

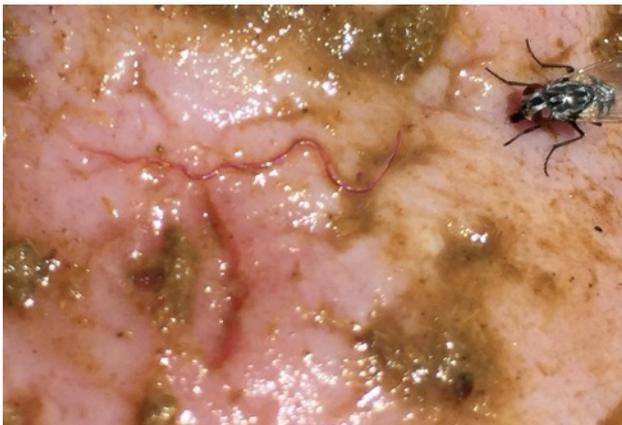
# Barber's Pole Worm in alpacas

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## Background

The gastrointestinal parasite *Haemonchus spp.* is better known as the barber's pole worm (BPW) because the adult female worm has a white tubular uterus that winds around their blood-filled tubular gut, giving the look of a barber's pole (Figure 1). This parasite is a blood sucker of domestic livestock, causing anaemia and illthrift and can kill alpacas (and sheep, cattle and goats) quickly and in high numbers.



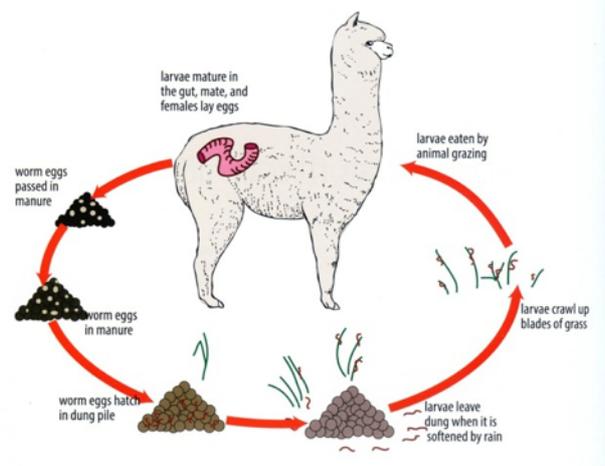
**Figure 1. Adult, female barber's pole worms in the third compartment of an alpaca (with fly for scale!)**

Barber's pole worm has historically been associated with prolonged warm, moist conditions and traditionally was rarely seen in winter in southern Australia. This distribution appears to be changing and studies are underway to better identify behaviour of BPW in alpacas. Barber's pole worm is widespread across farms, and waits for ideal conditions to rear its ugly head. Just because you have never had it diagnosed on your farm before, do not assume it does not exist on your farm. Alpacas are bought and sold and agisted all over the countryside and take their parasites with them too.

## Lifecycle

Adult BPW are located in the third stomach compartment (C3) of the alpaca. They attach to the lining of the stomach and suck blood. Female BPW

lay massive numbers of eggs every day (up to 10,000), which pass out in the alpaca's faeces (Figure 2). In mild-warm, moist conditions, the eggs hatch out in the faeces and live on bacteria in the faeces as they moult from the first larval stage, L1, to the second, L2. Larvae develop to the infective stage (L3) over 7 days under ideal condition (but may take up to 5 weeks) and migrate out of the faecal pellets after heavy dew or rain. Infective larvae move up leaf blades in films of moisture in warm weather and are ingested during grazing. The larvae continue development as they pass through the first two compartments of the stomach, and arrive at C3 as an immature worm. They attach to the lining of C3, and suck blood. When they reach sexual maturity they mate and begin laying eggs. It takes 21-28 days from the time an alpaca eats infective larvae until those BPW begin laying eggs.



**Figure 2. Lifecycle of barber's pole worm in alpacas (source Australian Alpaca Association Inc.).**

## Clinical signs

Because BPW are such prolific egg layers, livestock can ingest massive numbers of larvae from the pasture and be found suddenly dead in the paddock. Other alpacas in the group will be ill-thrifty and exhibit sudden weightloss (what has your regular body condition scoring told you about the herd?) and severe anaemia (have a look at mucus

membranes in mouth, vulva, and around the eyes for pale colour). Some alpacas have been described as having “bottle jaw” where the skin under the jaw becomes oedematous and swollen because the animal is hypoproteinaemic (low blood proteins, so plasma oozes out of the blood vessels into the skin). Note that if drench resistance exists on your farm, you will see these clinical signs despite having drenched recently.

To get an idea of how voracious these worms are, BPW suck approximately 0.05 mL blood per day in sheep. Therefore an animal carrying 2000 worms loses 100 mL blood per day so it will only take 10 days for the BPW to consume a litre of blood and a 50 kg sheep only has around 4 litres of blood. A sheep this heavily infected would have a worm egg count of 10,000 eggs per gram.

