall and cause the horses to become anemic, unthrifty, and poor doers. Large strongyles migrate into the blood vessels including the mesenteric artery that supplies blood to the digestive tract. The horse can have colic from poor circulation, an aneurysm, ruptured vessel, or transient lameness all related to blood circulation problems. Small strongyles live within the intestinal wall and cause chronic, low-grade colic and weight loss. The eggs of the strongyles are shed in the manure, the larvae hatch outside in the grass, and the horse ingests the larvae along with forage.

Ascarids

The ascarids, or roundworms, are large white worms often the size of a pencil and 8-15 inches long. Ascarids are seldom a problem in horses over 4-5 years old as the animal builds up an immunity to the parasite. Foals first have problems as early as 2-3 months of age. The migration of these parasites through the lungs leads to coughing, fever, and pneumonia. When the worms become large and numerous enough, the intestine can become blocked and cause colic and death. The ascarid eggs are passed in the manure, but unlike the strongyles, the eggs themselves are ingested by the horse, where the larvae are released into the digestive tract. These eggs are very resilient because of a thick shell. These eggs can persist in the environment for years.

Bots

During the summer, this external parasite lays its eggs on the hair of the shoulder, legs, and neck of the horse. These yellow nits or eggs will lay dormant until the horse's mouth comes in contact with the egg. The moist warmth causes the egg to hatch and the larvae burrow into the gums and tongue. Eventually they migrate to the stomach and attach to the stomach wall causing inflammation and ulceration. The horse with a severe bot contamination is subject to indigestion, infection, or interference with normal digestion. After being released from the stomach wall (after 8 to 11 months), the bot larvae passes in the manure and becomes a bot fly.

Pinworms

These parasites cause considerable irritation to the horse's rectum, thus provoking a lot of tail rubbing and itching of the rear quarters. Pinworms are less damaging to the digestive system, but cause considerable irritation and are evidence that the horse has other internal parasites. As with the other parasites mentioned, the horse infests itself by eating contaminated pasture forages. The larvae hatch in the intestine and grow into adults and the female lays her eggs around the rectum.

Hair Worms

The adult worm occurs in the stomach and in the small intestine, irritating and eroding the finger-like projections, or villi, of the gut, damanging the capillaries and lymph vessels within the villi. Signs of infection may be dark, foul-smelling diarrhea, because the damaged villi are unable to digest and absorb properly in the intestine. If there is severe damage to the villi, the underlying small vessels could be damaged as well, causing bleeding into the intestines. Bleeding may lead to anemia and loss of condition. Infection occurs by ingestion of grasses contaminated with worm eggs. Foals are very open to infection by hair worms, so broodmares should be dewormed and moved to clean pastures.

Intestinal Threadworms

Threadworms are long and hair-like, with adults growing to 8 to 9 mm in length. Infection can occur either by the horse swallowing larvae or the larvae can pass through the horse's skin. Young foals can also be exposed to the worm by nursing from infected mothers. Larvae mature to adult worms in the small intestine. If larvae enter through the skin, they move to the lungs,

then up the wind pipe where they are coughed up and swallowed. In the lungs the larvae can cause bleeding and respiratory problems. The worst problem is in foals where if untreated infection can cause diarrhea, weakness, weight loss and failure to thrive and grow at a normal rate.

Neck Threadworms

Infection is via a bite by an infected midge. The larvae are deposited into the wound and travel in the neck to the flexor tendons and suspensory ligaments, particularly of the forelegs. Swelling of the ligaments and tendons can occur if left untreated and may lead to lameness. If the microfilariae invade the lens of the eye, irritation, swelling and sometimes blindness may occur.

Lung worms

The horse lung worm is long and slender, measuring 25 to 70 mm. The larva go through the walls of the intestine and into the circulatory system. They are carried in the circulatory system into the lungs, where they mature. The eggs pass through the horse's system through the manure. When large numbers of the larvae are presente, the lining of the bronchioles may become irritated causing a severe cough, difficulty breathing and loss of appetite. The infection is light in older horses because they develop resistance but foals may die from a lungworm infection.

