



Deworming Demystified

You may not want to read this while dining on spaghetti, linguini, or - if you're exceptionally squeamish about worms, leeches and other slimy creatures - anything else

by Cherie Langlois

Common Ectoparasites

As if those blood-sucking parasites inside their bodies weren't enough, our animals also have to cope with a host of hungry external pests. Ectoparasites can transmit disease, lower milk production, and cause livestock to lose weight, become anemic and itch like crazy. Eco-friendly control methods include fly traps, parasitic wasps and good sanitation. Farmers also have many pesticidal weapons to choose from, including sprays, pour-ons and mineral additives. Always read the label and follow the manufacturer's directions.

Watch out for these notable nasties:

Flies: Stable, horn, horse, and deer flies suck blood and/or deliver annoying bites. Larvae of heel flies migrate through a cow's skin and body until they reach its back and exit via holes they cut into the hide.

Lice: These wingless insects plague livestock by biting, sucking blood, or dining on hair and scales. They can cause intense itching and hair loss.

Mites: A tiny spider relative, mites tunnel into skin to lay eggs or lay them at the base of hair and feathers. They cause several types of mange.

Mosquitoes: These notoriously blood-thirsty insects transmit several diseases, including West Nile virus which can kill horses, camelids, humans and other species.

Ticks: Another spider relative and disease vector, the tick latches onto its host to suck blood. Besides being unappetizing to contemplate, heavy internal parasite infestations in livestock can prove costly, time consuming and frustrating for farmers to deal with. They can also be deadly to our animals, a fact that was painfully impressed on Michelle Kutzler, DVM, a large companion ambulatory veterinarian at Oregon State University, when she was a young girl in 4-H.

"I lost Twig, my 21-year-old Thoroughbred mare, from an aortic aneurysm caused by the migration of strongyles. I was riding her when she fell down and died instantly," she says. "This was 20 years ago when our understanding of parasite resistances to anthelmintics was less clear. The recommendations included having a veterinarian deworm the horse annually through a nasogastric tube using a cocktail of anthelmintics which are no longer available."

Today we're fortunate to have a better understanding of parasite resistance and how to prevent it, as well as a hefty arsenal of easy-to-use dewormers and farm-management battle tactics at our disposal. The following worm-control basics, combined with a veterinarian's advice, can help you formulate or modify a deworming strategy that best meets your animals' needs.

A PARASITE PRIMER

Whether we like it or not, parasites are a fact of life for our livestock and for us. All living things on Earth—including many parasites themselves—play host to one or more exploitative organisms that live on or inside them, from microscopic protozoan to tapeworms reaching a nauseating 20 feet in length. Parasites make up the majority of species on our planet, and a number of them are justly feared because of the human diseases they cause such as malaria, African sleeping sickness and trichinosis. Not all parasites, however, pose a risk to us, or our animals. Indeed, a parasite that kills its host is pretty unsuccessful at the game of survival. In wild animals, a delicate balance between host and parasite seems to be the general rule.

When working out a worm prevention program on your farm, it helps to realize that each parasite species has a unique life cycle. The barber pole worm, one of the worst culprits affecting sheep and goats, has a life cycle involving adults that live



and breed in the gut. The parasites attach to the lining of the true stomach where they suck blood and body fluids and shed numerous eggs in the animal's dung. With the right conditions of moisture and warmth, the eggs hatch into larvae that pass through several stages until they become infective forms. Sheep and goats gobble these larvae with the grass, the creatures develop into adults, and the cycle repeats itself.

Another parasite, the liver fluke, needs two hosts to complete its life cycle. The adult lays eggs in the bile duct of a ruminant such as a cow or llama and the eggs pass into the animal's manure. After the larva emerges outside, it infects a snail, reproduces asexually, and later the juvenile fluke leaves to form a cyst on aquatic vegetation—ready to infect the first unwary cow that comes along. The cycle comes full circle as the fluke migrates back to the cow's liver and matures into an adult.

