What's On The Horizon For Parasite Control

Dennis French

By Aleta Walther

Among the plethora of studies and research dedicated to improving equine health, the war against internal parasites has made some of the biggest strides. The most effective dewormer to result from the last 20 years of research is Ivermectin. That anthelmintic's claim to fame is its ability to kill internal parasites in both the larval and adult stages—large and small strongyles, ascarids, adult pinworms, and bots. More importantly, after 13 years on the market, there have been no documented cases of Ivermectin resistance by equine adult small strongyles. Ivermectin is distributed by MSD AgVet and has been on the market since 1983.

While Ivermectin is the current marvel among oral drench and paste dewormers, there are some very promising products on the horizon of equine research. One is still in the development stage, and two others are currently under scrutiny by the U.S. Food and Drug Administration (FDA).

A Fungus Among Us

One of the most exciting possibilities for controlling worm infestation is not a drug at all, but a naturally occurring fungus that eats parasite larvae in the environment.

Among those enthusiastic about the fungus potential is Dennis French, DVM, who specializes in animal parasitology and is affiliated with Louisiana State University, Baton Rouge. French and colleague Thomas R. Klei, PhD, have worked on numerous parasitic-based research projects, including evaluations of several anthelmintics, among them Ivermectin.

"It is quite an interesting concept," said French of the fungus. "We have not used it yet, but I am encouraged by its potential."

The bulk of the fungus research is being done by Peter Nansen and his colleagues in Denmark. Nansen has identified several species of the fungus that might be effective in parasite control.

Nansen proposes mixing the fungus in the feed of horses and cattle. This way, the fungus is digested and intermingled in an animal's feces. When the animal defecates, the fungus is passed out of the animal, along with parasitic larvae. It is in the manure, on the ground, where the fungus interrupts the parasite's life cycle. It does this by feeding on the larva that is either active in the feces when it is eliminated, or that hatches after the feces is expelled by the horse.

The fungus literally breaks the life cycle by "capturing" the larva and holding it in the fecal pat (manure pile), French explained. Since the larva cannot migrate, it cannot get onto grasses and weeds where it would again be ingested by the horse. The fungus is a

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Worming horses is important to protect against different parasites, such as roundworms in the intestine (left) and bots in the stomach. Since there are many different types of parasites and anthelmintics, your veterinarian should be consulted to assist you in a complete herd health plan.

Bob Langrish

natural blocking agent that does not allow the larva to get loose to re-infest the horse.

When given the choice, horses prefer not to graze close to manure, thus larva held by the fungus in the manure have little chance of infesting a horse.

When one considers how many eggs or larva a horse can pass a day, it's easy to imagine how the fungus will have a colossal impact toward parasite control. French said a heavily infected horse can pass as many a 1,000 to 2,000 eggs per gram of feces dropped. The average horse drops 35 pounds, or about 1,600 grams, of manure daily—that is 1,600 grams times 1,500 eggs, or 24 million eggs or larvae a day.

"That's a lot of eggs," French said. "This is where the advantage of the fungus lies. If we can control the parasite in the feces, we greatly reduce the potential for re-infestation."

Because the fungus is a biological compound, French is optimistic it will receive FDA approval for distribution as a parasite control product. French does not know, however, when the product will be submitted to the FDA or how long it will take to get through the bureaucracy.

New Anthelmintics

French doesn't expect the fungus to be commercially available for several more years. However, there are two other parasitic compounds currently wending their way through the FDA. The new compounds are of the Avermectin family, Moxidectin and Doramectin. French expects that they might be on the market within two years. Doramectin was developed by Pfizer Animal Health, and Moxidectin was developed by American Cyanamid. Moxidectin is currently in use in Australia and New Zealand.

Both of these compounds appear to have some efficacy against resistant small strongyles in the horse's gut, he said.

French and Klei participated in clinical trials for Moxidectin. Their trial research determined that Moxidectin had efficacy similar to Ivermectin against all common adult and larval gastrointestinal nematodes. They also found that Moxidectin was less effective than Ivermectin against *Gasterophilus intestinalis* (bots). Moxidectin and Ivermectin were both ineffective against *Anoplocephala perfoliata* (tapeworms).

Whereas Ivermectin has had little efficacy against encysted cyathostome larvae, research on Doramectin and Moxidectin has found the two drugs to be more effective against the larva that burrow into the mucus membrane of the intestinal tract.