Stomach Worms

The larvae of these parasites are ingested by the common housefly or stable fly maggots, which develop in manure. The worms develop inside the flies' maggots. The flies mature and then deposit the larvae on the lips, nostrils, wounds and other naturally moist areas of the horse. The lavae may stay in the area of the wound or may be swallowd by the horse. If the horse likes the infested area, the larvae mature in the horse's stomach. Otherwise, they stay in the wound and create oozing, expanding sores. The infected wound may grow much larger and prevent healing. These wounds are commonly called **"summer sores"**. Larvae deposited in the eyes can cause conjunctivitis. Larvae that are eaten can cause gastritis and formation of tumor-like growths, which may rupture.

Tapeworms

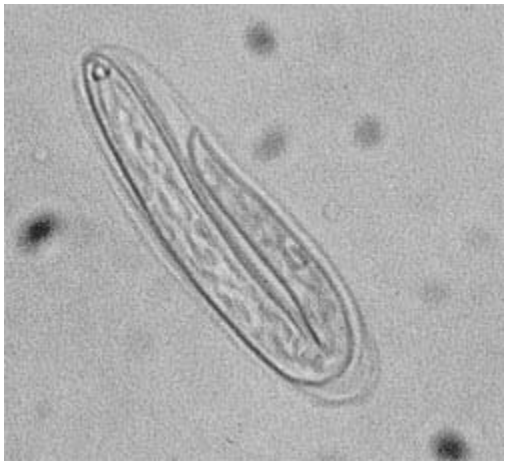
Eggs develop in the intermediate host, the oribatid "grass" mite. When infected mites are swallowed, the tapeworms mature within the horse. A sever case of tapeworm can cause intestinal irritation, which can lead to inflammation, bleeding and/or ulcers of the intestines. Fatal intestinal blockage can occur as the worms accumulate at the ileocecal junction. No dewormers labeled for tapeworms are sold in the US.

WORM EGGS OF HORSES AND THEIR CHARACTERISTICS

Oxyuris equi (Pinworm)

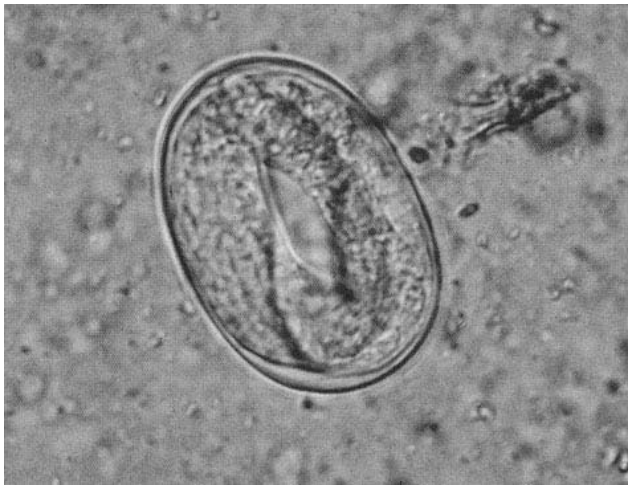
- medium-sized egg:80-95 µ in length - 40 -45 µ in width
- ovoid, slightly asymmetrical
    - dissimilar side-walls, one is somewhat flattened
    - excentric, transparent polar plug at one pole
- thick shell with smooth surface
- always contains a late-stage morula or an L1-larva

Habronema muscae (Stomach Worm)



- small worm egg: 40 - 55 µ in length, 8 - 16 µ in width
- cylindrical or bacilliform, strongly elongated
- somewhat barrel-shaped side-walls
- thick shell
- contains a larva
- in the faeces, both eggs and larvae may be detected

Strongyloides westeri (Intestinal Threadworm)

