

Alpaca worms - an overview

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Introduction

Alpacas, which are South American camelids, are susceptible to both cattle and sheep internal parasites including liver fluke (*Fasciola hepatica*). Worms specific to South American camelids, such as *Lamanema chavezii*, are not known to occur in Australia. Alpacas use dunging 'latrines' which can help to control roundworm parasites. As a result, worm burdens are often not high. However heavy barber's pole worm (*Haemonchus contortus*) burdens can occur, especially in high rainfall coastal areas in NSW and Queensland. Alpacas are also quite susceptible to liver fluke, possibly due to their relatively small livers.

What worms?

As outlined above, alpacas can carry sheep and cattle internal parasites, including liver fluke.

Drawing from information reported by Carmichael (South Australia, 1999; see references), these are some of the sheep or cattle worms found in alpacas in Australia:

- Black scour worm/stomach hair worm (*Trichostrongylus*)
- Small brown stomach worm (*Ostertagia/Teladorsagia*)
- Thin-necked intestinal worm (*Nematodirus*)
- Small intestinal worm (*Cooperia oncophora*). Alpacas can maintain *C. oncophora* infections without the presence of cattle. This cattle worm is more likely to establish in alpacas than sheep.

Carmichael further notes that, with respect to the worms mentioned above, crias (0-6 month old alpacas), weaners (6-12 months old) and tuis (1-2 years old) tolerate these reasonably well unless there is heavy pasture contamination.

In 1999, Carmichael reported that the lungworm *Dictyocaulus* sp had not yet been recorded in alpacas in Australia, but needed to be kept in mind as a possible cause of lung disease.

Regarding pasture contamination, while the latrine 'system' of alpacas can limit intake of worm larvae by alpaca, this can break down when stocking rates are heavy, when there are repeated heavy falls of rain (e.g. in coastal areas), and where management practices result in the spread of manure over the paddock (e.g. raking and spreading of dung from latrines in order to spread nutrients over the paddock)

Note that Carmichael's studies were done in the non-seasonal to winter rainfall zones of South Australia and Victoria. In these situations, although barber's pole worm (*Haemonchus*) may be present, they are likely to be less important than in the summer rainfall zones of north-eastern NSW and south-eastern Queensland, for example. In these areas barber's pole worms are very important worms of grazing ruminants and also lamoid species such as alpacas.

Liver fluke (*Fasciola hepatica*), as already mentioned, can be a significant parasite of alpacas in 'flukey' areas. Liver fluke and barber's pole worm are both 'blood suckers' (i.e. 'haematophagous') and potentially quite pathogenic, causing significant disease (anaemia etc.) and even death if present in large numbers.

While not directly related to alpacas, Carmichael (1999) commented that whipworm (*Trichuris* sp) in large numbers can cause severe diarrhoea in camels in Australia, and that these infections were not always ivermectin-responsive.

As to alpaca-specific worms found in South America, Carmichael (1999) states that these 'lamoid parasites' are not known to occur in Australia. *Lamanema chavezii* (first described in 1963) is the most prevalent lamoid worm in South America. Migrating *L. chavezii* larvae cause liver

necrosis in young alpacas. Although *L. chavezii* is not known to occur in Australia, it has been found in New Zealand (McKenna and others, 2009).

In 2014, Carmichael further states that “certain dangerous South American parasites, for example *Lamanema chavezii*, a small intestinal roundworm and *Microthoracius* spp. (camelid sucking lice) appear to have succumbed to quarantine treatments and do not present a threat to Australian alpacas”.

Host resistance (to worms)

According to Carmichael (1999), host resistance seems to occur in alpacas, as evidenced by declining egg counts from the second year (of life) on. This at least was the case in a southern Australia study in the late 1990s (5 farms, South Australia and Victoria). Carmichael suggested this host resistance was probably stronger in alpacas than in Merino sheep.

