



Down on the Farm

Tapeworms In Horses

by **HEATHER SMITH THOMAS**

Different types of tapeworms parasitize different species of animals. The tapeworms seen in dogs and cats (egg-containing segments of worms in their feces) do not live in horses, and the tapeworms that live in ruminants (cattle, sheep, etc.) are also different from the ones that infect horses.

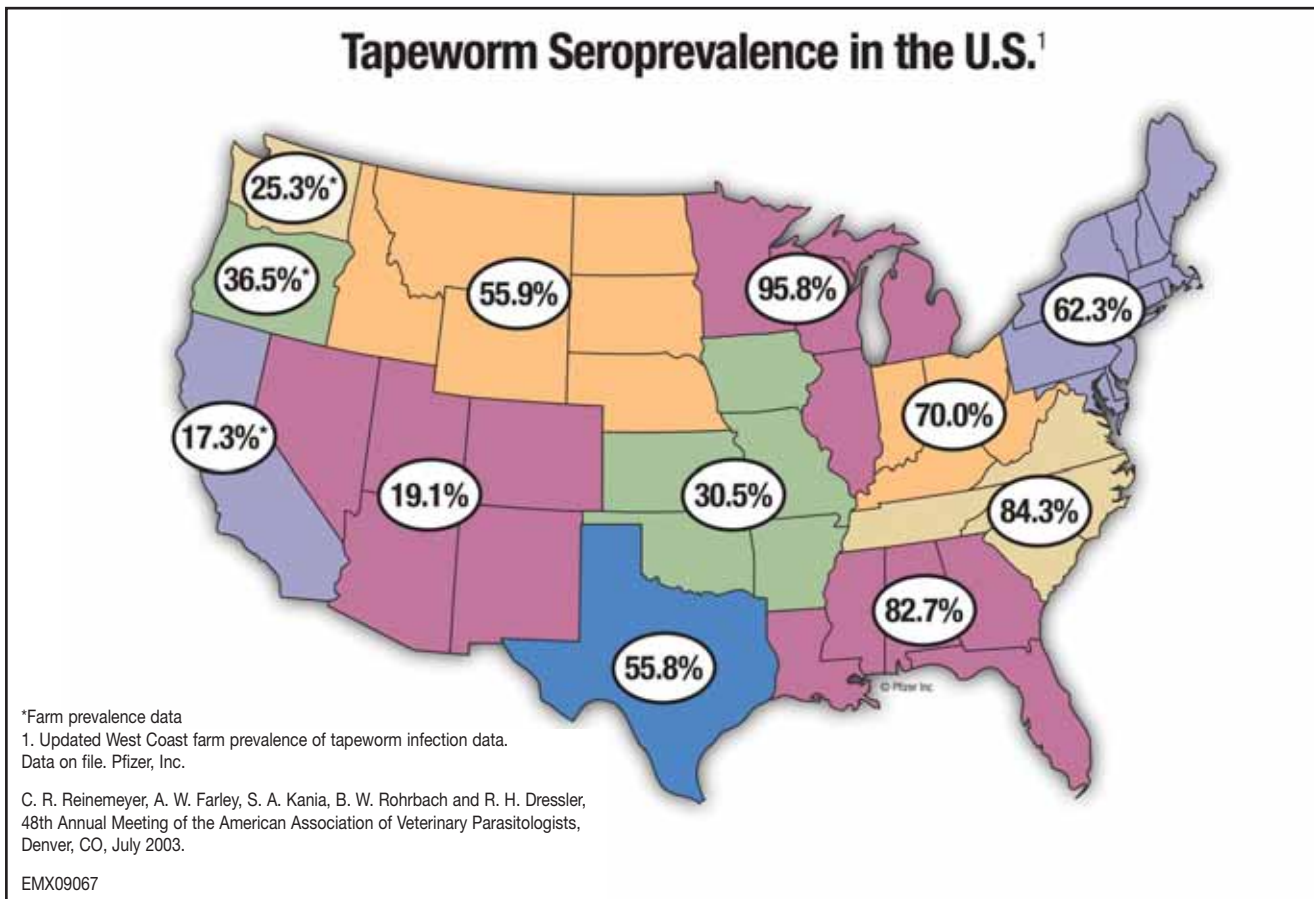
Tapeworms pose a greater risk in some regions than others. In the upper Midwest (Wisconsin, Illinois and Minnesota), for instance, more than 90 percent of the horse population has been exposed to tapeworms. The risk is lowest in arid regions of the West and Southwest. An updated study (published in 2009) using 600 samples from 300 farms in Washington, Oregon and California, showed that tapeworm prevalence on West Coast farms was higher than had earlier been presumed. The new study showed tapeworm exposure on 23.3 percent of Washington farms, 38.5 percent in Oregon, and 17.3 percent in California.