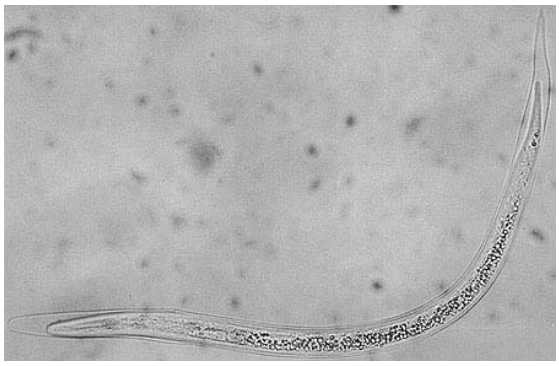


- small worm egg: 40 -5 0 µ in length, 30 - 40 µ in width
- ovoid
    - side-walls are symmetrical
    - similar, wide poles
- thin shell with smooth surface
- contains a short, thick larva

Dictyocaulus arnfieldi (Lung worm)

- medium-sized worm egg: 80 - 100 µ in length, 50 - 60 µ in width
- ellipsoid
    - symmetrical side-walls
- thin shell
- contains a larva which emerges from the egg very early

Dictyocaulus arnfieldi L2-Larva

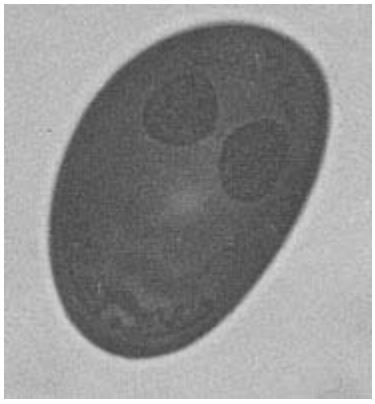


- length: 290 - 480 µ
- thickness: 14 - 18 µ
- well developed, clearly visible oesophagus
- tail has a punctiform, transparent projection
- no intestinal cell; granular contents

Anoplocephala sp. (Tapeworm)

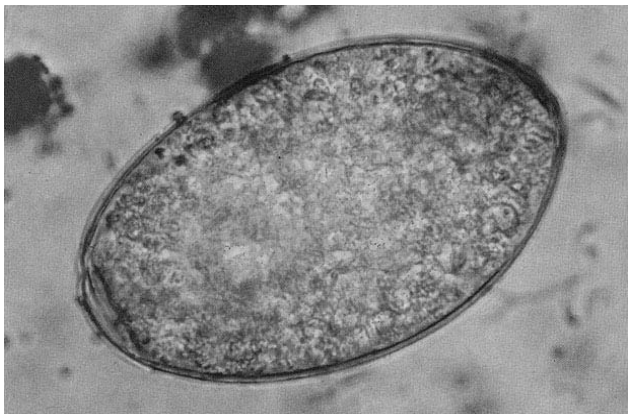
- medium sized worm egg:
  - Anoplocephala perfoliata: 65 - 80 µ embryo diameter 16 µ
  - Anoplocephala magna: 50 - 60 µ embryo diameter 8 µ
  - Paranoplocephala mamillana: 50-60 µ
- nearly spherical, sometimes more or less flattened at one or several sides
- thin, multilayer shell with greyis, smooth surface
- contains hexacanth embryo surrounded by a chitinous piriform apparatus

Dicrocoelium lanceatum (Fluke)



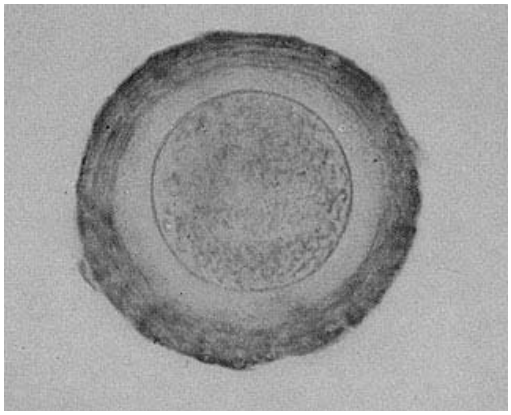
- small worm egg: 38 - 45 µ in length, 22 - 30 µ in width
- dark-brown
- irregular ellipse
  - similar, narow round poles
  - dissimilar, somewhat barrel-shaped side-walls
  - asymmetrical
- thick shell
- contains a miracidium that fills the egg entirely and has a structure that is very difficult to distinquish
- indistinct operculum

