

## The Oklahoma Cooperative Extension Service Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education

for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.

- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.



# Common Internal Parasites of the Horse

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### *Ascarid (Roundworm) Parascaris Equorum*

The horse roundworm is a very large (females may be up to 15 inches long), yellowish white nematode (worm) that may pass in the feces of foals and young horses. Typically, adult horses develop immunity to this parasite; therefore, roundworms primarily infect horses less than two years of age. The life cycle of the roundworm starts when the foal or yearling consumes grass, feed or from surfaces such as feeders, stall walls or water contaminated with the eggs. Adult females pass eggs into the horse's feces, where they spend about 10 days in the environment before they are capable of infecting a new host. Development of the egg to second stage larvae requires the correct temperature (25 to 35 C), but once developed to that stage, these hardy larvae can persist for 5 to 10 years. The eggs hatch larvae that burrow into the small intestines, migrating through veins to the liver, heart and eventually the lungs. After migrating in the air spaces of the lungs, the parasite larvae are coughed up and swallowed. The roundworm larvae are returned to the small intestine, where they mature to egg-producing adults, completing the life cycle. The life cycle takes about three months. Physical damage such as inflammation and scarring of liver and lung tissue occur in the horse during migration. Adult roundworms can cause physical damage, ranging from mild digestive upset and lower feed absorption, to severe colic, due to intestinal blockage or intestinal rupture. Intestinal blockage is more likely following the use of an effective anthelmintic or dewormer, as the now dead parasites essentially bind up in the intestine. Clinical signs of roundworm infection may include unthrifti-

Internal parasites represent a significant health threat to horses. Internal parasites (worms) are organisms that live a portion of their life cycle in a host animal. They live in internal organs, body cavities and tissues, and gain their nutritive source by feeding on the host animal and ingested nutrients. Part of their life cycle also occurs in the external environment, typically pastures. The horse is affected by many different species of parasites. The nature and extent of damage varies with the parasite. Parasites cost the horse owner in several ways:

- It is expensive to feed parasite burdened horses (they require more nutrients).
- Parasites rob the horse of intended nutrients.
- Parasites can cause anemia.
- Parasitized young horses grow slower.
- Parasites can reduce reproductive and athletic performance.
- Parasite burdens can suppress the horses' immune system, making them more susceptible to other infections.

### Signs of Parasitism

The signs of parasitism are common among different parasites infecting the horse and include:

- Weight loss
- Dull, rough hair coat
- Potbelly
- Decreased stamina or lethargy
- Coughing
- Diarrhea
- Colic
- Tail rubbing

There are numerous internal parasites that can infect horses, but only a few commonly cause significant health problems. It is important to understand the life cycle of these parasites. Successful prevention and control programs are effective because they interrupt the life cycle of parasites. The primary class of internal parasites that cause health problems for horses are nematodes (such as large and small strongyles), roundworms and tapeworms. Other internal parasites of minor significance such as threadworms, pinworms and botfly larvae are often considered when designing a parasite control program.



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ness, potbelly, rough hair coat and slow growth. Some young horses develop nasal discharge accompanied by a cough as a result of larvae migration. Many roundworms have developed resistance to the common dewormers, which is a significant issue in the control of roundworm infections in young horses. Additionally, there is evidence of adaptation of these parasites to overcome acquired immunity as their presence is becoming more frequent in adult horses.

### Strongyles (large and small)

Strongyles are grouped as either large or small but their eggs are indistinguishable in the manure. The adult form of all strongyles (large or small) live in the large intestine. Adult strongyles produce eggs that are passed in the feces, thus contaminating the environment. These eggs then develop into larvae that exist on the pasture vegetation. The larvae molt three times before it is ready to infect the horse. The larvae use moisture on grass to crawl up the blades of grass to be more readily ingested. The larvae can crawl up or down multiple times waiting for a host, or even burrow into the ground when the weather isn't favorable. Heavy rains are also an effective medium for dispersing larvae through the pasture. Consuming grass, feed or water contaminated with larvae infects the horse. These larvae are very resistant to harsh environmental conditions because of a protective sheath. These parasites can survive freezing weather, but a hot and dry environment will often kill them. Larvae can survive up to 31 weeks at winter temperatures, compared to up to seven weeks at summer temperatures. In contrast to ascarids, strongyle larvae can only survive in the environment for approximately one year, making them easier to control through good management practices.