It is unclear whether a similar host resistance to barber's pole worm occurs in summer rainfall areas. And, to this writer, it is doubtful there is much host resistance to liver fluke, which is also the case for most grazing livestock (sheep, goats, cattle), apart from horses and pigs perhaps, which seem to have a degree of resistance to liver fluke infection (Love S, 2017).

Coccidia – a brief note

Carmichael (1999) states that coccidia are host-specific, therefore domestic animals in Australia (sheep, cattle etc.) are not a source of coccidian infections in alpacas. He further comments that in Peru, coccidia are only important in young animals.

Although outbreaks had not been recorded in Australia (1999), ongoing vigilance is advised.

Worms in alpacas – what to do

How do you decide if your alpaca have worms or if they need to be drenched? Do you drench them when you think they might need to be drenched? Or do you treat them because you know they have worms?

Are you drenching too often, thus wasting money and increasing the likelihood of resistance to drenches developing? And when you do treat your alpacas, how do you know the drench worked?

Visual appraisal of animals alone is a notoriously unreliable way of assessing worm burdens. This is especially so in alpacas where the fleece can hide their true body condition. By the time

animals 'look wormy', they may already have a serious worm problem. Be aware also that a 'wormy appearance' (diarrhoea, pallor of eye membranes, ill thrift, poor exercise tolerance) can be due to causes other than worms.

WormTest (worm egg counting) can help you find out if your alpacas have worms or not.

Although specifically related to sheep and goat worms (with cattle-related material to come in 2019), **WormBoss** (www.wormboss.com.au) is a good resource for learning more about WormTesting, DrenchChecks and the like, as the general principles of worm control apply to all grazing livestock.

WormTest and DrenchTest

WormTest is used to monitor worm burdens of alpacas as well as other grazing livestock, including cattle, sheep, goats, horses and even free range poultry.

Worm egg counts (WECs) and fluke egg counts are done on dung samples submitted to a laboratory, usually in a lab-supplied kit.

Egg count results are sent to farmers, usually within one working day of the samples arriving at the laboratory. The type of worms present can also be identified. This requires culturing worm eggs and examining the larvae which hatch. This procedure is known as larval culture and differentiation and requires 10 days or so for the result.

Egg counts for roundworms are usually done by a flotation method. Liver fluke egg counts can also be done by a flotation method (using a different flotation liquid), but most labs in Australia use a sedimentation technique. If you want a fluke egg count as well as the standard WEC, you will need to specify that when sending samples to the lab.

DrenchTest

WormTest (worm egg counts (WECs)) is also a valuable tool for monitoring the effectiveness of drenches. Remember: resistance of worms to drenches is very common.

When checking drench efficacy against roundworms, do a WEC on the day of treatment and again 14 days later. For more information, see the section on testing at WormBoss.

To check the efficacy of liver fluke drenches (flukicides), one method is to do a fluke egg count on the day of treatment, and again 21-28 days later. For more information, see the NSW

DPI Primefacts on liver fluke (Boray and Love, 2017, and Love, 2017).

WormTest kits – availability and cost

WormTest kits are often free (depending on the laboratory) and are available in NSW from Local Land Services offices, rural resellers / merchandisers and some NSW DPI offices.

These kits typically contain sample jars or vials, a glove, and a laboratory submission form and instructions.

Private laboratories also provide a similar service. Prices for laboratory testing vary according to the tests required. Call your laboratory for current charges. (More information below).

When considering the cost of WormTesting, make sure to also factor in the benefits, which are considerable.

D.I.Y worm egg counts

Some producers opt to do their own roundworm egg counts.

NSW DPI has information on this (see Love, 2017a) and also provides training through Tocal Skills Training.

Some private providers run courses on worm egg counting.

Sample collection and using the kit

To collect dung samples, muster a number of the mob – or the whole mob - to a clean corner of a paddock for 10 minutes and then let them drift away quietly. Younger animals are often an important group to sample because they tend to be more susceptible to worms.

Fresh, clean dung samples can then be collected from the ground, avoiding soil. Alternatively, samples can be collected from the communal dung heap, but samples must be fresh (still very warm and moist) and clean.

