Effective Drenching Programs for Goats in the Top End

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INTRODUCTION
Worms in goats are a well known fact of life for goat farmers in the tropical areas of the Northern Territory (NT). For general information, see Agnote K5 – “Worms in Goats”. High worm burdens will kill goats. Most farmers have developed drenching programs to control worms in their goats. However, if you have been using the same drench for several years, it is probable that you will be experiencing drench-resistance. Worms have developed resistance to most classes of anthelmintics (worm drenches). As no new drench classes are likely to be released in the near future, careful use of current anthelmintics is required.

The most effective drenching programs in goats aim to reduce the number of chemical drenches given per year by using only those known to work in your goats, together with adopting other management practices that help to control worms. It is important to note however, that the strategic use of chemical drenches remains a vital part of controlling worms in goats in the NT.

BACK TO BASICS
An effective worm control program should attempt to minimise the use of drenches and improve management practices.

The following are general tips for effective drenching:

- Use a drench that is still active against the worms in your goats - laboratory test the drench to ensure it is still effective.
- Use the correct dose - weigh goats and separate them into weight groups, then dose them at the rate of the heaviest in each group. Also, check that the drenching gun is delivering the right amount. To do this, squirt five doses into a measuring cylinder and note the volume to ensure that the total amount is exactly five times the recommended dose.
- Drench over the back of the tongue with the goat standing in a race and the operator standing with the pack upright, so air is not sucked into the drench gun.
- Drench at the most appropriate times (see more information below).
- Hold off feed for 24 hours prior to drenching if possible for Benzimidazole (BZ) and Macro cyclic lactone (ML) drenches only - see more information below.
- Preferably hold animals in yards for one to two days after treatment to allow for the disposal of any active parasite eggs before going back onto pasture, then clean out the yards.
- Monitor worm burdens by laboratory testing.
- Worm only when necessary, particularly in the dry season. It may not be necessary to treat all goats at every drench – susceptible animals, such as weaners and lactating goats, may need extra drenches compared with other groups of goats. Use faecal egg counts (FEC) to determine which animals really need drenching and target those groups that have high worm burdens.
General management practices:

- Use “low worm” pastures for young animals, such as after cropping or cutting hay, pasture regrowth after burning, pasture that is rotationally-grazed with cattle.
- Wean kids at 12 weeks onto low-worm pasture.
- Rotate paddocks – frequent rotation using several paddocks and moving animals every two weeks in the wet season will prevent worms from completing their life cycle.
- Maintain animal nutrition. Healthy, well-fed goats are less susceptible to worms.
- Provide browsing vegetation and allow pasture to grow to more than 10 cm in height, as grazing close to the ground runs the risk of picking up many more worm larvae. Do not overstock.
- Quarantine imported animals and check FEC before releasing them. You should not allow someone else’s worm problem onto your property.
- Some animals have a much better natural resistance to worm infection than others – breed from such animals and cull those with persistently high worm burdens.
- If more than one type of drench is still effective in your herd, then changing between these different types of drench every 12 months can help to slow the occurrence of resistance.

**DRENCHES IN GENERAL**

Not many drenches are actually registered for use in goats. Using a drench that is not registered for goats is considered an “off-label” use and because goats are a food-producing species, there are special regulations regarding the use of drugs. Under the Agriculture and Veterinary Chemicals (Control of Use) Act, off-label use of a drench in goats is not allowed unless authorised by an Australian Pesticides and Veterinary Medicines Authority (APVMA) permit, or according to written instructions from a veterinarian. Correct precautions regarding withholding periods of meat and milk must be followed. Consult your local veterinarian.

Drenches can be classed as either broad-spectrum or narrow-spectrum.

**Broad-spectrum drenches**

Broad-spectrum drenches kill all types of susceptible round worms of sheep or goats if resistance has not developed. They may also have some action against tapeworms and liver fluke.

There are four different types of broad spectrum drenches, each with a different mode of action:

- **BZ**, or ‘white’ drenches - active chemicals include albendazole, fenbendazole, oxfendazole and mebendazole. Several BZ drenches are registered for use in goats.
- **Levamisole** (Lev) or ‘clear’ drenches - active chemicals include levamisole and morantel. Only one Lev product (containing morantel) is registered for use in goats.
- **ML** drenches - active chemicals include ivermectin, abamectin, doramectin and moxidectin. Only one ML drench is registered for use in goats.
- **Organophosphates (OP)** - active chemicals include naphthalophos. OPs were reintroduced to the market to counteract resistance problems. They are not registered for use in goats but there is a current APVMA permit (PER11457 – expires April 2011) allowing the use of an OP called trichlorfon in goats, for the control of Haemonchus. Consult your local veterinarian.

**Narrow-spectrum drenches**

They are designed to target particular types of worms and are generally only effective against one or two worm species. They include closantel, which is a narrow-spectrum drench with action against susceptible Haemonchus. No closantel products are registered for use in goats.