In general, mature, healthy livestock—like their wild counterparts—develop a degree of immunity to parasites, while young and old animals, and those under the stress of pregnancy, lactation, malnutrition or overcrowding are more likely to suffer ill effects from parasitism. Female sheep and goats, for example, experience an increase in parasites when the immune system becomes depressed around lambing or kidding time. "If you're going to have a problem with parasites, this would be the time," notes Ann Wells, DVM, a National Center for Appropriate Technology (NCAT) agriculture specialist from Prairie Grove, Ark.

Wormy Vocabulary

Parasite: An organism that lives on or inside another living organism, at whose expense it gains some benefit.

Host: The living organism that a parasite exploits.

Ectoparasites: Parasites that live outside a host's body.

Endoparasites: Parasites that live inside a host's body.

Anthelmintic: A chemical used to control parasites.

Parasitology: The study of parasites, organisms that are usually rather repulsive to look at (think leeches) and that many of us would prefer not to touch or examine too closely. A pasture's parasite load—and thus the worm levels in the animals that feed on it—will vary with the seasons, weather conditions and farm management practices. Worms like warm, moist environments so parasite levels tend to peak during spring and plummet during dry summer months, for instance. Farmers living in the arid Southwest deal with far fewer worm problems than those in the rainy regions of the Northwest. Too many livestock crowded on a small acreage with no rotation will have more parasites, as will those kept in unsanitary conditions.

As they drain our animals of blood and nutrients, large parasite loads can cause subtle problems like decreased production of milk and a lower conception rate in cattle. They can also induce more serious health emergencies such as impaction colic in horses or bottle jaw in sheep.

Signs of parasite infestation include weight loss, depression, rough hair coat, diarrhea and anemia, says Dr. Wells. "Pull the eyelid down and look at the mucous membranes. If they're pink, the animal doesn't have a parasite problem; if they look pale, the animal could be anemic from internal parasites."

OF WORMS AND DEWORMERS

Ask a group of farmers about their deworming protocols and you'll likely receive a confusing mix of answers. Some deworm every two months, others less often; some rotate dewormers, others stick with one brand. Along with what to administer, and when and how often to give it, you must also decide how to get the stuff into your stock as well as devise a control strategy that avoids creating resistant "superworms." It's enough to make your head spin.

Unfortunately, resistance to certain dewormers has already developed in sheep, goats, and to a lesser extent horses. "Some goat herds in Texas have parasites that have become totally resistant to all types of dewormers," says Dr. Wells. "The farmer's only choice is to de-stock [quit keeping goats on his pastures]."

On the bright side, we farmers can do plenty to keep ordinary old parasites from donning their superworm capes. For starters, keep in mind that if you have just a few animals (other than horses) on a lot of land, you can often get by without dewormers, suggests Dr. Wells, who has worked primarily with sheep and goats.



Common EndoparasitesHorses

Large and small strongyles can bring about several forms of colic in horses. Roundworms grow to 12 inches in length and can cause the small intestine to rupture. Large numbers of tapeworm may induce colic and weight loss. Bot flies deposit eggs on hairs and larvae invade the mouth, develop within the tongue/gums, then pass into the stomach. Bots can cause colic and stomach ulceration.

Cattle

Roundworms, tapeworms, flukes and coccidia parasitize beef and dairy cattle. An important parasite is the brown stomach worm, which can cause poor production, anemia and scouring. Lungworms may precipitate pneumonia, while coccidia—a subclass of protozoan—attack the small intestine, causing diarrhea.

Alpacas/Llamas

The most common cause of diarrhea in camelids is coccidia infections, notes Michelle Kutzler, DVM. Camelids can also be infected by giardia (another protozoan), tapeworms and liver flukes. The meningeal worm, whose intermediate host is a snail, occurs in the eastern United States and can damage the brain and/or spinal cord.

Sheep/Goats

The prolific barber pole worm is a major parasite of sheep and goats; it can cause diarrhea, anemia and fluid build-up beneath the jaw (bottle jaw). Coccidia usually affect young animals, causing diarrhea and decreased appetite. Lungworms, tapeworms and liver flukes also infest these ruminants.

Pigs

Large roundworms affect young pigs most significantly; the adult worms feast on the small intestine lining and their larvae migrate through the liver and lungs. Affected animals appear unhealthy and can have complications ranging from pneumonia to gut impaction. Whipworms, kidneyworms, and coccidia also parasitize pigs.

