

Internal Parasite Control in Louisiana Beef Cattle

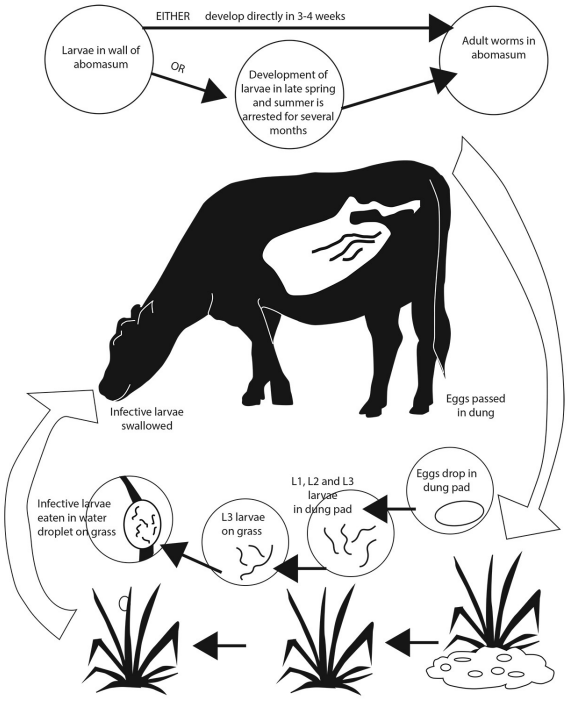
Christine B. Navarre, DVM

Introduction

Controlling internal parasites in grazing cattle has a significant positive return on investment; in most cases greater than any other management practice. However, there is increasing concern about resistance of cattle parasites to dewormers (anthelmintic resistance) and the ability of cattlemen to continue to have cost-effective parasite control. Worldwide there is documented anthelmintic resistance to all commercially available products in all of the important cattle parasites. But the extent of the resistance varies from country to country and from ranch to ranch. Anthelmintic resistance is a very complex and serious issue. Cattlemen need a basic understanding of parasite biology and control measures so they can work with their veterinarian to develop parasite control programs that balance the short-term economic benefits of deworming with the long-term impact of anthelmintic use on resistance.

Parasitology Basics

Adult parasites live in the gastrointestinal tract of cattle and lay eggs that are shed in manure. These eggs hatch and develop into infective larvae. These larvae crawl onto the grass and are ingested when cattle graze. The larvae then develop into adults in the gastrointestinal tract and lay more eggs.



Many factors, including rainfall, environmental temperatures, pasture type, grazing management, age and immune status of animals, previous product use and anthelmintic resistance patterns all determine the severity of parasite problems on an individual ranch in a given year. A unique parasite control program must be developed for each. The parasite load in the animal and on the pasture must both be considered.

Ostertagia ostertagi is an important cattle parasite in Louisiana. It can impact both young and mature animals. *Ostertagia* likes cool weather, and infective larvae do not survive well in the heat of Louisiana summers.

Cooperia sp. and *Haemonchus placei* are common parasites of calves. They are warm-season parasites, so large numbers build up in summer months. Cattle usually develop immunity to these parasites by the time they are yearlings, but adult cattle will continue to have low numbers that will contaminate pastures for calves.

Anthelmintic Resistance

Anthelmintic resistance is an inevitable consequence of the use of anthelmintics over time. Resistant parasites have genes that protect them from the effects of the anthelmintic. The parasites may be resistant to one or multiple products at the same time. Ranches can also acquire anthelmintic-resistant parasites with herd additions.

Anthelmintic resistance is usually suspected when a deworming fails to give the expected production responses. But poor performance or clinical signs of parasitism that don't improve following deworming should not immediately be interpreted as a failure of the product. Other factors to check include:

Proper product storage
Proper product administration including dose and route

Parasite Control: A Balancing Act

One of the key concepts in slowing down the development of resistance is the maintenance of **refugia**. Parasites in refugia do not have genes for anthelmintic resistance – they are still susceptible to anthelmintics. The more refugia in a population, the more the resistance genes in a population are diluted and the more effective anthelmintics will be.

Parasites in refugia can be on pasture or in animals. When an entire group of cattle is dewormed, we eliminate refugia in the animals. The only parasites that survive the deworming are the few that are resistant. These resistant parasites then mate and multiply and soon take over. Eventually, there is failure of the dewormer to work as expected.

The overall level of infective larval contamination of pasture is influenced by pasture management practices and environmental pressures. These influences will impact larvae from both resistant parasites and refugia.