Note: Drenches may come as individual products, or they may be what are known as ‘combination drenches’. These combine two or more drench types in one formulation and are generally broad-spectrum in action and are...
designed to be effective against a wider range of worms. Depending on the combination, there may be increased action against tapeworms and liver fluke. No combination drenches are registered for use in goats. Also, instead of using liquid drenches, some drugs are available in controlled-release devices or capsules. No capsule products are registered for use in goats and they are not recommended.

**Table 1. Drenches registered for use in goats in the NT**

<table>
<thead>
<tr>
<th>Anthelmintic group</th>
<th>Trade name</th>
<th>Active agent</th>
<th>Manufacturer</th>
<th>For use in</th>
</tr>
</thead>
<tbody>
<tr>
<td>BZ</td>
<td>Alben</td>
<td>albendazole</td>
<td>Virbac (Australia) Pty Ltd</td>
<td>Sheep, lambs, goats</td>
</tr>
<tr>
<td></td>
<td>Albendazole sheep, lamb and goat drench</td>
<td>albendazole</td>
<td>Western Stock Distributors</td>
<td>Sheep, lambs, goats</td>
</tr>
<tr>
<td></td>
<td>Fenbendazole</td>
<td>fenbendazole</td>
<td>4Farmers</td>
<td>Sheep, goats, cattle</td>
</tr>
<tr>
<td></td>
<td>Oxfen LV</td>
<td>oxfendazole</td>
<td>Virbac (Australia) Pty Ltd</td>
<td>Sheep, goats, cattle</td>
</tr>
<tr>
<td></td>
<td>Panacur 25</td>
<td>fenbendazole</td>
<td>Virbac (Australia) Pty Ltd</td>
<td>Sheep, goats, cattle</td>
</tr>
<tr>
<td></td>
<td>Valbazen broad-spectrum sheep, lamb and goat drench</td>
<td>albendazole</td>
<td>Coopers Animal Health</td>
<td>Sheep, lambs, goats</td>
</tr>
<tr>
<td>Lev</td>
<td>Oralject goat and sheep wormer</td>
<td>morantel</td>
<td>Vetsearch International Pty Ltd</td>
<td>Goats, sheep</td>
</tr>
<tr>
<td>ML</td>
<td>Caprimec for goats</td>
<td>abamectin</td>
<td>Virbac (Australia) Pty Ltd</td>
<td>Goats</td>
</tr>
<tr>
<td>OP</td>
<td>Neguvon</td>
<td>trichlorfon</td>
<td>Bayer</td>
<td>Goats (under permit)</td>
</tr>
</tbody>
</table>

Note: Always read the label and follow the instructions for use in goats. The use of trade names does not imply that NTG in any way endorses any particular product.

**WHAT CAUSES DRENCH RESISTANCE?**

Within any population, there is genetic variation, as is the case in worms. A small number of worms may possess an alternate biochemical pathway to the path blocked by an anthelmintic. When an animal is drenched with that anthelmintic, a small number of the resistant worms may survive and go on to reproduce. With continued treatment with this same anthelmintic, the proportion of resistant worms will increase. Eventually, there will be few susceptible worms but many resistant worms, making the drench ineffective.

**IS YOUR DRENCHING PROGRAM EFFECTIVE?**

**Fact 1**

Goats may be infected by a variety of worms, but the most harmful is the blood-sucking Barber’s pole worm, *Haemonchus contortus*. Signs of infection include anaemia and oedema but not scouring. Sudden death may occur. This worm is a prolific egg-producer and contamination on pastures will increase dramatically during favourable moist conditions. It can be effectively controlled with narrow-spectrum drenches if resistance is not already present. Other roundworms in the NT include *Trichostrongylus* (black scour worm) and *Ostertagia*. These are not controlled by narrow-spectrum drenches but can be controlled with broad-spectrum anthelmintics.

There are no liver flukes in the NT and thus no treatment is required. Tapeworms are readily seen as white worm-like segments in faecal pats and can occur in large infestations. They are not considered to be a significant problem except perhaps in kids less than six months old. Regular treatment is not required.
**Fact 2**
Resistance to a variety of drench groups is widespread in worms of goats in Australia. Some strains of worms have developed multiple resistances. Resistance is said to occur when a drench cannot reduce the FEC by 95% or cannot kill 95% of adult worms.

Recent testing at one property in the Darwin area indicated only a 5% reduction in FEC when using albendazole. This is an indication of severe resistance. The use of closantel reduced FEC by only 80%, indicating an emerging resistance to it.

Continual use of an inefficient anthelmintic will ensure the development of resistance.

**Fact 3**
Resistance problems can be introduced from southern areas, or even from other properties in the NT, in infected imported goats. Unless such introduced goats are tested to confirm the absence of eggs in their faeces, it is not possible to declare them parasite-free, even if they have been drenched prior to dispatch.

