

Worms and Drench Resistance

ANIMAL HEALTH AND WELFARE ARTICLE by **Elizabeth Garner-Paulin** > Tarraganda Lodge Alpaca, NSW
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Drench resistance is generally regarded as the most economically important sheep health problem in Australia today with an estimated 90% or more farms experiencing the phenomena. There is no sheep drench on the market today that is not affected to some extent. Unless unnecessary drenching is reduced, the cost of drench resistance to the sheep industry alone is estimated in excess of \$700 million per annum in the next five years. Less well documented but equally well known are drench resistance problems in other livestock industries.

The Australian alpaca industry is on notice with cases of drench resistance now appearing within our own industry. Whilst the vast majority of alpaca breeders embrace the concept of worms as a management issue and not a stand alone drenching regime, we must ALL review our practices and attitude to drench use now, or face the serious consequences of widespread drench resistance in our industry within a very short period of time.

Traditional worm control methods

Modern drenches have proven highly effective and easy to use and consequently have formed the centrepiece of parasite control for most livestock producers.

In the past, the recommended and easiest method of worm control was two (*and sometimes more*) drenches per year for the entire herd; the time of year for drenching would depend on geographical location and seasonal conditions.

In addition to whole of herd drenching, is the practice of indiscriminate drenching. If an animal is scouring or not thriving, then it is generally assumed that a drench will correct the problem before or without further investigation carried out.

What's wrong with this method?

It is well documented that the two methods of drench use outlined above, combined with incorrect dose rates are the cause of the immense problem of drench resistance today in other livestock industries; what has surprised everyone, is how quickly drench resistance has occurred.

Within other industries, new approaches to worm control in the form of integrated worm management are now being encouraged.

Alpaca breeders choosing not to heed the lessons of sheep graziers and who continue down the road of excessive and/or indiscriminate drenching; without doubt, will be contributing to a very difficult future for their own studs and this industry.

What is drench resistance?

Drench resistance refers to the ability of a worm to survive in the presence of normally lethal levels of a drench; in essence, 'survival of the fittest'.

Naturally resistant worms are not common in a population but they do exist. A genetic mutation allows them to survive the drench and then pass on their resistant genes to their offspring. Overuse of the same type of drench can further enhance the selection process of these genetic types of worms.

Under dosing is a critical factor in producing drench resistance, with sub-lethal doses of drench selecting intermediate strains of resistant worms.

*As resistance is developing, breeders may experience subclinical production losses that are not easily seen. When drench resistance hits critical level, the results can be catastrophic; most particularly in the case of Barbers Pole Worm (*Haemonchus contortus*).*

The Australian alpaca industry is not alone in the appearance of drench resistance in our Camelids. In 2003, the American Alpaca and Llama industries started recording resistance to both Ivermectin and Fenbendazole.

To demonstrate the frightening speed in which resistance can occur, following is a table outlining some drench release dates and just some of the reported location and date discoveries of drench resistance in the Australian sheep industry.

Worms of significance in alpaca

Alpaca are susceptible to both cattle and sheep internal parasites, however the burdens for many of these types of worms are rarely in disease causing proportions, most often due to alpaca latrine practices and good nutrition. It is important to determine what parasites pose a significant risk in your area by speaking to your vet and other local breeders and develop your worm control programme accordingly. ►

Year	Drench Released	Year	Resistance Discovered/Reported and worm type
1961	Thiabendazole (<i>TBZ – BZ family</i>)	1966	NSW <i>Haemonchus</i>
		1977	18% of New England Farms resistant – <i>Haemonchus</i>
1968	Levamisole (<i>LEV family</i>)	1979	NSW – <i>Ostertagia</i>
1982	Closantel	1987	Northern NSW – <i>Haemonchus</i>
		1996	Prevalent resistance Northern NSW – <i>Haemonchus</i>
1988	Ivermectin (<i>ML family</i>)	1993	Northern NSW – <i>Haemonchus</i>
		1994	WA – <i>Ostertagia</i>
1995	(Moxidectin – Cydectin) (<i>ML family</i>)	2000	WA – Approx 40% of farms have ML resistance
		2000	Northern NSW / Southern QLD – ML resistance <i>Haemonchus</i> more common
		2000	Southern NSW – First reports of ML resistance <i>Ostertagia</i>
		2003-2005	Approx 60% of WA farms have ML resistance <i>Ostertagia</i>
		2003-2005	Approx 30-60% of Northern NSW farms have ML resistance <i>Haemonchus</i>