Chickens

A number of roundworm species can infest chickens; large roundworms, cecal worms, and capillaria are three of the more common. Symptoms range from lowered egg production to emaciation and depression. "I've had clients who automatically deworm every month or every few months," she says. "To prevent drug resistance, it's important to deworm only when necessary. If you go out and your animals look healthy, have shiny coats, and are eating and producing well, you should make sure that worms are really a problem before deworming them." Dr. Wells adds that animals with natural immunity keep resistance to parasites up in the herd.

So before loading up on dewormers, find out if your livestock have a worm problem by collecting some representative manure samples for your veterinarian to analyze. If you have a varied menagerie, take in fresh samples—still warm—from each species, says Dr. Kutzler. Keep in mind that a routine fecal exam won't pick up liver flukes; your vet will probably need to send a specimen to a lab for special analysis.

"I can't emphasize enough the importance of an initial fecal exam when you're setting up your deworming protocol," Dr. Kutzler says. "After that, you should have fecals done every one or two years. We can tell you what types of parasites you're dealing with and also give you an egg count."

You can purchase dewormers from the feed store, a livestock supply company, or from your veterinarian. Be aware that there are different classes of anthelmintic and each class includes several different drug derivatives. These drugs are found in various deworming products and differ as to which livestock species they've been legally approved for. So even though a deworming product containing a specific drug may be approved for use in select species, it doesn't mean that another deworming product that contains that same drug will be approved for those same animals.

Three of the more common anthelmintic classes used in deworming products are the macrocyclic lactone class, which includes ivermectin, widely used in many dewormers that have been approved for use in sheep, cows, horses and pigs; the benzimidazole class, which includes the commonly used drug fenbendazole found in various deworming products approved for use in horse, cattle, pigs, sheep, goats and poultry; and the pyrimidine class, which includes pyrantels often found in products for horses and pigs. Other drugs from various classes include levamisole, found in several products approved for sheep, cattle, pigs and horses; dichlorvos, found in dewormers approved for pigs and horses; and piperazine often used as an active ingredient in products approved for horses and poultry.

Dewormers vary as to the spectrum of parasites they eliminate—ivermectin products typically target a wider range than fenbendazole-based products, for instance—and how they control worms. No dewormers are currently approved for use in camelids, and few are cleared for goats, so it's important to talk to your veterinarian before using any anthelmintics to make sure they're safe for your animals, Dr. Kutzler stresses. For off-label use of dewormers in milk or slaughter animals, check with your vet about dosage and withdrawal times—some chemicals stay in the system longer than others. Find specific detail on all FDA-approved deworming products at the FDA Animal Drug Products Online Database System.



To prevent parasite resistance from developing, many experts now recommend rotating dewormer classes. For horses and camelids in Oregon, veterinarians at Oregon State University advise rotating between pyrantel, benzimidazole, and ivermectin during the year (where liver flukes flourish, camelids should also receive clorsulon as an oral liquid at each deworming, adds Dr. Kutzler). With ruminants, Dr. Wells maintains it's best to rotate classes every one to two years. "Some people think they should rotate anthelmintics each time they deworm, but research has shown that the parasites develop resistance faster this way," she says.

Dewormers can be administered by paste, oral liquid or drench, injection, pour-on, feed additive, mineral block or powder, and tablet; you'll probably want to use whichever is easiest, safest and most economical to give to the livestock species you keep. Most horse owners use paste dewormers, for example, while many cattle ranchers opt for pour-ons. Oral liquid anthelmintics are commonly used for small ruminants.

Making sure an animal gets the appropriate dosage for its weight—and keeps it down, in the case of oral medications—is another way farmers can help prevent parasites from developing resistance to anthelmintics, stresses Dr. Kutzler. "Sometimes horses will spit out part of their paste dewormer and then you've given a subtherapeutic dose," she says, noting that owners shouldn't be afraid to give more in this case. "There's a very large margin of safety with most anthelmintics."