## Diagnosis

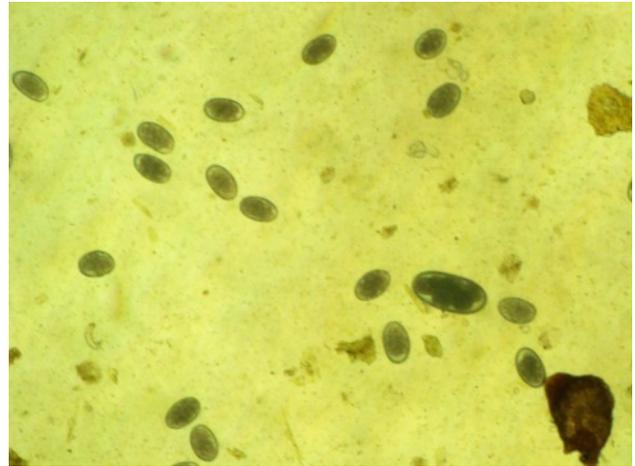
**1. Dead alpacas.** It is important to look for BPW in the correct place! Adult and larval forms of BPW are found in the third compartment of the stomach not the small intestine. Adult female worms are 20-30 mm long, quite fine and have the characteristic red and white stripes, males are about 15 mm long and larvae are smaller. They are all attached to the lining of C3 in large numbers (because they have killed the alpaca).

**2. Faeces.** Fresh samples of faeces should be collected directly from the rectum of approximately 10 alpacas in each mob using a gloved finger. 10-15 faecal pellets should be collected from each animal and placed into separate plastic bags. Air should be excluded from the bag and bags placed into the refrigerator and kept cool during shipment to the laboratory. Collect samples early in the week so they do not get lost in transit over the weekend. Do not freeze faeces. Alternatively, move alpacas to a communal dung pile and hold them there for 10-15 minutes then collect warm samples from the dung pile in a similar fashion. Most strongyle worms, such as *Ostertagia spp.* and *Trichostrongylus spp.* lay 10's to 100's of eggs per gram of faeces. Barber's pole worms lay 1000's to 10,000's eggs per gram of faeces.

Barber's pole worm eggs look similar to other strongyle eggs found in alpacas (Figure 3). If egg counts are very high, it is a fair assumption BPW is involved. If counts are in their 100's, then the only definitive method of diagnosis is to ask the laboratory to perform worm egg incubation, larval culture and identification.

Sometimes alpacas will pick up massive numbers of larvae from the pasture and die before larval forms of BPW have had time to mature and begin egg

laying in C3. Worm egg counts may be zero or low, but diagnosis will be made at autopsy by the presence of larvae in C3. If worm egg counts are low, and larval BPW is suspected, it is possible to test faeces for occult blood in the faeces using tests such as Occultest® or Hematest® as larvae are ‘messy feeders’ and spill blood into the gut of the host.



**Figure 3. Multiple strongyle eggs and one larger *Nematodirus spp.* egg (source Harun Rashid).**

## Treatment

Been ‘saving that drench for an important event’? Been avoiding overuse of drenches to reduce the risk of causing drench resistance? I hope so. This is the time to use your effective drench! Do not delay once a diagnosis has been confirmed or you will lose more animals.

There are many different drenches available to use against BPW. There are:

- (a) narrow spectrum drenches that target BPW
- (b) broad spectrum drenches that kill BPW and other worms in the gastrointestinal system
- (c) short-acting drenches
- (d) long-acting drenches

It is essential that you select a drench in consultation with your veterinarian that is effective and will perform the job you require. That is, the selected drench will kill the worms you are targeting and that the parasites are not resistant to the active ingredient from over-use of the drench.

Effective **short-acting drenches** basically eliminate the worm burden in the alpaca on the day of drenching. Animals continue to pick up more infective larva with every mouthful, but they do not start re-infecting the pasture with worm eggs for another 21-28 days (the period it takes for the ingested larvae to mature, mate and start laying eggs) so become re-infected quickly if you are unable to drench and move onto a ‘clean’ paddock.

The definition of a clean paddock is one that has been rested completely for more than 3 months over a dry summer, 6 months autumn/winter/spring or has had a crop/hay recently harvested. Most alpaca farms do not have 'clean' paddocks once BPW infection is established – assume there is BPW in every mob on the property.

With the advent of **long-acting drenches** in the ivermectin family (macrocyclic lactones, MLs, mectins) you are able to use injectable drench in this family that will kill the current burden of worms and keep killing ingested larvae for approximately 2-4 weeks, depending on the actual drench used. You are therefore able to protect the herd for 4-8 weeks (as it takes worms another 21-28 days to start laying eggs), which allows you to sort out paddocks, perform worm egg counts to monitor, and also, move into the cooler weather of autumn. Cooler environmental temperatures will kill larvae on the pasture. It is standard practice in camelids to administer drenches in the ivermectin family at 1.5 times the cattle dose stated on the packet. Many alpaca farmers prefer using an injectable anthelmintic to ensure the correct dose is delivered by subcutaneous injection. If using oral worm drenches, make sure the alpaca swallows the full dose and does not let it drain out of the mouth. Avoid using pour-on drenches as their absorption is poor in alpacas.

