Vet Call

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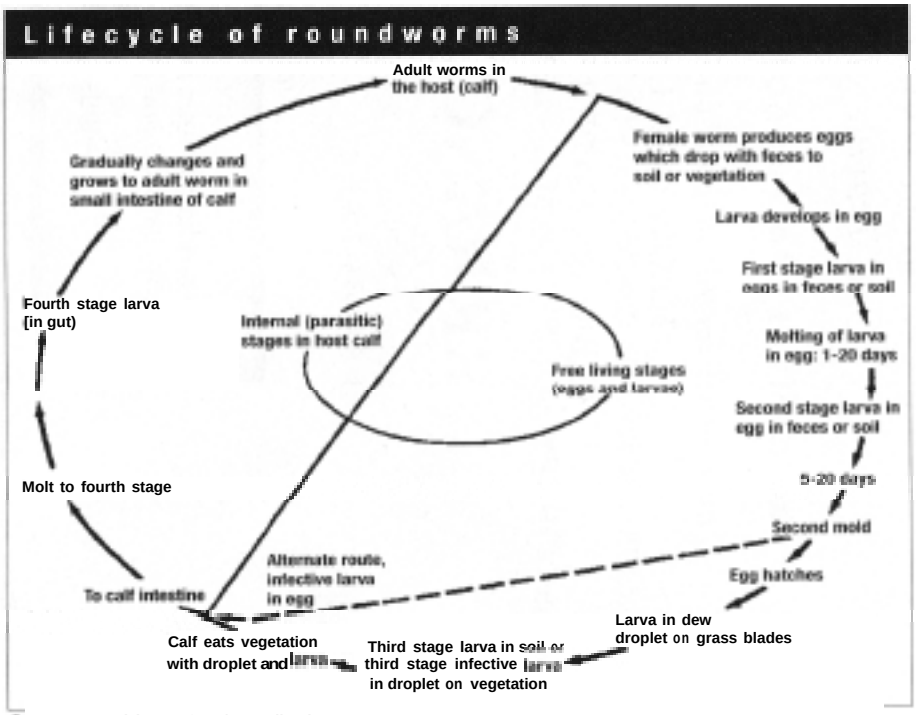
Control of nematode parasites (roundworms) in cattle

A number of nematodes are found in the abomasum (stomach), intestine and lung of beef cattle. The brown stomach worm, also known as the medium stomach worm or *Ostertagia ostertagi,* is considered to be the most harmful and economically important parasite of cattle. The brown stomach worm can destroy important glands located in the abomasum resulting in loss of serum proteins, reduced acidity and diarrhea.

Clinical signs of parasitism include progressive weight loss, diarrhea, rough hair coat, bottle jay, anemia and dehydration. Individually or collectively, these signs are not diagnostic for parasitism, and many other diseases including nutritional deficiencies need to be ruled out. Effects of parasitism may include inefficient feed utilization, delay in attainment of breeding age, poor conception rates, depressed milk production and lighter calves at weaning. And, at least in the case of *Ostertagia sp.,* parasitism has a non-specific immunosuppressive effect.

The prevalence of internal parasitism varies considerably throughout the United States and is dependent primarily on climactic variables — temperature and moisture. Although north-south divisions are often used to describe these differences, a more accurate reference is to describe length of grazing season. In regions such as the Southeast and south-central United States, nematode parasitism is a fact of life and without some form of effective prevention and control, losses in productivity or deaths will occur. In contrast, in the upper plains and many western states, nematode parasitism is considered to be minimal or unimportant, conditions should be evaluated to determine if nematode parasitism merits prevention and control measures.

Largest infections are usually found in weanling and yearling cattle, including replacement heifers. Adult beef cattle generally show little evidence of nematode infection or disease unless stressed by nutritional deficiency or other diseases.



Source *Great Plains Beef Cattle Handbook*

Transmission

The female lays eggs that are passed in the feces. Eggs hatch and the larvae go through three stages (L1, L2 and L3) of development on the pasture, rapidly in warm weather and slowly during cooler weather. Once the larvae reach the infective stage (third stage, L3) they can survive for several months during optimum weather conditions including autumn through winter in the South and from spring through autumn in the North. High temperature and drying during the summer and subfreezing temperature during the winter can effectively kill eggs and larvae on pasture, therefore, parasite transmission is reduced during these periods.

Ostertagia does not survive well on pasture under hot and dry conditions, but a portion of the population can survive the winter even under snow cover. Other nematodes such as *Haemonchus* and *Oesophagostommum* thrive during warm weather.

Infective larvae on grass blades are swallowed during grazing and develop into adults inside the animal in two to four weeks to six to eight weeks depending on worm species. The most damage occurs during the period of larval development into the adult stage. The entire lifecycle from egg to egg-laying adult is six to 12 weeks. It's obvious in areas of the country with long grazing seasons, several generations of parasites are possible each year.