Ingrid Wood, an alpaca breeder in Columbus, N.J., treats her Huacaya alpacas with injectable doramectin (Dectomax) to prevent meningeal worms and fenbendazole to kill other parasite species. She weighs her animals twice a year so she can give them an appropriate dose. "I've found the liquid fenbendazole works better with alpacas than paste—they spit half of the paste around the barn," she says. "I form a pocket on their lip and use a large syringe with a stainless steel metal extension. It works beautifully."

So just how often should you deworm your animals? It all depends. Gary Hart, of rainy Tacoma, Wash., treats his Scottish Highland cattle three times a year: in the fall when he starts feeding in a sacrifice area, in mid-winter, and when he's ready to turn them out to pasture in the spring (he also rotates pastures). With this program, he hopes to bring his cows through the winter in good shape and give them a better chance of rebreeding on schedule.

Wood deworms her alpacas every six weeks with doramectin throughout the year because meningeal worms have infected camelids in her area—the parasite's intermediate host is a snail that inhabits her lush pastures and wetlands. "I feel strongly that there's no blanket parasite program—the program must be custom tailored to each farm and region," she says.

"For average situations in Oregon, we recommend that horses be dewormed three to four times a year," adds Dr. Kutzler. "But if the horses are on pasture and they aren't rotated, if there are large numbers of animals, or the likelihood of reinfection is great, then the horses should be dewormed every eight weeks."

Since parasite load depends on so many factors—soil and pasture management, weather conditions and season, the animal's age and stress levels—it's best to devise a strategic deworming plan with your veterinarian's assistance.

MANAGING PARASITES TO DEATH

Along with the judicious use of anthelmintics, the following management strategies will help you reduce the numbers of parasite eggs and larvae lurking around your farm.

1. Keep stalls, barnyards and pastures as clean and dry as possible.

Most internal parasite eggs reach the outside world via manure; hence, remove the manure and you give the boot to worm eggs and larvae, too. Composting manure will help kill parasites, as will spreading it so sunlight can dry it out. Since worms like moisture, keeping mudholes to a minimum will also reduce their numbers.

Wood, who keeps her farm meticulously clean and removes her animals' communal manure pile daily, notes that the only parasite problem her alpacas have experienced was one bout of tapeworms.

2. Use feed tubs or hay mangers to keep food off the ground.

Reducing the time your critters spend eating off the ground will also cut down on reinfection. Wood places her male alpacas' feed in a wash tub, but this didn't work with her females. "With the girls I'd put hay in the tub and within five minutes they'd have it pulled out. I finally gave up and bought rubber stall mats," she says.



3. Supply your animals with a nutritious diet.

Good nutrition and a healthy immune system can overcome a lot of worms, Dr. Wells stresses. And don't forget that pregnant, lactating and growing animals all have greater nutritional needs.

4. Rotate pastures regularly.

"The majority of the life cycle of worms is outside the host animal, so pasture management is important," says Dr. Wells, who is a big advocate of controlled grazing. "Make sure your animals don't graze grass too close to the ground. Larvae crawl up on the grass blades, but they usually stay below two inches. If you move your livestock before the grass gets this short, you're moving them before they eat the larvae."

5. Alternate different livestock on pasture.

The parasite species affecting sheep and goats are different than the ones that inhabit cattle or horses. You can disrupt parasite life cycles by running cows in a pasture, then horses or sheep, or even by keeping two of these species together. The non-hosts break the life cycles by eating larvae and eggs—these animals are a dead-end for parasites, explains Dr. Wells. "A flock of chickens running loose with hoofstock can also help break the cycle by scratching through manure and exposing it to sunlight, and by ingesting eggs and larvae," she says.

6. Deworm your livestock before putting them on clean pastures.

A clean pasture can be one that has never had your species of livestock on it, one hayed the previous year, or one grazed by animals that host different parasite species. Before moving livestock to clean pastures, Dr. Wells advises farmers to deworm all their animals, then wait 24 hours after oral deworming or up to three days after using pour-on dewormers to give the animals a chance to expel viable eggs. Dr. Wells did this herself when she moved her Cotswold-cross flock from Missouri to her new farm in Kansas—a place that had never been occupied by sheep. "I didn't have to deworm them for seven years after that," she says. Now I bet that's something most of us could stomach.

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