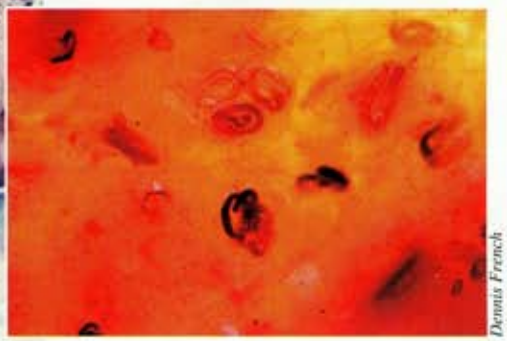
"Ivermectin has no effect on encysted forms even at elevated doses," French

Life Cycle Of *Strongylus Vulgarus*

Strongyles are fairly common parasites among horses and are found wherever horses graze. According to Dennis French, DVM, who specializes in animal parasitology and is affiliated with Louisiana State University, all horses become parasite infested sometime in their life and most have chronic infestation of some level. Whether or not a horse's health is affected by the worms will depend on the level of infestation.

During the warm and moist days of spring, parasitic larvae, or worms, hatch from eggs, which are found in manure that has been eliminated by an infected horse. The larvae migrate to surrounding plants and grasses and are ingested as the horse grazes. In the case of the bot fly, the fly lays its eggs on the hairs of the horses muzzle, legs, or shoulder. When the horse licks itself, the eggs are ingested and transferred to the stomach, where they hatch and attach themselves to the stomach's wall.

Worms have varying migration and developmental stages that take place in the horse's system. However, all produce offspring that are eliminated through the feces either as a larvae or eggs.—*Aleta Walther*



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This 2-year-old filly shows signs of infestation with larval cyanthomiasis (small strongyles). (Top right) A hemorrhagic cecum due to larval cyanthostomiasis; (right) cyathostome larvae.

explained. "But it is very effective in removing adults who lay the eggs which produce resistant babies. On the other hand, from our one study, it appears that Moxidectin has a dramatic effect on encysted forms of these small strongyles larvae."

This breakthrough in removing encysted larvae of small strongyles will be a boon to researchers who have recently determined that small strongyles are more damaging than previously thought.

"We used to think that small strongyles were not a problem," French said. "However, we are hearing of more and more reports that the larvae of these small strongyles actually cause some clinical problems (diarrhea) as they emerge from the lumen of the bowel. We also suspect that the small strongyles have a great impact on a horse's overall condition and can stunt a foal's growth."

French's contacts at American Cyanamid also informed him that studies in Australia and New Zealand are uncovering some exciting results. It appears that after treating a horse with Moxidectin, egg counts in manure are staying at, or near, zero for up to 30 weeks following treatments.

"If research and usage confirm the fact that Moxidectin can reduce egg counts as long as company officials say it can, I expect it will be well received by veterinarians and horse owners (in this country)," he said.

That potentially makes it a real nice tool, or drug, to use especially in highly intensive systems where egg shedding is an important factor in parasite transmission, French said.

"If you can knock out the shedding of parasites for 30 weeks, that is a tremendous benefit toward controlling re-infestation," he added.

No official or specific study information was available on Doramectin. Officials at Pfizer declined to offer any information on their product, saying they could not comment on the drug while under FDA consideration.

With the introduction of Doramectin and Moxidectin on the horizon, what will the best product be for parasite control? Will Doramectin or Moxidectin dominate the parasite control products industry like Ivermectin does now?

"The introduction of these products will

give us more tools to treat with," French said. "The advantage of having multiple products available is that one product may be more effective against a particular type of parasite, and another drug may be more effective against another. Moxidectin, for instance, has more efficacy against encysted small strongyles, whereas Ivermectin may be better against bots or large strongyles."

Having more anthelmintic drugs is an advantage, claims French. Flexibility allows horse owners and veterinarians to pick and choose products depending on a farm's individual situation and the horses being treated.

"Moxidectin will perhaps work better against some parasites when compared to Ivermectin," French said in conclusion. "What remains to be seen is how the products will interplay within the market. The success of one product over another will depend on what goes through the minds of veterinarians as they promote products, and what goes though the minds of horsemen when they compare and buy these types of products. Hopefully, they will base their choices on efficacy and the benefit to the health of the horse being treated first, and cost second."