Information from NSW DPI Agnote "Sheep worm control & drench resistance – no worries?", 2005 Stephen Love

The most challenging internal parasites for alpacas in Australia are:

- > Barber's Pole Worm – *Haemonchus contortus*
- > Small Brown Stomach Worm – *Ostertagia ostertagi*
- > Black Scour Worm – *Trichostrongylus spp*
- > Liver fluke – *Fasciola hepatica*

Drenches

Anthelmintics, or more commonly 'drenches', are products that contain a chemical or chemicals that kill the target worms. There are currently no drenches on the market that are registered for use in alpaca; however, their use under the direction of a veterinarian is permissible.

The following is a list of drenches commonly prescribed for alpaca by veterinarians in Australia, New Zealand and USA:

- > **Ivomec** – Ivermectin. Mectin (ML) family
- > **Ivomec Plus** – Ivermectin & Clorsulon
- > **Cydectin** – Moxidectin. Mectin (ML) family
- > **Closicare** – Closantel
- > **Panacur** – Benzimidazole (BZ) family, Fenbendazole
- > **Valbazen*** – Benzimidazole (BZ) family, Albendazole

(NB: * The chemical *Albendazole*, as present in *Valbazen* poses serious risk during early pregnancy and must not be used in that circumstance)

With the current drench resistance direction, it is possible that alpaca breeders will be faced with having to use a combination of drenches in the future.

Under no circumstances should drenching with multiple drenches be performed unless under the direction of a veterinarian.

Integrated worm management

With no new drenches coming on the market, all livestock industries are faced with having to reassess their management strategies in order to preserve the value and remaining efficacy of the drenches we currently have.

Strategic drenching

With the aim of maximising effect and reducing the number of treatments required, strategic drenching treatments are given at critical times of the year in relation to the epidemiology of parasite burden and in association with animal management.

Adult alpaca

Studies documented in 1999 RIRDC report 'Australian Alpaca Fibre, Improving Productivity and Marketing' described that adult alpaca can maintain a natural resistance to infection and routine drenching may not be necessary; and that age related resistance to worm burdens usually becomes established in the second year and should persist if general management and husbandry are adequate.

Dams, cria and weaners

Generally, alpacas most vulnerable to worm infestation are cria, weaners and pre and post parturition hembra.

With pre and post parturient hembra, it is the suppression of her overall immune system so her body may not mount a response to the developing foetus which in turn can leave her vulnerable to high burdens of worm infestation. Drenching of hembra post birthing can be appropriate.

Drenching of cria is not recommended unless the cria is under significant worm challenge.

From a management perspective, most important is that cria, dams and weaners are kept on 'clean' paddocks and not permitted to run with large groups of adults where they can be exposed to higher levels of larvae.

By avoiding overstocking wherever possible, performing routine faecal egg counts to monitor worm burdens and not running cria, dams and weaners with large numbers of adults, you can reduce the incidence of excessive worm infestation and reduce drench requirements. ►

Quarantine drenching

There are two ways of inadvertently obtaining drench resistant worms; breed them yourself or import them.

Quarantine drenching of every animal that arrives on your property is imperative. Generally Ivomec has been sufficient for alpaca; however it is possible that a combination of drenches will need to be used in the future under veterinary supervision.

