

Frequently Asked Questions about Worms (Internal Parasites)

What are the main worms of concern in goats?

It depends on your region and farm, but these would be the top three:

Haemonchus contortus (barbers pole worms)

Trichostrongylus spp. (black scour worms)

Teladorsagia circumscista (was called *Ostertagia*, brown stomach worm)

What is the best way to worm a goat?

Drenching is best as worms are in the gut, so the deworming drug needs to be there as well. Pour-ons have been shown to lead to the development of resistance in Switzerland and also to not kill the worms in goats, just stops the worms laying eggs for a couple of weeks and long enough for a test at 14 days to show no eggs but the worms are still there doing damage. Injectable products work but best kept as a treatment for skin mites and not for worms. Injections have a long tail i.e. a long period of time when there are low concentration in the goat's body which leads to resistance. The best worm drench is the one your vets prescribes for your goats at the dose rate that is likely to be higher than that for sheep (most Australian states require a vet to give you a prescription if using at a higher dose rate). First of all make sure you have worms by doing a faecal test first (scouring could be due to coccidiosis for example), drench your goat/s then 14 days later check the drench worked by getting another faecal sample/s checked for worm egg counts. If there is a 98% reduction, keep using this drench. Now the recommendation is to use 2 or 3 drenches all from different families to slow the development of drench resistance.

Where do I send a faecal sample for testing in Australia?

The paraboss website keeps a list of laboratories in each state that provide worm egg count services. See <http://www.wormboss.com.au/tests-tools/professional-service-providers.php>. I do Worm Egg Counts but just for my clients and charge \$22 for the first then \$11 for subsequent counts to a maximum of 5. Those that buy BioWorma from me get 5 free Worm Egg Counts with their first purchase to ensure there are no existing worm burdens before the Bioworma can start reducing pasture contamination.

What are the current APVMA approved options for intestinal worm control in goats?

This changes over time so it is best to check the website of the Australian Pesticide & Veterinary Medicines Authority PubCRIS website— www.apvma.gov.au. Basically there are white drenches, also called benzimidazoles and abamectin (Caprimec) registered for goats however the label dose for some may not be what your veterinarian would advise.

Are the other options that can be used / prescribed off label?

Veterinarians can prescribe sheep drenches "off label" or goat drenches at higher dose rates than that on the label. The veterinarian must give a written prescription and this must state a withholding period to prevent any residues. However if a label has a statement such as DO NOT use in milking goats whose milk may be used for human consumption they veterinarian can not override this DO NOT statement.

What causes bottle jaw?

Bottle jaw is caused by low blood protein levels and fluid leaks out of the blood and accumulates in tissues in the lower areas of the body, generally under the jaw. The most common cause is barber's pole worms (*Haemonchus contortus*) but less likely causes are liver fluke and Johne's disease. Check the eye mucous membrane colour of your goat as both parasites cause severe anaemia which shows up as pale mucous membranes. See my YouTube video on how to check a goat's eye colour. If the goat is anaemic this helps distinguish between bottle jaw and an allergic swelling of the face.

If barber's pole worms are suspected take a faecal sample and send off to a lab to confirm. Don't wait for the result if this will take more than a day but give at least two worm drenches from different drench families. Take another faecal sample in 14 days to check the drenches have worked. Ask your local veterinarian or extension office if you are in a liverfluke area and if you are, ask the lab to also test for liver fluke eggs. You will also need to increase the protein and energy content of the goat's diet and ask your veterinarian for iron and multiple Vitamin B injections. All these nutrients are needed to make new blood to replace the blood lost but this also takes time, around 2 weeks.

Bottle jaw is very serious and needs immediate treatment and some goats may need a blood transfusion to survive.