Animals accustomed to handling can be sampled direct from the rectum (a glove is supplied in the WormTest kit). Ten samples from separate alpacas are required and sufficient dung to fill each sample container in the WormTest kit should be collected. Fewer animals than 10 can be sampled, but this is less economical and, in larger groups of alpaca, gives less information on

the likely level of worm burdens in the rest of the group.

Keep samples from young animals separate or identify individual animals. Fill out the information sheet and post the package to the laboratory within 24 hours of collection. Keep samples cool but do not refrigerate them.

Individual animal vs bulk Wormtests

This is often discussed, especially with respect to sheep. For more information on this, see Love (2017a) or Kahn (2017).

However, Carmichael (1999) states that bulk counts are not useful in alpacas.

Where is the testing done?

WormTests are done at the **NSW DPI State Veterinary Diagnostic Laboratory (SVDL)** at Menangle. This lab is NATA accredited (to ISO 17025) and provides a wide range of diagnostic services. (NATA is the National Association of Testing Authorities).

Contact details for the NSW DPI State Veterinary Diagnostic Laboratory:

P: 1800 675 623

E: laboratory.services@dpi.nsw.gov.au

8:30am-4:30pm Monday-Friday (excluding public holidays)

Postal address: Private Bag 4008, Narellan NSW 2567

Delivery address: Woodbridge Road, Menangle NSW 2568

(Street) NSW DPI State Veterinary Diagnostic Laboratory

For a list of **private or other providers** see:

<http://www.wormboss.com.au/tests-tools/professional-service-providers.php>

Interpreting worm egg counts

Results (egg counts) will usually be sent to you within one day of samples being received by the laboratory and a copy sent to your nominated veterinarian. Larval culture results take a little longer.

In non-seasonal and winter rainfall areas at least, WECs in alpaca are usually low (less than a few hundred eggs per gram (epg), and significantly

less than WECs commonly found in sheep or goats.

Results should be discussed with your vet or other suitably qualified animal health advisor to determine the need for any worm treatments.

Carmichael (1999) comments:

Bulk counts are not useful in alpaca (as mentioned above).

At least 15 individual WECs should be done, and preferably the whole mob if it is not too large.

Interpreting WECs is very subjective, and extrapolating from WEC benchmarks for sheep or cattle is dubious.

Because WECs in alpacas are often low (e.g. lower than sheep and goats), the counting method in the lab needs to have a minimum sensitivity of around 15 eggs per gram. That is, the cattle method (where two chambers in a Whitlock Universal slide are counted) should be used instead of the sheep method (just one chamber counted).

Carmichael (2014) does, however, offer some guidelines. See Table 1 below.

Table 1. Alpacas - when to drench (benchmark egg counts (epg), for 'scour worms')

	Egg type and egg counts		
	Strong.	Nem.	Nem+strong
Crias, weaners	>350	>100	>250
Tuis, adults	>125	>50	>75

Notes:

The table applies to 'scour worms', and note that Carmichael's studies were done in non-seasonal and / or winter rainfall areas of South Australia and Victoria where barber's pole worm (*Haemonchus*, which produces many eggs) is not a major worm, unlike summer rainfall areas of north-eastern NSW, and Queensland.

EPG= eggs per gram of faeces

'Scour worms': worms that tend to cause diarrhoea, notably black scour worms (*Trichostrongylus* spp), brown stomach worm (*Teladorsagia/Ostertagia*) and thin-necked intestinal worm (*Nematodirus* sp).

'Strongyle': the egg type produced by *Trichostrongylus*, *Teladorsagia/Ostertagia*, *Haemonchus* etc.

Nematodirus: this produces eggs that technically are 'strongyle' type, but are much larger than other 'strongyles' and are easily distinguished during egg counting.

Crias: 0-6 month old. Weaners: 6-12 months old. Tuis: 1-2 years old.

Summer rainfall and similar areas will have barber's pole worm (sometimes in large numbers) as well as 'scour worms'.

