Haemonchus contortus Fact Sheet

A Fact Sheet for the Canadian Sheep and Goat Industries

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Small ruminants, such as sheep and goats, are extremely susceptible to the adverse effects of intestinal parasites[1]. *Haemonchus contortus* is a major challenge throughout the world, particularly in regions with warm and wet conditions[2,3]. Young and lactating sheep and goats are the most susceptible to *Haemonchus* infection[4]. *Haemonchus* is incredibly costly to the Canadian sheep and goat industry due to significant performance losses, morbidity and mortality, drug costs, and labor associated with treatment and management[5]. *Haemonchus* cannot be eradicated, but can be limited, through control, to decrease economic losses for producers[4].

The Code of Practice for the Care and Handling of Sheep requires that[6]:

- Producers must understand the basic biology of parasites that affect sheep.
- Stockpeople must monitor flock for signs of internal/external parasitism.
- Parasite control and treatment strategies must be developed and implemented on-farm; work with the flock veterinarian to develop a control strategy tailored to the farm location and management.
- Parasite control and treatment strategies for tapeworms in dogs must be developed and implemented on farm.

What is *Haemonchus contortus*?

Haemonchus contortus, better known as the barber pole worm or wire worm, is an intestinal worm that uses sheep and goats as a host[3,7]. Adult worms live in the abomasum (also known as the true stomach) of an animal and feeds on their blood by puncturing the stomach wall (**Figure 1**)[1,3]. This causes haemonchosis, an infection characterized by severe anemia from blood loss[1]. Collectively, worms can consume up to 1/10th of an animal's blood volume in 24 hours[8].

Signs of *Haemonchosis*

Signs of a *Haemonchus contortus* infestation include: anemia, dehydration, "bottle jaw" (accumulation of fluid in the lower jaw due to anemia), poor appetite, weight loss, and significantly reduced growth[3,5,7,10]. Due to anemia, the conjunctival mucous membranes around the eyes appear pale pink to while color[7,11].

Figure 1. Heavy *Haemonchus contortus* infection in abomasum of a sheep
Source: Merck Manual Veterinary Manual

Lifecycle and Infectivity

The life cycle of *Haemonchus contortus* takes 17-21 days to complete[9]. It begins when larvae in the infective stage are ingested by sheep and goats during grazing[3]. Once ingested, the larvae travel to the animal's abomasum where they continue to develop[3]. Lastly, they molt in the adult form. Adult female worms produce thousands of eggs per day (5,000-10,000) which are secreted in the animal's

feces onto pasture[3]. Eggs will hatch into larvae under favorable conditions (e.g. warm and moist) and develop within fecal pellets through the immature stages in as short as 5 days[3,7]. Infective larvae travel onto pasture where they are ingested by sheep and goats during grazing, restarting the life cycle.

In Canada, infectivity is highest in late summer (mid-July to August) and early fall because *Haemonchus* prefers warm and humid conditions (>25°C)[12]. The two biggest sources of pasture contamination with *Haemonchus* eggs are 1) lambs and kids (late July/August) followed by 2) ewes and does in late gestation and lactation (usually spring)[13].

Larvae go into an inactive state inside the animal during winter to survive the Canadian climate[7,12]. In this state, the worms do not lay eggs or cause damage to their hosts. In late April – early May as the worms resume activity, ewes or does develop severe infestations at the same time as late pregnancy or lactation when the animal's immune system is stressed[7,12]. Ewes/does will contaminate the spring pasture with eggs and immediately expose vulnerable lambs or kids.

Contributing Factors

There are various factors that contribute to *Haemonchus contortus* infestation including: environments with high temperatures and humidity, an animal's genetic make-up, and resistance to dewormers due to excessive usage[3].

Control Methods

To determine what control management protocol is best for your operation, consult with your veterinarian.