What is the best treatment for worms in goats

Worms are in the gut so a drench is best to treat worms with a drench. The best drench is the one that works on your farm and on your goats' worms. You can only tell this by doing faecal egg counts. Use your current worm drench, then when goats have medium to high worm egg counts (must be >500 eggs per gram) drench then retest faeces in 14 days. If you get a 95% or more reduction then this drench works so use this one. New research suggests it is best to use a combination drenches (although none are registered for goats) or to combine this with a drench of another family given shortly after on the same day to delay the development of resistance.

How do I know how much my goat weighs?

There are several ways:

- Use digital platform livestock scales (but these are expensive)
- Use bathroom scales made for people and place these on a solid flat surface, weigh yourself then pick up the goat and step back on these scales and look at the combined weight. Take away your own weight to get the goat's weight.
- Measure the heart girth i.e. put a tape-measure around the goat's chest just behind the front legs then use a chart to convert this to kgs. If you don't have one of these tapes then use a dressmaking tape-measure and measure the chest girth and then look at the fact-sheet that can be downloaded from my website – www.goatveto.com.au and then see the worm page.
- Measure the heart girth i.e. put a tape-measure around the goat's chest just behind the front legs (in inches), then measure (length) along one side from the lowest point of the shoulder bone by the front legs to the pin bone next to the tail (in inches). Calculate the weight using this formula - (heart girth) x (heart girth) x (length) and divide the result by 300. This will give you the weight in pounds. To convert the number to kilograms multiply by 0.4536.

Can feeding browse and high tannin feed help?

If goats always graze with their heads up i.e. browse, then they won't eat any worm larvae as worm larvae can only climb only so high. Unfortunately goats both browse and graze grass. If goats are in paddocks that only have grass and clover their diet actually contains more worm larvae than sheep grazing the same pastures.ⁱ Goats tolerate tannins in their feed very well and it does not affect digestibility or intake generally.ⁱⁱ Electron-microscope studies have shown that barbers pole worms in contacts with tannins in the gut have changes in their outer coating and mouth.ⁱⁱⁱ

Some research has been done using Sulla (*Hedysarum coronarium*) which has a high % of tannins and has shown promise in sheep. However in this trial there was no significant difference in worm numbers between kids fed 100% Sulla and those on hay and lucerne pellets.^{iv} It has been shown that the high condensed tannin levels in the legume, sericea lespedeza (*Lespedeza cuneata*) when fed as either fresh feed or pellets can reduce faecal egg counts and the number of barbers pole worms (but not scour worms).^v Another trial in which goats were housed and fed either *sericea lespedeza* or Bermuda grass hay and dosed 3 times a week with 500 *Haemonchus contortus* larvae showed that the first group had lower egg counts, higher packed cell volumes and fewer (*H. contortus*, *Teladorsagia circumcincta*) and small intestinal (*Trichostrongylus colubriformis*) when killed at the end of 12 weeks.^{vi} Unfortunately seed supplies of have not yet been available in Australia.

A small research trial using sainfoin hay feed for 7 days a month to adult goats naturally infected with *Haemonchus contortus*, *Teladorsagia circumcincta* and *Trichostrongylus colubriformis* found reduced worm egg counts compared to control goats feed ordinary hay.^{vii}

Other researchers looked at five of tropical native Australian plant species but they found only that worm egg counts of both barbers pole and scour worms were reduced but not total worm burdens and only for these species: *Acacia salicina*, *Acacia nilotica*, *Eucalyptus corymbia*, but not *Casuarina cunninghamiana* and not *Eucalyptus drepanophylla*.^{viii} Feeding trials in Africa with *Acacia polyacantha* which has high tannin levels showed that 100 – 130 grams of dried leaf meal for 20 days reduced WEC by 27% and actual worm numbers by 13 %.^{ix}

Can I use Q drench or Zolvix on my dairy goat who provides me with milk for our household?