The larvae of large strongyles migrate through various parts of the body. One large strongyle species (*Strongylus Vulgaris*) will burrow into and migrate in the walls of the arteries that are the primary blood supply to the small and large intestines. This migration can result in disruption of blood flow to the intestines by the formation of blood clots, resulting in colic. After approximately 120 days, the larvae move to the lumen of the large intestine where maturation is completed. As adults, these parasites will lay several thousand eggs each day, completing the life cycle. The entire life cycle takes six to seven months.

Other species of large strongyles have similar life cycles, except their larval migration is primarily in the liver. This migration results in damage to this organ, but it is not as dangerous



as the migration through the intestinal blood supply. These strongyle larvae also return to the large intestines where they mature into adults but their life cycle is approximately eight to 11 months.

The use of effective chemical (dewormers or anthelmintic) compounds has dramatically reduced the prevalence of large strongyles. Today, because of the reduction to near elimination of clinical diseases caused by the large strongyle, the small strongyle is considered to be the number one nematode and most common intestinal parasite of adult horses. Horses severely infected with small strongyles may exhibit clinical signs, such as sudden onset of diarrhea and colic. Horses can be infected with small strongyles and not show overt signs of disease. Small strongyles have been implicated to cause subclinical effects such as decreased feed efficiency, rate of gain and performance.

The life cycle of the small strongyle (cyathostomins) is very similar to large strongyles, except the larvae do not migrate beyond the wall of the intestines. The larva will burrow in or encyst in the wall of the large bowel for several months before becoming adults (mature worms). It is not known if the final migration of the larvae and complete maturation is actually held in check by the horse's innate immune system, the 'sensing' of the climate conditions that are unfavorable for development of larvae or by the presence of adult strongyles in the lumen of the intestine. It is hypothesized that the adults provide feedback to the larvae to prevent over competition for resources.

Regardless, when the larvae slow their migration, they become encysted within the intestinal wall by the immune cells. Here, they can reside up to two years before taking their place as adult worms in the intestine. Sudden emergence of the larvae is known as cyathostomiasis, and can follow deworming that removes the adults, or in response to favorable conditions for development in the pasture. Significant inflammation and injury to the intestinal wall can cause profuse diarrhea and can be fatal. The severity of clinical signs is related to the degree of damage to the intestines, which varies with the level of infection. Unfortunately there is no current test available to assess the larval burden in the horse.

Female adult small strongyles produce a tremendous number of eggs, and are typically the primary parasite egg seen in the feces of the horse. There are only a few types of chemical dewormers that can effectively treat the encysted larval stage. Unfortunately, many small strongyle populations have developed resistance to the common chemical dewormers, making control more difficult in certain situations.

### Cestodes (Tapeworms) *Anoplocephala perfoliata*

Tapeworms are a member of a class of internal parasites called cestodes. The adult equine tapeworm is a flatworm, approximately 3 inches in length. The life cycle of this parasite requires an intermediate host, which is a tiny pasture mite that feeds on horse feces. Gravid segments (or those carrying eggs) of the tapeworm break off and pass through the horse with the ingesta. But, in contrast to the more common cestodes in cats and dogs where these segments are easily visualized, the proglottids disintegrate in the intestine, releasing their eggs into the feces. When the mite consumes tapeworm eggs in an infected horse's feces, the egg will develop for several months inside the mite into the infective cysticercoid stage of the tapeworm. Another horse can then become infected

