

# Small Strongyles.....A Big Problem!

## What All Horse Owners Should Know

by: Dr. Jessica Young

Mother Nature has been tough on horse owners in Iowa these past two winters, with extreme temperatures, record snowfalls, and ice storms. This past weekend wasn't any different, as temperatures were well below what they should be for this time of year. I had just gotten inside the house from the barn to thaw out when I got a panicked call from a client. Two of her young miniature horses had died suddenly during the cold snaps, and now two days later a third miniature horse, "Maggie", was getting sick.

"The first one I lost I attributed to the cold weather and her being small and not very hardy," she said. "The second one really made me worry, and now I am just plain scared and I want to know what is going on."

We talked on the phone and I asked her the same questions I ask all horse owners when talking about their sick horse: How is her appetite? What has her stool production been like? Is she running a temperature? Has she been acting colicky? Has she been vaccinated and regularly de-wormed? Anything toxic she could have been exposed to? Has there been a change in her feed?

The client said that the mares that had died had only been at her place since the past fall, but she was fairly certain that they didn't have much preventative veterinary care before she got them. Since coming to her barn, they had been vaccinated and regularly de-wormed, and the feed was the same that all of her other healthy horses were eating. "They were dropping a little bit of weight over the last few weeks," she said, "but I was feeding them extra and they were eating well, so I thought the weight loss was just due to the extremely cold temperatures." We talked a little more and determined that they were being fed plenty for their size and for the cold weather conditions. The client told me with much distress in her voice, "I'm scared to go out in to the barn in the morning; they suddenly stop eating the night before and they are dead the next morning. Please help me figure out what is happening to my animals. They are my family."

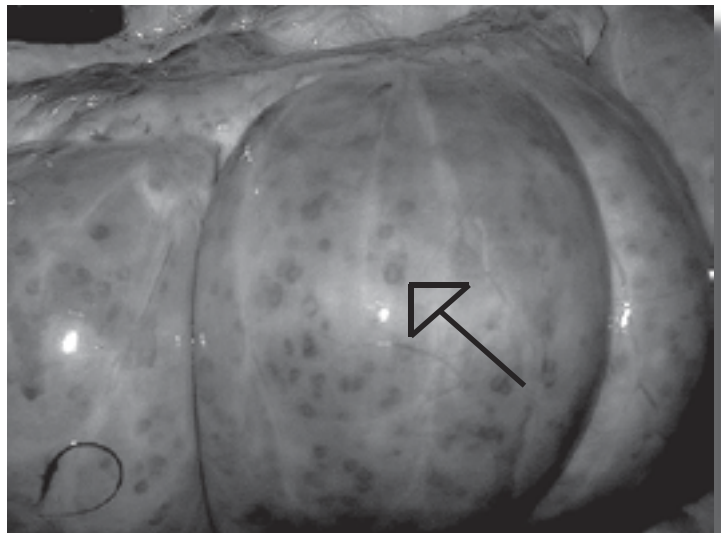
When I got to the farm to examine "Maggie" she was standing in the corner of the stall with her head hanging and her eyes were glossy and unresponsive. She was extremely weak, and it looked like she was having difficulty even standing. She was also so dehydrated that I was unable to find a vein through her thick winter coat to pull blood for analysis. I told the client that if we didn't get her to the clinic in a few hours for intravenous fluids and supportive care, we were likely to lose her within a matter of hours. The country roads were blown shut with snow from the gusty winds the night before, so pulling a horse trailer was too dangerous. Undeterred, the client put "Maggie" in the backseat of her truck and drove her to the clinic.

After arriving at the clinic, we were able to clip some hair and get blood pulled, and we ran a fecal analysis to check for parasites. Blood work showed exactly what we were expecting: extreme hypoglycemia (low blood sugar) and dehydration, and

pronounced anemia (low red blood cell count). The fecal exam did not reveal any parasite eggs.

Unfortunately, "Maggie" was too far gone for us to save her; an hour after arriving at the clinic and while receiving intravenous fluid therapy, "Maggie" died. I had warned the client that she was very sick and she had a lot of tough hurdles to get over, but I still didn't want to have to make the call to tell the client that she had lost yet another horse. After speaking for a while about what could be going on, we decided to do a post-mortem examination (necropsy) on "Maggie" to see if we could get some answers. We would take samples of all the major organs and send them to a laboratory for microscopic analysis if the cause of death was not obvious.

When we started the necropsy, gross visual examination of the large colon made the cause of death very apparent: "Maggie's" large intestine was full of encysted small strongyle larvae (see figure 1).



**Figure 1.** Encysted small strongyle in the lining of the large colon.



**Figure 2.** Thousands of red, late stage small strongyle larvae inside the large intestine.

When we opened up the large intestine, there were thousands to millions of late stage small strongyle larvae everywhere (see figure 2, previous page). Despite a negative fecal exam and a regular de-worming schedule, "Maggie" had died from parasites after all. Wanting to know if this is what had killed the other two horses, we did a brief necropsy on the second mini that had died. Sure enough, we didn't get very far into the exam when we saw hundreds of larvae through the wall of her colon too. No doubt about it, small strongyles were killing these horses.