Irrespective of the size of the property, a quarantine area is imperative. Having received a quarantine drench, new arrivals should remain in the quarantine area for a minimum 24 hours, preferably 48 hours before release into a 'wormy' paddock so that any resistant worms that slip past the quarantine drench will be diluted by the drench susceptible worm population.

Refugia – Maintaining populations of susceptible worms

As the saying goes, "if you can't beat them, join them". We are never going to achieve eradication of worms. It is the drench resistant worms which are our major concern and we need to keep worms susceptible to the drenches that we have, in order to have some control over them.

So we need to think sideways and implement an additional strategy that will hinder the growth in population of the drench resistant worms.

Refugia is the maintenance of a population of worms that are sensitive to a drench or are in 'refuge' from a drench. The populations of worms in 'refuge' are those that were sitting in the pasture as eggs or larvae when drenching time came around and those inside an animal that missed out on a drench.

When treating all animals in a herd, only the resistant worms will survive. When drenched animals are moved to a clean pasture, only worms that are drench resistant will develop in that pasture.

However, if animals go back to a 'wormy' paddock, the drench resistant worms will breed with the drench susceptible worms to maintain a worm population that should still respond to drenches. In other words, the population of worms in refugia provides a pool of genes to dilute the resistant genes.

Leaving some animals untreated; such as older wethers or retired hembra, will assist in maintaining a population of drench susceptible worms in 'wormy' paddocks, with faecal egg counts to monitor the health and safety of the animals.

Faecal egg count (FEC)

One of our greatest weapons in the war on worms and drench resistance is faecal egg count.

Some breeders are able and choose to do their own faecal egg count but your vet and state agricultural department can also perform FEC on a group or individual basis.

Performing FEC twice a year will give you a clear indication if your worm management strategies are working. Speak to your vet or agricultural department about the best time of year for FEC in your particular area.

Samples can be from individual animals or from the communal poo pile (avoiding soil) however individual samples are far more effective wherever possible, allowing you to identify particular animals with problems and also to show patterns of a herd parasite problem that may be developing.

Faecal egg count for drench effectiveness

Faecal egg counts for the efficacy of the drench you are using are very worthwhile. Collect samples 7-10 days after drenching, irrespective of the type of drench used.

Pasture and paddock management

The importance of pasture and paddock management cannot be understated in an integrated worm management programme.

This can prove extremely difficult in this time of drought and with smaller sized properties but keeping some essentials in mind will assist breeders:

- > Alpaca's general inclination to use toilet areas is a significant bonus in controlling worm infestation and certainly collecting poo is of benefit. It is worthwhile to note that during the height of drought with minimal or no pasture, animals will seek out green pick and even fussy animals can be inclined to graze around poo piles. This will increase the risk of worm infestation.
- > In moist and/or humid conditions, manure should not be spread on paddocks without composting.
- > SPELLING: Pastures need to be spelled for more than 10 weeks in autumn/winter for useful reduction in numbers of worm larvae. There are two influencing factors for this: a time lag of several weeks, or even months, between eggs being deposited in the manure and the appearance of larvae on the pasture and also, larvae can survive for many months during cool conditions. Certainly in summer rainfall areas the time between storms during October and November can be hot and dry which provides a shorter life expectancy for larvae; spelling paddocks during these dry times can reduce larvae later on. Contact your state DPI or RLPB to learn more about grazing strategies in your local area.
- > ROTATIONAL GRAZING: Cell and rotational grazing systems, with frequent rotations between paddocks, generally do not leave sufficient time between grazings to significantly reduce pasture worm contamination levels. During the cooler and wetter months of the year this could require several months stock-free.
- > CLEAN PADDOCKS: Maintaining areas for dams, cria and weaners that have not been grazed by large groups of adults for 100+ days will assist in reducing exposure to high levels of larvae during a vulnerable stage.

The alpaca industry has faced and will continue to face many challenges and breeders' willingness to embrace new practices places us in a strong position for a successful and viable future. Every worm programme should be tailored specifically to the individual farm and this must be done in conjunction with your veterinarian. ■

Acknowledgements

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