

# *Haemonchus contortus* (Barber Pole Worm) Infestation in Goats

Gastrointestinal nematodes, commonly known as worms, present the greatest danger to the goat industry in the Southeastern region of the United States. *Haemonchus contortus*, commonly referred to as the barber pole worm, is a clinical problem for goats. Anemia, low packed cell volume (PCV), diarrhea, dehydration, peripheral, and internal fluid accumulation are common signs of barber pole worm infestation. Infested goats have lower growth rates, markedly reduced reproductive performance, and have higher rates of illness and death. Consequently, *H. contortus* may account for greatly reduced profits in a goat operation.

In the Southeast region, there are a number of factors that contribute to barber pole worm infestation in goats:

- Environment with high temperatures, humidity, and rainfall
- Genetic make-up of goats makes them highly susceptible
- Resistance to anthelmintics as a result of excessive usage
- Frequent anthelmintic treatments per year without a positive fecal sample exam
- Many goat producers overstock their pastures and maintain as many as 40 goats per acre
- Few anthelmintic drugs are approved by the Food and Drug Administration for goat use.

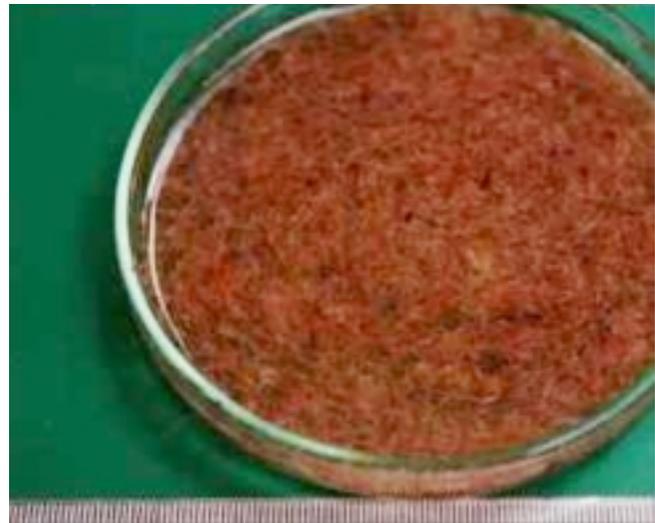
## About Barber Pole Worms

*Haemonchus contortus* is cylindrically shaped, tapered at both ends, and has a complete digestive system. This worm is a worldwide threat, but is more prevalent in sub-temperate and temperate regions under warm and wet conditions, such as in the Southeastern United States.

## Morphology

Adults (20-30 mm); Eggs are thin-shelled, 24 cell

Adult *H. contortus* live in the abomasum (true stomach) of goats.



*Adult H. contortus recovered after necropsy.*

## Life Cycle

Goats are born without *H. contortus*; however, they become infested with the worm when they start grazing. The L3, or infecting larvae, are eaten by the goats during grazing. The L3 larvae then burrow into the internal layer of the goat's abomasums (true stomach) where they develop to a L4, or pre-adult larvae. The L4 molts into L5, the adult form.

Adult male and female worms live in the abomasum of goats, where they feed on blood. The worms mate and produce eggs. Adult females deposit from 5,000 to 10,000 eggs per day, which are passed through goat feces to the pasture. Eggs are hatched either in soil or water. When the soil is warm and moist, eggs will hatch into L1 larvae (first stage juveniles). The L1 larvae then develop

through stages L2 and L3. Large numbers of juvenile parasite worm (L3) may accumulate on heavily grazed pastures.

**Damage Caused by Barber Pole Worm**

After a goat has ingested L3 larvae, the worm will burrow into the mucosal (internal layer) of the stomach, nourishing on the red blood cells of the goats, which can be life-threatening to the goat. An infected goat can bleed to death within hours.

Signs of the barber pole worm infestation in goats:

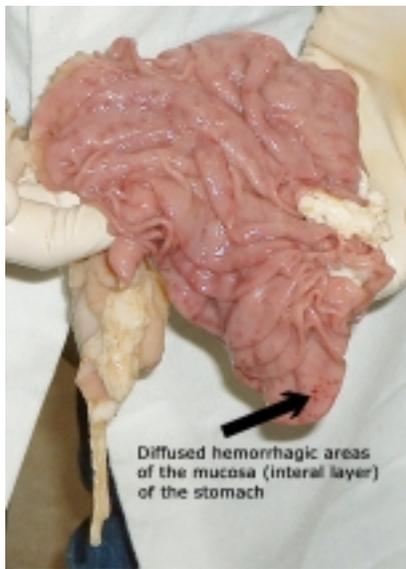
- Diarrhea
- Dehydration
- Unthrift appearance, rough hair coat, depressed, low energy, lethargic, and uncoordinated
- Significantly reduced growth and reproductive performance
- Fluid accumulation in sub-mandibular tissues (bottle jaw), abdomen, thoracic cavity, and gut wall
- Blood loss, white mucous membranes, anemia/PCV



*Signs of peripheral and sub-mandibular (bottle jaw) edema*



*Extreme dehydration, near death*



*Stomach after necropsy.*

**Note:**  
*Larva is a juvenile form, the newly hatched, earliest stage worm that undergoes metamorphosis, differing markedly in form and appearance from the adult. Anthelmintics are widely used to battle worms and worm eggs.*



*Blood loss, anemia, white musous membranes*

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**Controlling Barber Pole Worm**

Scientists have been researching ways to manage this parasitic worm and minimize cost production in herds. Management practices must be based upon breaking or interrupting the life cycle of the worm by:

- Use of chemical anthelmintics commercially available
- Improved herd and pasture management practices
- Use of plants with anthelmintic properties

**Use of Commercial Anthelmintics**

Anthelmintics (chemicals/drugs) are widely used to battle barber pole worms. However, only two anthelmintics are



*Goats are browsers, introduce shrubs and forbes in your pasture.*

approved by the Food and Drug Administration (FDA) to treat goats: Morantel tartrate and Fenbendazole. Producers have reported that the drugs have shown little effectiveness in the control of the barber pole parasite in goat herds because of the worm's resistance.