Fasciola hepatica (Fluke)



- large worm egg (>130 µ): 130 - 145 µ in length, 70 - 90 µ in width
- nearly regular ellipse
  - nearly similar poles
  - symmetrical, strongly barrel-shaped side-walls
  - thin shell
  - granular, yellowish-brown contents that fill the whole egg (fertilized egg is surrounded by a great mass of yolk cells); no blastomeres

Parascaris equorum (Ascarid, Round Worm)



- medium-sized worm egg: ± 100 µ in length, ± 90 µ in width
- nearly spherical
- brown, yellowish
- thick, albuminous shell covered with fine dots
- contains one or two cells
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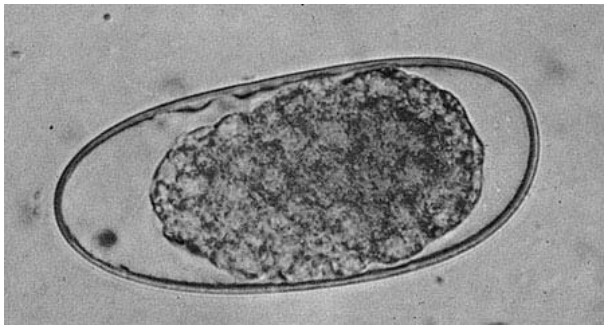
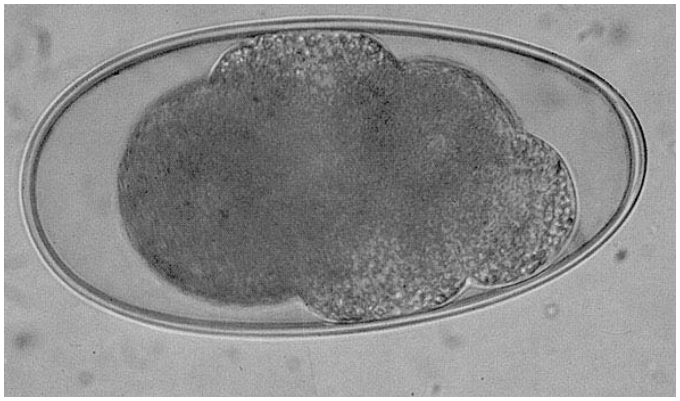
Trichostrongylus axei (Stomach Hair Worm)



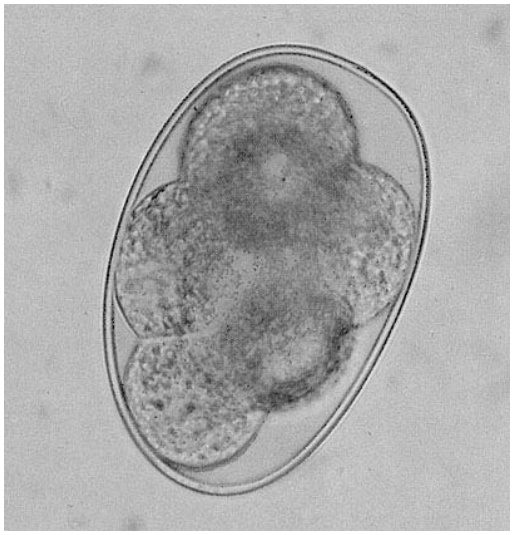
- medium-sized worm egg: 70 - 108 µ in length, 30 - 40 µ in width
- irregular ellipse
    - dissimilar, not very wide poles, one of which is more rounded than the other
    - dissimilar side-walls, one of which is often flattened
- thin, chitinous shell with smooth surface, covered with a thin yolk membrane inside
- 16 to 32 blastomeres
- can be distinguished from Triodontophorus, Strongylus and Trichonema, by its clearly dissimilar poles and its number of blastomeres - usually 16, or more.