Goals to controlling *Haemonchus contortus* include preventing heavy exposure in susceptible hosts, reducing overall levels of pasture contamination, minimizing the effects of parasite burdens, and encouraging the development of immunity in animals[14]. Prompt recognition of factors that favor parasitic infection is essential (e.g. weather, grazing behavior)[14]. It is also important to distinguish the difference between sheep and goats that are "resistant" and those that are "resilient". Resistance refers to the ability of the host to actively reduce the number of incoming larvae or worms[13]. Resilience refers to the hosts ability to maintain productivity while tolerating a challenging parasite infection[13].

Integrative Parasite Management

Management practices must attempt to interrupt the worm's life cycle whether it be through dewormers, animal management, or pasture management[8]. Coordination of dewormers with other methods of control provide safe pastures and give economic advantage to producers by reducing labour requirements, pasture contamination, and dewormer resistance[2,11].

Chemical

Chemical management of parasites involves proper use of synthetic dewormers, targeted selected treatment, and testing for dewormer resistance. Timing to deworm varies between regions and for different species of parasites[14]. Synthetic dewormers are designed to reduce worm burdens and are often used to combat *Haemonchosis* because they are cheap, simple, and cost effective[4]. However, resistance has become a serious problem. Increased resistance can also occur because of frequent dosing, under-dosing, inappropriate administration, or wrong dewormer choices[10]. Therefore, it is recommended that producers test for dewormer resistance every 1-2 years using a fecal egg count reduction test (FECRT)[12,14]. The best time to do this is early to mid-summer when *Haemonchus* is most active.

Targeted selected treatment (TST) involves only treating animals that either require treatment. It slows drug resistance by reducing the number of treatments, and increasing refugia (worms that have not been exposed to the drug)[13]. Dewormer resistance can be reduced or prevented if

approximately 30% of animals are not treated[13]. TST requires practical decision-making tools that producers can use. The FAMACHA system is a low-cost tool to assess anemia by comparing the color of the animal's lower eyelids and to a color-coded chart (**Figure 2**) that ranges from deep red (non-anemic) to white (severely anemic) to determine the need for deworming[2,3,13,15]. Regular and frequent inspections of sheep and goats is mandatory for safe implementation during the summer. Another tool, is the Five Point Check system that looks at the nose, eyes, jaw, back, and tail of individual animals for signs of parasitic infestation[13]. This system also requires fecal egg count monitoring.

Figure 2. Examining lower eyelid of a sheep using FAMACHA color-coded chart
Source: American Consortium for Small Ruminant Parasite Control

Natural

In response to increasing synthetic dewormer resistance, many studies are examining alternative options for parasite management. One area of investigation has been in natural dewormers. Producers should consult with their veterinarian prior to using natural dewormers.
Natural management practices include, but are not limited to, lambing/kidding and weaning management, nutritional management, pasture and grazing management, and genetic selection. Producers who lamb/kid in winter and fall report less parasite problems[13]. As well, animals can be kept indoors during late gestation/early lactation to minimize peri-parturient egg rise in ewes or does. *Haemonchus contortus* has evolved to thrive in weak intestinal environments[16]. Nutritional support that improves the health of the animal's digestive tract can increase its resilience and lessening the effects of an infection[10].

For pasture and grazing management, long grass is safer than short grass because larvae are restricted on how high they can climb (5 cm)[13]. Overgrazing increases infection rates because it forcers sheep and goats to graze close to the soil. Other options include alternative forages, rotational grazing, and multi-species grazing. Rotation with cattle has shown to lower pasture infectivity to sheep and goats[13].

As for genetic selection, the genetic makeup of sheep and goats make them highly susceptible to *Haemonchus*[3]. FAMACHA provides producers with a tool for genetic selection because they can identify animals that are more susceptible to *Haemonchus*[,3]. Breeding for resistant or resilient sheep or goats can be done by selecting a breed or individuals within a breed (e.g. rams that have lower FEC compared to other rams in the group)[13]. Little research has been done with goats on selecting for genetic resistance, therefore, it may be easier to identify and cull adults with parasite infestation that are slow to develop immunity[13].

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