Examples of differing levels of pasture contamination:

- Contaminated pastures
    - Permanent pastures used continuously for grazing
    - Overseeded pastures that have recently been grazed
- Clean pastures
    - Environmental temperature impacts on pastures left fallow for a season

        - *Ostertagia* larvae don't survive well in summer
        - *Cooperia* and *Haemonchus* don't survive well in winter
    - Pastures grazed by other livestock species
    - Stocker pastures grazed by cows (cleaner)
- Cleanest pastures
    - Non-permanent pastures
    - Tilled and planted
    - Used for harvesting hay

The quickest way to get widespread anthelmintic resistance is to deworm an entire group of cattle and then put them on a clean pasture. In this way we have no refugia left on pasture and we eliminate refugia in the animals. The only parasites left in the animals are resistant. When they reproduce, they will contaminate the pasture with an almost pure population of resistant parasites. There are no refugia on pasture to dilute the resistant worms.

Another common scenario for development of resistance is grazing stocker calves on permanent pastures combined with frequent use of dewormers. This is especially true of the macrocyclic lactones that may have a residual effect for weeks. Initially there is a mix of refugia and resistant parasite larvae on the pasture, but as the calves graze day after day, the refugia larvae are killed by the residual product, and only the resistant parasites survive. Egg shedding is then only by resistant parasites, which eventually shifts the population to mostly resistant parasites both in the animals and on the pastures.

The above situations can be avoided by trying not to eliminate *all* parasites on a ranch. Cattlemen should work with their veterinarian to find a balance between keeping overall parasite levels low enough to prevent economic losses while at the same time retaining some refugia to slow the progression of anthelmintic resistance.

Diagnostics

With the emergence of resistance a "deworming schedule" is no longer appropriate. Designing a parasite control program must be done on each individual operation based on diagnostic testing results. There are two types of tests that should be performed:

- Routine surveillance
    - Quantitative fecal egg counts
        - Modified Wisconsin sugar float or Mini-Flotac for cattle > 1 year of age
        - McMaster for cattle < 1 year of age
        - Multiple age groups and multiple seasons
- Anthelmintic efficacy
    - Fecal egg count reduction test (FECRT)
        - Follow recommendations of veterinarian for reliable results

Principles of Control

The following principles can be incorporated into an overall parasite control program:

- Increase overall herd immunity
    - Proper nutrition will help cattle fight the effects of parasites
- Use cows as "vacuum cleaners" for calf parasites by grazing dry cows after calves
- Don't bring resistant worms to the farm with herd additions
    - Deworm with multiple classes of anthelmintics on arrival according to advice from the herd veterinarian
    - Drylot for 24-48 hours
    - Turn out onto contaminated pasture
- Cull "poor doers"
    - They may not be as resistant to parasites as cattle that maintain themselves under the same management system
- Keep refugia
    - A refugia program should be developed with a veterinarian based on diagnostics
    - Utilize selective nontreatment
        - For example
            - In cow/calf operations only deworm cattle less than 5 years of age
                - Older cows then serve as a source of refugia
        - For replacement heifers only deworm 70-90% of the group
            - Percentage left untreated should be based on the FECRT results
        - Some EXCEPTIONS are
            - When deworming for liver flukes when majority of animals may need treatment
            - Times of nutritional or other stress
    - Avoid deworming going into summer
        - Deworming combined with environmental impact on pasture larvae eliminates *Ostertagia* refugia
    - Avoid deworming ALL animals before turnout onto clean pastures
        - This is especially critical with macrocyclic lactones and other long-acting products
    - Avoid using the same pastures for young stock year after year
        - For example, don't raise replacement heifers in the same pasture year after year – move the "heifer pasture" around on the ranch

Principles of Control (continued):

- Use and store products properly
    - Use at least two classes of dewormer at the same time
        - **Must ALWAYS do this with a refugia program to prevent multi-drug resistance**
    - Avoid generics unless there are data to prove their efficacy
    - Dose based on actual weights if possible
    - Don't store products at the processing area
        - Follow label directions for storage
    - Seek advice from a veterinarian to select the right product for right time of year and right age of animal
- Use on farm anthelmintic trials and fecal egg count data to determine the economics and health benefits deworming on a specific operation
    - The cost of diagnostics can be offset by targeting the right animals with the right products at the right time

Authors

Christine B. Navarre, DVM
School of Animal Sciences
Louisiana State University Agricultural Center

James E. Miller DVM
Department of Pathobiological Sciences
School of Veterinary Medicine
Louisiana State University

Matt G. Welborn, DVM
Department of Clinical Sciences
School of Veterinary Medicine
Louisiana State University

May 2020