Prior to 2003, there were no deworming products specifically designed or labeled for tapeworm control, and most horsemen didn't worry about these worms. Today, however, there are several products available for use against tapeworms. Many veterinarians feel horses should be treated for

tapeworms once or twice a year. Tapeworms are hard to diagnose, so you can't always tell whether your horses have tapeworms or not—some horsemen add a product for tapeworms to their annual deworming schedule, just to be safe. If you know you have tapeworms on your farm, it's wise to deworm for them two or three times a year. On most farms, however, even just a once a year cleanout is a good idea. There may soon be a new diagnostic test that can show whether or not your horses actually have these worms.

Products For Tapeworms

Craig Reinemeyer, DVM, PhD (formerly on the faculty at the University of Tennessee College of Veterinary Medicine and now President of East Tennessee Clinical Research), has been doing studies on equine internal parasites—and drugs to control them—for many years. Today, horsemen have several options for the control of tapeworms. These drugs include: combinations of moxidectin and praziquantel (the latter kills tapeworms), marketed as Quest Plus and ComboCare; combinations of ivermectin and praziquantel, marketed as Zimecterin Gold or Equimax Paste; and Pyrantel Pamoate Paste, marketed by IVX Animal Health. Pyrantel Pamoate



Paste contains the same chemical as Strongid (which was often used in early years at double dosage for tapeworm control) but is sold in a different concentration and dosage (13.2 mg per kg), says Reinemeyer.

"In addition to the original Strongid, there are generic pyrantels on the market for deworming, but the new formulation is the only one labeled and approved for tapeworms. Technically, a veterinarian could not recommend the others for tapeworm control since there is now an approved pyrantel product available," he explains.

"All the approved anthelmintics are more than 95 percent effective against tapeworms, and the FDA only requires 90 percent efficacy for a label claim," he says. When trying to control tapeworms, it's wise to occasionally alternate products, to prevent future resistance problems. The products that we've been using for decades to control strongyles and ascarids are all experiencing resistance issues and we don't want that to happen with tapeworms.

"At a parasitology conference I attended a few years ago, I suggested that horse owners start considering rotation of products for tapeworm control. Six years ago, we had no resistance problems in ascarids which are probably the most important worms in juvenile horses. Since then, however, some failures of ivermectin and moxidectin have been reported in the scientific literature, and I've observed them in the field," says Reinemeyer. "The diversity of new products for tapeworms offers a great chance to get ahead of the game in preventing resistance. Horsemen should seriously consider rotating these products," he says. It may buy us more time in the future by delaying the emergence of resistant tapeworms.

"There seems to be a recurring pattern with parasites of livestock, that once we have some effective chemicals available to treat them, the basic research slows down or stops. The urgency is gone. In the long run, this is a short-sighted way to look at things because none of these deworming products work forever." If the research effort is discontinued, we won't have any new strategies or products to control the parasites once these worms develop resistance.

"We are currently facing serious resistance issues with other equine parasites. We are starting to see more populations of ascarids that are resistant to ivermectin and moxidectin, and I think we also have the same thing going on with pinworms," he says.

Strategic recommendations for controlling tapeworm infections would be very useful for horse owners and practitioners, yet this hasn't been investigated, he says. "Right now veterinarians are just recommending seasonal treatments. The most common pattern would be deworming in spring and fall, but we can't really say how well that's working. People seem to be satisfied with it, but how do they know? It's very difficult, at this point, to diagnose tapeworm infections, so most horse owners are flying blind," says Reinemeyer.

Diagnosics

"There is no currently available test that can accurately determine whether or not an individual horse is infected

with tapeworms," he says. Horse owners and veterinarians hope that there will eventually be better tests. There is promising research in this direction, which may be of help in the future. The hard part in developing an accurate diagnostic test is the difficulty in finding known negatives and known positives, to check the validity of any diagnostic test.

In some of the present research, fecal samples were taken from horses known to have tapeworms. "Some of these were proved by finding tapeworm eggs repeatedly in their feces. Other specimens came from horses who were necropsied for various reasons and tapeworms were actually seen in their intestinal tract. Samples from those horses were classified as known positives," says Reinemeyer.

"It was much harder to come up with known negative samples. Since tapeworm eggs are so hard to find, the absence of eggs proves nothing about a horse's infection status. A negative sample does not necessarily mean the horse does not have tapeworms. The only way to get a confirmed negative sample from a horse is post mortem. You have to look within the intestinal tract of a horse, recovered at necropsy or from a slaughterhouse," he says.

"The validation for any diagnostic test should yield and evaluate two important characteristics—sensitivity and specificity. Sensitivity is the ability of a test to correctly identify an infected animal. If 10 horses in a pasture all had tapeworms and a test you ran indicated that five of them were positive, then the sensitivity of that test would be only 50 percent."

The other criterion is specificity. "This is the ability of a test to correctly identify an uninfected animal. If you tested 10 horses who were not infected with tapeworms and the tests indicated that nine were negative and one was positive, then the specificity of that diagnostic test would be 90 percent because it incorrectly identified one of the 10. No diagnostic test is absolutely 100 percent specific and 100 percent sensitive," he says.