All worm drenches are registered in Australia by the APVMA (apvma.gov.au) and in order to do so they must provide research data on residues. Unfortunately it costs a lot of \$ to do milk residue tests and the dairy goat market and hence potential sales are sometimes not considered by the manufacturers to be enough to cover these costs. There is no way to force a manufacturer to register their product for dairy goats if they don't want to. Meat and Livestock Australia have covered the costs for residue data for goats for "Caprimec" but there is no research levy collected for dairy goats to fund Q drench or Zolvix milk residues and even then the manufacturer must agree to have this research done and provide some of the confidential registration data. I have made many submissions about the difficulties of access to veterinary medicines for dairy goats and these are all on my website. Last year I spoke in person to the Productivity Commission in support of my written submission.

In all states except Victoria, a worm drench not registered for use in goats needs a veterinary prescription to use on another species such as goats and this is essential as the dose for Q drench or Zolvix is higher than on the label. In Victoria you can use a sheep drench on another species such as goats, but only at the same dose rate and with the proviso that you do not cause any residues, so

you still need a vet's prescription. A vet can only prescribe if they have seen your goats or visited your farm in the last 6-12 months. A vet must state the dose and with-holding period on the prescription. If there is a DO NOT statement on the label a vet cannot over-ride it in a prescription. Vet have some leeway but only for one goat in a herd.

Residues are important for goats as any detections of residues can lose access to overseas markets. If a veterinary medicine is not registered for use in goats then there is no Maximum Residue Limit and hence goats must have NO residue. Meat levels are checked every year and unfortunately 2% of samples had moxidectin detected last financial year. State authorities would have investigated the goat producers involved.

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Where can I get more information?

This website is updated with the latest information so keep checking the worm page on www.goatveto.com.au.

The best website is the WormBoss website and the relevant drench decision guide for your region or the small-holders' guide. See www.wormboss.com.au. Also like the ParaBoss Goats Facebook page and subscribe to their newsletter. I was a joint author of the website and decision guides.

There is a USA website that has some excellent information especially regarding Copper Oxide Wire Particle boluses. See www.wormx.info

References

- Arroyo-López, C., I. Fourquaux, J. F. J. Torres-Acosta, C. A. Sandoval-Castro and H. Hoste (2013). "Scanning electron microscopy of *Haemonchus contortus* exposed to tannin-rich plants under in vivo and in vitro conditions." *Experimental Parasitology* **133**(3): 281-286.
- Hernández-Orduño, G., J. F. J. Torres-Acosta, C. A. Sandoval-Castro, A. J. Aguilar-Caballero, C. M. Capetillo-Leal and M. A. Alonso-Díaz (2012). "In cafeteria trials with tannin rich plants, tannins do not modify foliage preference of goats with browsing experience." *Ethology Ecology & Evolution* **24**(4): 332-343.
- Jallow, O. A., B. A. McGregor, N. Anderson and J. H. Holmes (1994). "Intake of trichostrongylid larvae by goats and sheep grazing together." *Aust Vet J* **71**(11): 361-364.
- Max, R. A., A. E. Kimambo, A. A. Kassuku, L. A. Mtenga and P. J. Buttery (2007). "Effect of tanniniferous browse meal on nematode faecal egg counts and internal parasite burdens in sheep and goats." *South African Journal of Animal Science* **37**(2): 97-106.
- Mechineni, A., D. S. Kommuru, S. Gujja, J. A. Mosjidis, J. E. Miller, J. M. Burke, A. Ramsay, I. Mueller-Harvey, G. Kannan, J. H. Lee, B. Kouakou and T. H. Terrill (2014). "Effect of fall-grazed sericea lespedeza (*Lespedeza cuneata*) on gastrointestinal nematode infections of growing goats." *Vet Parasitol* **204**(3-4): 221-228.
- Moreno, F. C., I. J. Gordon, M. R. Knox, P. M. Summer, L. F. Skerratt, M. A. Benvenuti and C. A. Saumell (2012). "Anthelmintic efficacy of five tropical native Australian plants against *Haemonchus contortus* and *Trichostrongylus colubriformis* in experimentally infected goats (*Capra hircus*)." *Veterinary Parasitology* **187**(1-2): 237-243.
- Paolini, V., F. De La Farge, F. Prevot, P. Dorchies and H. Hoste (2005). "Effects of the repeated distribution of sainfoin hay on the resistance and the resilience of goats naturally infected with gastrointestinal nematodes." *Vet Parasitol* **127**(3-4): 277-283.