Triodontophorus sp. (Large Strongyles, T. serratus - T. tenuicollis - T. brevicauda)



- large worm egg: 130 - 140 µ in length, 55 - 65 µ in width
- ovoid
    - the small axis is shorter than half the large axis
    - similar, or nearly similar poles
    - barrel-shaped side-walls
- smooth wall
- contains a morula with large, black blastomeres
- to be distinquished from Trichonema sp. (smaller size and parallel side-walls) and Strongylus sp. (smaller size, the small axis is longer than half the large axis).

Strongylus spp. (Large Strongyles, S. vulgaris, S. equinus, S. edentatus)

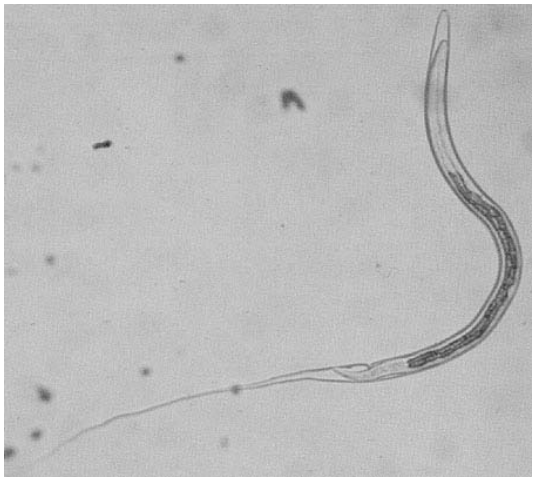


- medium-sized worm egg:
  - Delafondia vulgaris (=S. vulgaris)
    - 83 - 93 µ in length, 48 - 52 µ inwidth
  - Strongylus equinus
    - 75 - 92 µ in length, 41 - 54 µ inwidth
  - Alfortia edentata (=S. edentatus)
    - 78 - 88 µ in length, 48 - 52 µ inwidth
- ovoid
  - similar, or nearly similar poles
  - similar, strongly barrel-shaped side-walls
  - small axis is longer than half the large axis
- thin shell with smooth surface

Strongylus vulgaris (=Delafondia vulgaris) L3 - Larva

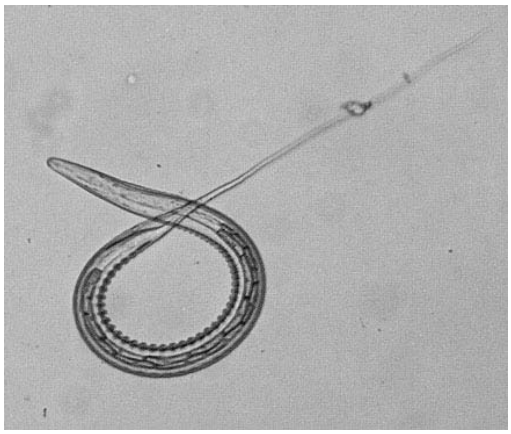
- 800 - 1000 µ length, 40 µ in width
- body/tail ratio = 2.5/1
- has 28 - 32 rectangular intestinal cells

Strongylus edentatus (=Alfortia edentata) L3 - Larva



- 800 µ in length, 40 µ in width
- body/tail ratio = 2/1
- has 20 intestinal cells.