Do not import resistance. Clean out introduced goats with a quarantine drench. Consult with your local veterinarian. The following regime is suggested:

- ML/Lev/BZ combination drench (note this is an off-label use. You must consult a veterinarian).
- Hold the goats for 24 hours after drenching before releasing onto pasture and keep them separate until after conducting a FEC reduction test to check for resistance.

Do not let someone else’s problem become yours!

**Fact 4**
Resistance has been shown to occur in all states to the most recently introduced drug group, the MLs. Moxidectin, ivermectin, abamectin and doramectin belong to the ML group. Resistance to one drug within a group often means the worms will show resistance to all other drugs in that group.

Drenching programs for sheep in southern states recommend the use of MLs in combination with other groups of anthelmintics (BZ and Lev) to help prolong activity. Despite current research on new groups, no new types of drenches will be introduced in the near future.

**Fact 5**
Goats are different to sheep. Dose rates must be based on body weight, as goats of the same age may be heavier than sheep. Also, goats tend to metabolise drenches more quickly than sheep, so may need a higher dose to maintain drug levels long enough to be effective. Thus, drench inefficiency may be due to insufficient doses rather than resistance problems. For example, when using BZs in goats, it may be recommended to use two single doses 12 hours apart or a double dose. However, with Lev or closantel, increasing the dose rate may cause drug toxicity. With ivermectin, a one and a half dose may be recommended. Remember, for any off label use (which includes a dose rate different to the one recommended on the label), you must consult a veterinarian.

**Fact 6**
You do not need to guess when drenching is required or whether your drench is effective. FECs and larval cultures can be performed at Berrimah Veterinary Laboratories (BVL). An FEC is a good guide to the level of infestation and types of worms present in your animals and allows you to monitor your drenching program. Effectiveness of your drench can be monitored by a faecal egg-count reduction test (FECRT). Contact BVL or your local veterinarian for details of the tests before you drench.
DRENCHING STRATEGIES FOR USE IN THE NT

The strategy you select depends on the anthelmintic resistance status of your herd. Before your next drench, organise with your vet or the laboratory to do a FEC, and follow up with a FECRT after drenching so you know if you have a resistance problem. Laboratory monitoring of your drench effectiveness is suggested for at least the first drench per year, every year.

1. If there is no known benzimidazole resistance.

Use a product containing albendazole, fenbendazole or oxfendazole that is registered for use in goats and follow the label directions. Suggested times for drenching are:

- September - October (depending on first rain).
- December.
- February.
- April (depending on last rain).

NOTE:

- Kids may require more drenches, but check the FECs or monitor closely for signs of anaemia or ill-thrift.
- Remember, do not rely on drenching alone to control parasites.
- Fenbendazole is the only BZ registered for use in lactating does whose milk is to be used for human consumption. Check withholding periods.

2. If there is benzimidazole resistance, then use other registered products.

If morantel or abamectin have not been previously used on the property and the goats are not known to have resistance, then either of these drenches should be used. Follow the label instructions closely. Ensure a FECRT is done to check for effectiveness. Abamectin can be used in lactating goats (note with-holding period) but not morantel.

3. If more resistance is present it may require off label use of drenches.

If resistance occurs, alternative strategies such as still using a registered BZ product, but drenching twice at 12 hourly intervals at an increased dose rate may be used.

The only macrocyclic lactone registered for use in goats, in Australia is abamectin (in Caprimec). Abamectin has a short duration of action and resistance is already occurring. Some other MLs (for example moxidectin) have a more sustained action and may still be effective, but their use in goats is off-label.

Alternatively, combination drenches can be used and a narrow spectrum anthelmintic (i.e. closantel) can be added if required. No combination drenches or closantel products are registered for use in goats, so the program should only be undertaken under the advice of a veterinarian.
It is safer to use a combination product than to mix your own drenches. The best combination of drugs to use depends on the particular resistance problems occurring. Also, obviously combination drenches are more expensive. One strategy is to use a combination of ML, BZ and Lev for the first drench in October, then for the remaining wet season drenches use a combination of ML, BZ and Lev, plus a closantel product to control Haemonchus if required.

- October - ML, BZ and LEV combination.
- December – as above, plus closantel.
- February – as for December.
- April – as for December.

NOTE:

- Kids may require more drenches, but check the FECs or monitor closely for signs of anaemia or ill-thrift.
- Remember, these are off-label uses. You must consult your veterinarian before treating with combination drenches.
- For these programs to be suitable, the effectiveness of drenches must be known. Goats should be monitored using a FECRT.

Users of agricultural or veterinary chemical products should always read the label and permit (if any) before using the product. They should strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of the permit by reason of any statement made or not made in this Agnote.

Off-label use for a veterinary product (including anthelmintics) not registered for goats is not allowed unless authorised by an APVMA permit or according to written instructions from a veterinarian. There are penalties for offences against the Agricultural and Veterinary Chemicals (Control of Use) Act.

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