Pomroy, W. E. and B. A. Adlington (2006). "Efficacy of short-term feeding of sulla (*Hedysarum coronarium*) to young goats against a mixed burden of gastrointestinal nematodes." Veterinary Parasitology **136**(3/4): 363-366.

Shaik, S. A., T. H. Terrill, J. E. Miller, B. Kouakou, G. Kannan, R. M. Kaplan, J. M. Burke and J. A. Mosjidis (2006). "Sericea lespedeza hay as a natural deworming agent against gastrointestinal nematode infection in goats." Vet Parasitol **139**(1-3): 150-157.

ⁱ Jallow, O. A., B. A. McGregor, N. Anderson and J. H. Holmes (1994). "Intake of trichostrongylid larvae by goats and sheep grazing together." Aust Vet J **71**(11): 361-364.

ⁱⁱ Hernández-Orduño, G., J. F. J. Torres-Acosta, C. A. Sandoval-Castro, A. J. Aguilar-Caballero, C. M. Capetillo-Leal and M. A. Alonso-Díaz (2012). "In cafeteria trials with tannin rich plants, tannins do not modify foliage preference of goats with browsing experience." Ethology Ecology & Evolution **24**(4): 332-343.

ⁱⁱⁱ Arroyo-López, C., I. Fourquaux, J. F. J. Torres-Acosta, C. A. Sandoval-Castro and H. Hoste (2013). "Scanning electron microscopy of *Haemonchus contortus* exposed to tannin-rich plants under in vivo and in vitro conditions." Experimental Parasitology **133**(3): 281-286.

^{iv} Pomroy, W. E. and B. A. Adlington (2006). "Efficacy of short-term feeding of sulla (*Hedysarum coronarium*) to young goats against a mixed burden of gastrointestinal nematodes." Veterinary Parasitology **136**(3/4): 363-366.

^v Mechineni, A., D. S. Kommuru, S. Gujja, J. A. Mosjidis, J. E. Miller, J. M. Burke, A. Ramsay, I. Mueller-Harvey, G. Kannan, J. H. Lee, B. Kouakou and T. H. Terrill (2014). "Effect of fall-grazed sericea lespedeza (*Lespedeza cuneata*) on gastrointestinal nematode infections of growing goats." Vet Parasitol **204**(3-4): 221-228.

^{vi} Shaik, S. A., T. H. Terrill, J. E. Miller, B. Kouakou, G. Kannan, R. M. Kaplan, J. M. Burke and J. A. Mosjidis (2006). "Sericea lespedeza hay as a natural deworming agent against gastrointestinal nematode infection in goats." Ibid. **139**(1-3): 150-157.

^{vii} Paolini, V., F. De La Farge, F. Prevot, P. Dorchies and H. Hoste (2005). "Effects of the repeated distribution of sainfoin hay on the resistance and the resilience of goats naturally infected with gastrointestinal nematodes." Ibid. **127**(3-4): 277-283.

^{viii} Moreno, F. C., I. J. Gordon, M. R. Knox, P. M. Summer, L. F. Skerratt, M. A. Benvenuto and C. A. Saumell (2012). "Anthelmintic efficacy of five tropical native Australian plants against *Haemonchus contortus* and *Trichostrongylus colubriformis* in experimentally infected goats (*Capra hircus*)." Veterinary Parasitology **187**(1-2): 237-243. .

^{ix} Max, R. A., A. E. Kimambo, A. A. Kassuku, L. A. Mtenga and P. J. Buttery (2007). "Effect of tanniniferous browse meal on nematode faecal egg counts and internal parasite burdens in sheep and goats." South African Journal of Animal Science **37**(2): 97-106.