"I don't understand," the client said, "I have wormed these horses and their fecal exam was negative!"

"Maggie's" history is a scary one and one that rings true for small strongyle infections. Almost always, the horses have been regularly de-wormed and the fecal analysis is negative. Unfortunately, there is a unique feature of the parasite's life-cycle that makes them resistant to standard de-worming protocols, and that is the encysted larval stage that most horse owners don't know about.

Small strongyles are considered to be the most important and most dangerous internal parasite of horses. Adult small strongyles are small white worms that live in the large intestine of horses. The adults lay eggs in the large intestine and the eggs are passed in the feces. Under the right environmental conditions, (temperature, humidity, and vegetative cover) the eggs eventually develop into third stage larvae, which are the infective stage of the parasite eaten by horses while grazing on pasture. The larvae are the "teenager" stage in the life cycle of the parasite and are not reproductively active (only the adult female worms lay eggs): therefore, horses with large infections of strongyle larvae can still have a negative fecal exam (no parasite eggs are present in the feces on microscopic examination).

Once ingested, the third stage larvae have the unique characteristic of being able to burrow into the lining of the large intestine. Once this happens, a cyst forms around the larvae, and the larvae can become dormant for up to two years under the right conditions. During this encysted stage, the larvae are resistant to standard de-worming protocols. Once they develop into the fourth stage larvae, they break free from the cyst in the lining of the large intestine and develop into reproductively active adult worms. The synchronous rupture of high numbers of encysted larvae causes inflammation of the lining of the intestinal tract and can cause weakness, weight loss, anorexia, recurring colic, diarrhea, and death in severe cases. Less severe infections can cause dull hair coat, intermittent soft feces, decreased performance, decreased growth rate, and various forms of colic.

Researchers think there is an annual cycle in small strongyle development and survival. In Northern climates, large numbers of small strongyle larvae are present in pastures during the spring, summer, and fall months. As the days begin to shorten and temperatures begin to drop, the larvae encysted in the lining of the large intestine become dormant during the winter months while environmental conditions

aren't favorable for development. Once temperatures begin to rise in later winter and early spring, larvae begin to emerge from the intestinal lining and mature into adults for reproduction through the summer months when conditions are favorable for the eggs to hatch and develop into infective larvae. This is when clinical signs in horses usually start to appear.

Controlling small strongyle infections in horses is a matter of understanding transmission, proper pasture management, and correct timing with an anthelmintic (de-wormer) treatment. Larval counts can be extremely high on overgrazed pastures, and removal of manure becomes critical to decrease the number of eggs in the environment. Infective larvae can survive freezing temperatures and snow cover. Winter temperatures only delay egg development which resumes once temperatures rise. Harrowing should not be done on occupied pastures because under favorable conditions of warm temperatures and high moisture this could actually disperse infective larvae. Fresh manure should also never be spread on grazing pastures, and manure piles should not be allowed to drain where horses graze. If spreading manure, make sure it is properly composted to ensure that the eggs are destroyed.

Paddocks (areas of turn-out with no vegetative cover) and stalls are not areas of high transmission. Larvae are least resistant in hot, dry conditions and require vegetation to provide the correct microclimate of temperature and humidity for development. Stalls generally have manure removed regularly and are too dry for egg development. Stalls that are wet are generally that way from excessive urine accumulation which is toxic to egg development as well.

In today's society, horses have limited grazing areas. Ideally, you should have 2-3 acres for each horse, but more commonly horses are being pastured on less than a quarter acre per horse. This means that reducing fecal contamination is almost impossible. Therefore, strongyle control programs are targeted at reducing the number of eggs in the feces and implementing strategic de-worming programs.

Treatment of encysted populations of small strongyle larvae requires special de-worming protocols. There are only two types of de-wormer that are effective against the encysted larval stage of small strongyles, moxidectin (Quest<sup>®</sup>) and fenbendazole (Safe-Guard<sup>®</sup>, Panacur<sup>®</sup>). Fenbendazole must be given at twice the standard dosage for 5 days in a row (Panacur<sup>®</sup> Powerpac, Safe-Guard Power-Dose<sup>™</sup>) to kill encysted larvae. Research has reported that the larvicidal dose of fenbendazole is the most effective treatment, so this is what most veterinarians will recommend. Larvicidal doses of fenbendazole should only be administered under the advice of a veterinarian as potential serious side effects could occur if not given correctly. Generalized de-worming protocols are also not practical for all horse owners, and programs should be developed individually for each situation. For control of small strongyles and other parasite populations within your horse herd, contact your local veterinarian for more information.