Deworming a horse



Down on the Farm Cont'd.

"Any test for tapeworms with a high specificity would be very good, but sensitivity is probably more important (for tapeworms), because that criterion would identify an infected animal, herd, farm or premise, to know whether or not you actually have a tapeworm problem," he explains.

"Some people (and I've heard this argument from pharmaceutical companies) ask why anyone would want to spend \$15 to \$20 on a diagnostic test when you can go ahead and treat a horse safely and effectively for the same or even less money. It's a logical question. But the answer is that once we finally have good diagnostic tests we would then have the tools to eradicate this parasite on a lot of farms. The products are available now to do this," says Reinemeyer.

"The efficacy of praziquantel, for instance, is literally 100 percent. If you know you have a problem, you could attack it and get rid of it. Another potential benefit of an accurate diagnostic test is that it could foster more research. The frustration of trying to do any research now is that you really can't determine the tapeworm infection status of every member of a herd. Consequently, we can't answer important questions such as: How soon do foals first get infected? Do horses stay infected all through the year? How long can pastures remain infective for new horses brought onto the farm?" There are all sorts of questions we can't answer right now and an effective diagnostic test would be the most important tool for facilitating applied research.

"Right now we don't really know when to treat, or how often to treat, in order to eradicate the problem. If we can eradicate tapeworms on a farm, perhaps we will begin to recognize health problems in horses whom we don't presently associate with tapeworm infection. We do know tapeworms can cause colic and some severe gastrointestinal upsets. But those are extreme circumstances. What we don't know about tapeworms is what the average infection does to the average horse." Horses with tapeworms may have reduced performance, increased susceptibility to certain disease conditions, or other minor problems we're not aware of.

"Right now, since we don't have the tools to detect tapeworm infection in living animals, we can't measure and compare those things. There's a possibility that eradicating tapeworms in horses might reduce some digestive disturbances that show up as colic."

Another area of deficient knowledge concerns the biology of equine tapeworms. One of the things we don't know is how tapeworm infections cycle through the calendar year. "Most parasites reproduce on a very seasonal basis, which is a logical thing for them to do," he says. For the life cycle of a parasite to continue, the eggs are passed at a time of year when there is enough warmth for them to hatch and forage plants for hatching larvae to crawl onto. The eggs passed in feces must be able to hatch and develop to an infective stage, so they can be present on forage that grazing horses can ingest them. Most equine parasites are not reproducing during

the seasons when environmental conditions are unfavorable for these processes.

"We don't know if this seasonal pattern occurs with tapeworms. The present diagnostic test for equine tapeworms relies on seeing eggs in the manure, which means that the worm is reproducing. If there is a period of several months when tapeworms stop producing eggs, our test is fruitless during that time," he says.

A more accurate test that could detect an infection any time of year is needed, whether or not the worm population is reproducing. A DNA test would be effective, since DNA is always leeching out of worms whether they are reproducing adults or immature juveniles. If the worm is there, it could be detected.

DNA tests are now being used for many things and horsemen are hoping that research will come up with a DNA diagnostic test for tapeworms. Horse owners who have never treated for tapeworms might have their veterinarian use a test like this just to see whether or not their horses actually do have tapeworms, and owners who have been treating for these worms may use it to see if they need to keep treating.

"One unfortunate aspect of this type of technology is that it may not be readily available as an on-farm test. A practicing vet would not be able to make an accurate diagnosis during the farm visit, and would have to wait for results from a referral lab. But right now, the only absolute way of determining infection status is by post-mortem examination," he says.

We need better tests than running fecal checks to find tapeworm eggs, since the sensitivity of this type of test is probably less than 20 percent, according to Reinemeyer. "Normally a diagnostic test that's only 70 to 80 percent sensitive is not looked upon too favorably, but in this case it would be seen as a huge improvement. A new, more effective test would be a very good research tool, and eventually it would help us do more things out in the field—both by supporting research and by helping develop other testing procedures."

Life Cycle Of The Equine Tapeworm

The most common type of equine tapeworm depends on an intermediate host, the oribatid mite, to complete its life cycle. These tiny pasture mites help decompose organic matter, and may exist by the thousands in a square foot of soil. The tiny mites help break down equine feces and in the process they ingest any tapeworm eggs expelled in manure. The eggs hatch inside the mite and develop into an infective stage (in two to four months) in the body cavity of the mite.

Horses become infected with tapeworms when accidentally consuming some of the mites as they graze the pasture, or eat hay or bedding containing these tiny creatures. As the mites break down in the horse's digestive tract, their bodies release the infective stages (cysticercoids) of the tapeworms. The immature parasites then develop into adult worms that attach to the junction of the small intestine and the cecum. They stay there, feeding on the intestinal lining where they mature and reproduce. Their eggs are passed on out of the horse in the feces, to continue the cycle. 🐾