with tapeworms by consuming grass or hay contaminated with mites containing this infective stage. There are typically millions of these pasture (oribatid) mites on a pasture. Adult tapeworms live or attach to a horse's intestines at the ileocecal junction, or where the small intestine terminates at the cecum. Heavy infections of tapeworms can cause inflammation, ulceration and thickening of this area of the intestines. The injury to the intestines can be severe enough to cause obstruction or other serious intestinal abnormalities, which may result in acute intestinal pain and may require surgery. Pasture-housed horses are at a greater risk of tapeworm infestation. There does not appear to be any age-related immunity to tapeworms, as they are found in all ages of horses. There is also a higher prevalence of tapeworm infection in horses in more northern climates, suggesting they may be less heat tolerant, and conversely, show greater tolerance of cold temperatures.

### *Strongyloides Westeri* (Threadworm)

*Strongyloides* is an intestinal parasite that can infect foals as early as four days of age. A foal becomes infected by ingestion of larvae in the dam's milk or by penetration of the foal's skin by infected larvae in the bedding. However, the larvae are not present in colostrum. The larvae migrate through the lungs and the small intestine. The life cycle can be completed in less than two weeks. This creates the potential for severe infestations in a relatively short time. Foals will quickly develop immunity to these parasites and the intestinal infection of adult parasites will disappear by 60 to 90 days of age. The primary medical problem a strongyloides infection may cause is diarrhea that may not respond to treatment. Some foals will become dehydrated and develop other problems related to chronic diarrhea. Treatment of mares with an anthelmintic effective against strongyloides within 24 hours of birth significantly reduces transmission of this parasite to foals. In general, *Strongyloides westeri* have become relatively rare due to advent of anthelmintics (dewormers) effective in their treatment.

### Stomach Bots *Gasterophilus* spp.

Stomach bots are not worms, but rather the larvae of the botfly. Female botflies lay their eggs by attaching them to the hairs of the horse. Different species lay their eggs on different parts of the horse's body (legs, jaw, lips, etc.). The eggs are tiny, yellow/orange in color and attach to the hairs of the legs or throat. The eggs on the legs are stimulated to hatch by the lip action and warm saliva as the horse licks its leg. The eggs around the nostrils and lips spontaneously hatch in one to one and a half weeks. Larvae attach and burrow into the tongue and gums of the mouth and incubate there for three weeks. Bot larvae can cause small ulcers on these areas of the mouth. After incubation, they are swallowed and attach to the lining of the non-glandular or upper part of the stomach or the duodenal ampulla. Bots spend approximately nine months attached to the stomach lining before passing in the manure. This typically occurs in late winter to early spring. These larvae pupate into adult flies. The life cycle depends on the parasite larvae overwintering in the stomach, then passing out in the manure in spring, subsequently developing into adult flies.



The adult flies are active from late spring to the killing frost in the late fall and can be very annoying to the horse. Botfly larvae likely cause minimal damage to the stomach, but may cause problems such as obstruction or damage to lining of stomach if present in large numbers. However, until these parasites are proven not to cause damage, their control should be considered in any parasite control program. It is recommended to routinely remove bot eggs from the horse's hair coat. When handling horses with bot fly eggs on their hair, use caution. While rare, the larvae are capable of burrowing into human skin, and if one rubs their eye after handling bot eggs, the larvae can actually invade the eye or other skin surfaces. Always wash your hands and avoid rubbing your eyes if handling horses with bot eggs on their hair.

### *Oxyuris equi* (pinworms)

Pinworms are one of the causes of tail rubbing in horses. The female crawls out of the anus and lays her eggs on the skin in this region. As a consequence of rubbing, horses can spread pinworm eggs throughout the horse's environment. Transmission can occur in stalls and from contact with grooming materials, tail wraps, fence posts, etc. Furthermore, pinworm eggs are hardy and can persist on the perianal region and in the environment for relatively long periods of time. Use of dewormers should always be followed by a thorough cleansing of the area under and around the tail and anus to prevent reinfection.

For information on parasite control, see Fact Sheet VTMD-3976, *Control of Internal Parasites in Horses*.

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