Strongylus equinus L3 - Larva



- 1000 µ in length, 40 µ in width
- body/tail ratio 2.8/1
- has 16 rectangular intestinal cells.
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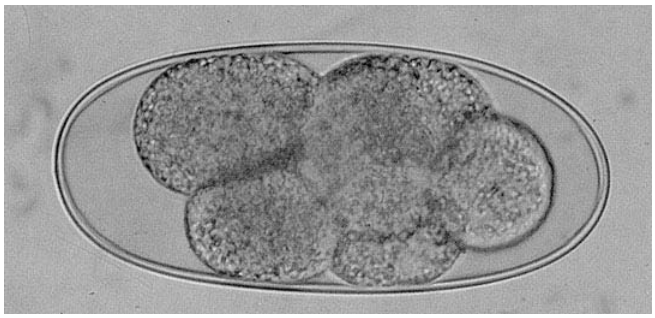
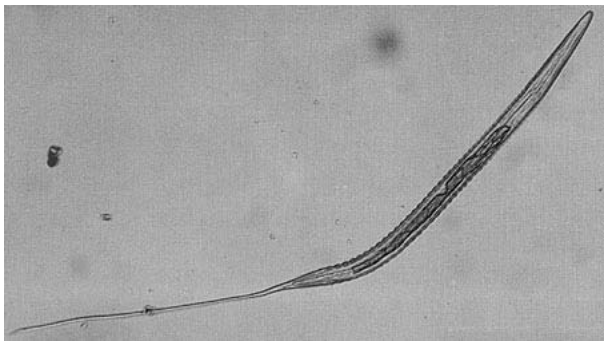
Trichonema (=Cyathostoma, Small Strongyles)



- the genus Trichonema comprises a large variety of species. It is impossible to differentiate their worm eggs
- medium-sized worm egg: 100-110 µ in length, 40 - 45 µ in width
- long ovid
  - the small axis is shorter than half the large axis
  - nearly similar poles
  - more or less flattened, parallel side-walls

- thin shell with smooth surface
- contains a morula with a small number of large blastomeres
- to be distinguished from Triodontophorus (larger size and barrel-shaped side-walls) and Strongylus sp. (small axis is longer than half the large axis).

Trichonema (=Cyathostoma) L3-Larva



- length: 850 µ
- the larva has a sheath
- its tail is long and whip-shaped (body/tail ratio = 1.5/1)
- 8 triangular intestinal cells
- to be distinguished from Strongylus larvae (16 to 32 intestinal cells).

Bot Flies (Gastrophilus intestinalis, G. nasalis)

Physical description of parasite - Adult flies are brown, hairy and bee-like, with one pair of wings, and measure about 3/4 inch. The larva (bot) is also 3/4 inch long with a narrow, hooked end and a broad, rounded body.

Stages/lifecycle - After a 3 week developmental period in the mouth, bot fly larvae of both species, G. intestinalis and G. nasalis, migrate and attach themselves to the mucus lining of the horse's stomach and remain there during the winter. After about 10 months, they detach from the lining and are passed out of the body through the feces. The larvae burrow into the ground and mature. Depending on the conditions, adults emerge in three to 10 weeks. Adult females deposit eggs on the horses legs, shoulders, chin, throat and the lips. Depending on geographic location, the life cycle of bot flies is not fixed to only certain times of the year and bot larvae can be active in horses anywhere from August to May.

How the parasite enters the horse's system - Egg laying begins in early summer. Eggs of the different species differ in color and placement. G. intestinalis lay up to 1,000 pale yellow eggs on the horse's forelegs and shoulders. Moisture and friction from the horse licking itself cause the eggs to hatch in about seven days. G. nasalis lays about 500 yellow eggs around the chin and throat of the horse. These eggs are not dependent on the horse licking them to hatch. After

hatching, G. intestinalis larvae are licked into the mouth. g. nasalis burrow under the skin to the mouth, there wandering through the mouth for about a month before migrating to the stomach for overwintering.

Effects of parasite if left untreated - Horses that show no outward signs of illness can be severely infested, giving no clue of the potential damage occurring inside. However, some horses do show signs of infestation, including an inflamed mouth area and stomach irritation. Infestation with bot larvae may cause holes in the stomach lining. If the infestation is severe, the opening from the stomach to the intestines may be blocked, which can cause irritation, ulcers and even colic. The burrowing larvae can cause small tears in the skin, which can become infected. "Dive bombing" adult flies cause nervousness in horses.


Bot eggs on leg hair

Three Species of Bot Fly:

1. Common horse bot - *Gastrophilus intestinalis* **Legs, sides, flanks*
2. Throat bot - *Gastrophilus nasalis* **Under the head, neck, mane*
3. Nose bot - *Gastrophilus haemorrhoidalis* **Muzzle*

http://www.wisc.edu/ansci_repro/101equinelab/parasites/general.html