Unique lifecycle and subsequent challenge of *Ostertagia sp.*

Not only is the brown stomach worm the most economically important internal parasite, it presents a control problem that is different than the other nematodes because of the seasonal variation in its life cycle. As stated previously, *Ostertagia* does not survive well on pasture during periods of hot, dry weather. Therefore, in the southern United States, to protect itself, the parasite enters a hibernation-like state in which it stays in an early larval stage inside cells of the abomasum rather than continuing its

development. This state is called the arrested or inhibited stage. During the arrested stage, the larval worms do not cause any measurable problems for the animal. However, once the worst of the summer weather is passed, about August or September, the larva resumes its maturation and increases in size which causes massive destruction of the cells of the abomasum. At this time, the disease is termed type II Ostertagiasis. Type II disease most commonly affects yearlings (steers and replacement heifers) from September through November. In some situations, first- and second-calf heifers are also susceptible. In severe cases, death will result without treatment.

In the northern United States, type II Ostertagiasis is also a problem, but the timing of the disease is different. The larvae become inhibited during the winter months when subfreezing temperatures kill most larvae on pastures. As a result, type II disease occurs from late winter into spring.

The early dewormers, now classified as Class I (see table at right), were effective against adult worms, but were not able to kill the inhibited larval stage. This made them appropriate for controlling Ostertagiasis during the times of the year when the parasite was not inhibited, but ineffective against type II disease. Newer products (Class II) are able to kill both adults and inhibited larvae and are effective against type II disease.

Control of nematode parasitism in cattle

There is not a known practical means of killing larvae on pasture, therefore, eradication of worms is virtually impossible. The expected outcome from an effective parasite control program is to keep infections below the levels that interfere with production and health. The components of internal parasite control include: grazing management, properly timed use of anthelmintics and enhanced immunity to parasite infection.

Grazing management involves placing young cattle (weaners, stockers and replacement heifers) on the pastures that should have the lowest levels of parasite larvae and eggs. This judgment is based on knowing that the pasture has not been grazed for a period of time or that other young stock have not just come off the pasture. Keeping cattle off a pasture for several weeks in the summer and then harvesting hay is a common technique for decreasing the parasite load. If a group of young cattle has to follow other cattle in a pasture, they should follow adult, non-lactating cows (low egg shedders) versus other young stock. A preferable method is to have young cattle be the first on a pasture and follow them with the adults.

Dewormers

Class I	Class II
Thiabendazole (TBZ, Thibenzole)	Fenbendazole (Panacur, Safe-Guard)
Levamisole (Levasole, Tramisol, Totalon)	Oxfendazole (Synanthic)
Morantel (Rumatel)	Albendazole (Valbazen)
	Ivermectin (Ivomec)
	Doramectrin (Dectomax)

Development of broad-spectrum anthelmintics that are effective against the inhibited stages of *Ostertagia* have been of immense benefit in reducing losses due to parasitism. However, there has been a tendency to consider anthelmintics as the sole or primary means of control rather than using them as an adjunct to grazing and other management practices to reduce parasite losses. Even the most effective compounds will appear to have failed if treated animals are returned to heavily contaminated pastures.

Up to about a year of age, cattle have little resistance to nematode infections. However, they can rapidly develop a strong immunity to several worm species once they are past 12 months of age. The primary exception is *Ostertagia,* in that cattle do not show much resistance to this parasite until they reach 18 months of age or slightly older.

In an ideal situation, strong immunity will be developed if calves are exposed to relatively low levels of pasture contamination and a continuous high level of nutrition during the suckling phase and on through the weaning or yearling phase. Low levels of exposure can be accomplished with systematic anthelmintic treatments that maintain low worm burdens in the calves and on the pastures.

Strategic treatment means that young cattle are treated up to two to three times prior to and during periods when the development and survival of nematode larvae on the pasture is greatest, due to environmental conditions. The strategy is to remove worm populations from cattle before pasture infection increases and to maintain populations in cattle and on pasture at low levels. The interval between the treatments is determined by the time that it takes reinfecting nematodes from pasture to reach sexual maturity and full egg production. This may be as little as three weeks for some species (Cooperia), but four to six weeks for most others.

In the case of adult cattle, even though they possess a high level of immunity to nematodes, treatment at least once a year may be applicable, namely at some point shortly before calving. If adult treatment is done at a time of year when *Ostertagia* is not likely to be arrested in development, the older, less expensive Class I dewormers may be utilized.

Summary

Basically there are no widely recognized recommendations that apply to control of cattle nematodes in the United States for every management system or age class of cattle. Strategic treatment with anthelmintics along with grazing management will remain as the mainstays of nematode control. Although there is little evidence for the existence of drug resistance in cattle nematodes, the problem is substantial for nematodes of sheep and goats, and to a lesser extent horses. Therefore, veterinarians and producers should be aware of this potential threat and take measures necessary to avoid the selection of resistant nematode populations.

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