Use of others anthelmintics is called extra-label use because they are not approved by the FDA for use on goats unless used under veterinarian guidance.

**Table 1:** Anthelmintics (Chemicals or drugs for deworming) with a direct effect on the worm or worm eggs.

Anthelmintics (Dewormer)	Brand Name	FDA Approval	Dosage	Route	Withdrawn	
					Meat	Milk
<b>Benzimidazoles</b> Fenbendazole	Panacur/ Safeguard	App'd	9.0mg/lb	Oral	14d	4d
<b>Cholinergic Agonist</b> Morantel tartrate	Rumatel	App'd	4.5mg/lb	Oral	30d	0 d

**Note:** Consult your veterinarian as part of your parasite control program to get information about the appropriate use, dose, route, duration, possible adverse effects, and withdrawal periods for various extra-label anthelmintics before administration in your herd.

### Improved Herd, Pasture and Management Practices

Here are some ways to control barber worms:

#### Feeding Practices

- Keep stocking rates low.
- Provide clean water and minerals.
- Use gravel or concrete in the feedlot area to break the worm life cycle and to prevent re-infestation.
- Provide high-quality hay for goats raised in areas where forage is not available year-round or when the pasture conditions are poor. Hay should be kept off of the ground to avoid contamination by feces.



*Dry lot to interrupt worm life cycle.*

#### Pasture Maintenance

- Incorporate browse plant species when possible. Goats love to browse and prefer shrubs and forages to grass. If goats consume forages at least 6 inches tall, infestation from barber pole worms is reduced.
- Try a mixed species grazing program using cattle and goats.
- When possible, use the pasture for hay cutting after grazing. This will help to break the worm life cycle and prevent re-infestation. Direct sunlight during the summer months or during freezes in the winter will also help decrease the population of larvae that remain in the soil.
- When possible, alternate the pasture with a short cycle crop, such as culture alfalfa. This management practice will help to break the worm's life cycle, and decrease larvae population in the pasture and prevent re-infestation.
- Use clean feeders and continue to practice good hygiene in the pens and pasture.

#### Doe Treatment

- Provide good nutritional management. Well-nourished animals are better able to respond to *H. contortus* infestation. Does with good nutrition at late pregnancy have an increased immune response to parasites.
- Deworm the doe soon after she has kidded. The pregnancy hormone progesterone and the lactate hormone prolactin have been shown to reduce the ability of does to fight worm infestation. Progesterone suppresses the doe's immune system. Does that are lactating and raising kids are more susceptible to worms. Monitor the herd closely from kidding to weaning.
- Goat genetics are an important component that will determine an animal's ability to resist *H. contortus* infestation. Resistance can be measured by fecal egg counts (FEC). The resistance to worm infestation is heritable. The doe's ability to withstand infestation is defined as

resilience and is measured by blood hematocrit or packed cell volume (PCV). Resilience is less heritable than resistance.

### **FAMACHA System as a Management Tool to Control Barber Pole Worms in Goats**

The FAMACHA system was developed by South African scientists and veterinarians. It is a low-cost tool that can greatly influence management practices in goats. The FAMACHA system monitors clinical anemia (reduction of red blood cells, packed cell volume) by examining the color of the goat's lower eyelids and comparing it to a color-coded chart. Variation in eyelid color from pale to red indicates the degree of anemia. Based on this chart, only goats with anemia should be

treated. This practice will prevent the overuse of anthelmintics and consequently minimize chances of parasite resistance to anthelmintics. The test has an effectiveness of 90 percent compared to the 20-30 percent effectiveness of overused anthelmintics.

Goat producers should check 10 percent of the total animals in the herd as frequently as every other week using the FAMACHA chart. A fecal exam should accompany FAMACHA examination.

FAMACHA also provides producers with a tool for genetic selection. Using FAMACHA, producers can identify animals that are more susceptible to hosting the worm and can cull these goats from the herd. In turn, producers will be able to identify animals with high resistance

and resilience, which seem to be inherited traits in goats.

### **Use of Plants with Anthelmintic Properties**

Researchers are exploring the use of plants to control barber pole worm. Forages, such as clover, vetches, chicory, and sericea lespedeza, contain condensed tannins. Condensed tannins reduce the number of stomach worms and egg production. Feeding sericea lespedeza hay to goats can reduce fecal egg counts by 80 percent and create a higher packed cell volume.

#### **Note:**

*Larva is a juvenile form, the newly hatched, or earliest stage worm that undergoes metamorphosis, differing markedly in form and appearance from the adult. Anthelmintics are widely used to battle worms and worm eggs.*

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New November 2006; UNP-78