Before you treat your animals, carefully read the directions for use of the selected drench. Shake the container so the drench is mixed evenly. Make sure you weigh some of the largest animals in the group and treat to the heaviest in the mob so that no animal is under-dosed. If the group has a wide range of weights, divide into lighter and heavier mobs so the smaller animals are not overdosed. Calculate the correct dose. Ensure drenching equipment, delivered via both injectable and oral routes, is calibrated to deliver the correct dose (and check throughout the day). Ensure drench is not spilled during drenching. If you are using an oral drench, place the drench gun over the back of the tongue and allow time for the alpaca to swallow. If injecting, place the needle subcutaneously. Do not hold drenched animals off water for too long after treatment.

Remember that no drugs are registered for use in alpacas and you should work in close consultation with your local veterinarian to obtain appropriate information about off-label use of drenches.

## Prevention

- 1. Monitor worm burdens regularly** in your herd by collecting fresh faeces and testing for worm egg output in the herd. Worm egg counts are given as a measure of numbers of parasite eggs per gram of faeces. The animals most at risk with gastrointestinal parasitism are the late pregnant females, lactating females with crias at foot, and recently weaned stock. Parasites in C3 are able to detect when livestock are about to give birth through hormonal changes in the pregnant female, and start producing many more eggs per gram than in non-pregnant females. The pasture then becomes heavily contaminated and newly born cria are then exposed to the worms on the pasture as they start grazing. Beware of BPW though as it may strike males and non-lactating females as well.
- 2. There is only one routine drench** that should be performed on any farm and that is to crias at the time of **weaning**. You should not routinely drench the herd "twice a year" or "at shearing" just because someone told you to! Never wean crias onto a pasture that has had heavily pregnant and/or lactating females with crias at foot grazing on it in the last year (yes, year!) otherwise you will put them on a contaminated pasture at high risk of parasitism. Plan your weaning paddock a year in advance so that after they have been drenched, they can be placed onto a 'clean' paddock.
- 3. You should also monitor for drench resistance** (where a drench is no longer effective at killing more than 95 % of worms in the gastrointestinal tract) by collecting faeces from alpacas 10-12 days after drenching. There should be greater than 95 % reduction in worm egg count between pre- and post-drench worm egg counts if the drench is effective. You will need to perform a Faecal Egg Count Reduction Test if drench resistance is suspected.  
  
It is possible to perform your own worm egg counts. You will need a microscope, egg counting chamber, graduated beakers, pipettes and saturated salt solution. Training courses are run intermittently by your local department of agriculture or local veterinarian.
- 4. There is now a test in Australia, called the 'Haemonchus Dipstick Test'**, that allows farmers to test sheep faeces for blood on farm. The test has not been validated for use in alpacas to date. The test is conducted in separate mobs on faeces pooled from fresh faecal samples (1 pellet from each of 20 individuals) collected from the ground (NOT from the rectum as this collection method may result in blood in the sample). The dipstick test involves diluting faeces with water and boiling it. The test takes about 30 minutes and changes colour

according to the amount of blood in the faeces. The more worms in C3, the more blood in the faeces and the higher the reading on the dipstick. The test is intended for use as another tool in the farmer's decision-making process as to when to drench for BPW. The test can be used weekly in high-risk periods and less frequently (say, monthly) when conditions for BPW are less favourable. It is important to note that the test measures blood in the faeces and not actual worm numbers so results should be interpreted with reference to previous dipstick tests, faecal egg counts and other relevant information such as paddock records and grazing management.

**5. Selection of animals with innate resistance to parasites** (known as 'host resistance') has been undertaken in sheep for many years. It is possible to perform worm egg counts at weaning (and therefore before they have been drenched for worms) and select sires with the lowest worm egg counts at weaning. These animals will pass on the trait of having lower worm egg counts in their offspring.

**6. Haemonchus vaccine.** The vaccine is now registered for use in sheep in Australia. Watch this space re alpacas.

**USE GOOD HUSBANDRY TECHNIQUES. KEEP GOOD RECORDS. WRITE DOWN TREATMENTS/MATING DATES/MEAT WITHHOLDING TIMES.**

**NO PRODUCTS ARE REGISTERED FOR USE IN ALPACAS. CONSULT YOUR VETERINARIAN AND ALWAYS READ THE LABEL BEFORE USING ANY OF THE PRODUCTS MENTIONED. NEVER USE ANY PRODUCT IN ALPACAS THAT IS NOT REGISTERED FOR USE IN FOOD PRODUCING ANIMALS.**

**FOR ANY SIGNS OF UNUSUAL OR SERIOUS ANIMAL DISEASE, RING THE DISEASE WATCH HOTLINE: 1800 675 888.**



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