Further suggestions (from this writer):

Barber's pole worm in alpacas: consider drenching if WECs are >350-500 and larval culture indicates most of the eggs are from barber's pole worm. This guideline is conservative compared to benchmarks in sheep for barber's pole worm. (See Wormboss). In extreme situations (conditions extraordinarily favourable for *Haemonchus*, i.e. continuing mild to warm and very wet conditions), there can be disease (anaemia, even deaths) from large rapidly acquired burdens of immature *Haemonchus* before WECs rise appreciably. In most cases of disease (haemonchosis) from *Haemonchus*, WECs are high (eg >>1000 epg), somewhat higher than significant WECs from 'scour worm' infections.

Liver fluke: any positive egg count is significant.

Disease (fasciolosis) can occur before counts become positive. Liver fluke do not produce eggs until they are ~ 10-12 weeks old or older. Liver fluke infection increases the risk of black disease (infectious necrotic hepatitis, caused by *Clostridium novyi*. Preventable by vaccination. See Vaughn J, in References).

Benefits of regular WormTesting

WormTest is good value for money.

- It may save you the expense of unnecessary drenching.
- WormTest can help forestall a disaster due heavy worm infections.
- The test can be used to check whether a drench is working (DrenchTest).
- WormTest is a useful tool for monitoring the performance of your worm control program.

Don't guess; WormTest!

Drenches for alpaca

There are no anthelmintics (drenches) registered for use in alpacas.

The only way drenches (sheep drenches, for example) can be used legally in alpacas in NSW is by prescription from a registered veterinarian, in the context of a bona fide veterinarian-client relationship.

Note also that sheep dose rates, for example, may not be appropriate in alpacas. Your prescribing veterinarian can provide relevant advice on this.

Resistance of sheep and cattle worms to available drenches is common. You can determine what drenches are effective on your property by doing regular DrenchTests.

Also be advised there are occasional reports in the overseas veterinary literature of albendazole toxicity in crias.

Integrated parasite management (IPM)

As with other animals, integrated worm control is better than relying solely on frequent treatments.

IPM involves having a number of 'strings to your bow'. IPM includes the following:

Effective use of drenches

Use drenches no more than necessary, and be careful with your choice of drench. See your local vet or other qualified adviser.

Grazing management

Set-stocked animals are more likely to get wormy. Move animals to fresh pasture from time to time, but note that rapid rotational grazing (e.g. every few weeks) may not be effective due to inadequate rest periods for pastures, unless conditions are very hot (>>30 degrees), which will cause the death rate for infective larvae to increase significantly. WormBoss gives guidance on this. For example, see the appendices in the program specified for your region.

<http://www.wormboss.com.au/programs.php>

Although alpaca are susceptible to cattle (and sheep) worms, rotational grazing using adult cattle (which generally shed few worm eggs), for example, is likely to reduce exposure to worms. Carmichael (1999) says that, optimally, avoid rotational grazing or sharing with other species, especially young ruminants.

Be careful with alpaca used as guardians for lambing-ewe flocks, as ewes can heavily contaminate the lambing paddock with worm eggs.

Avoid overcrowding.

Avoid grazing crias and weaners with large numbers of older animals.

With respect to liver fluke, avoid grazing known 'flukey' areas in danger periods (e.g. dry autumns after a wet spring and summer (during which fluke transmission was high). Land near slow flowing streams and drainage ditches where the necessary intermediate hosts ('lymnaeid' aquatic snails) live are potentially 'flukey' areas.

Removing faeces

Carmichael (South Australia, 1999) suggests removing faeces from latrines at least monthly and composting for 10 or more weeks (summer), and double that in cooler months.

Nutrition

Well-nourished animals generally tend to have stronger immunity and fewer worm problems.

Fine tuning

Fine-tune your worm control program using tools such as regular worm egg count monitoring (WormTest) and testing the effectiveness of drenches (DrenchTest). (Resistance of sheep and cattle worms to drenches is common). Get good advice, especially sound information relevant to your local area.

References and more information

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DIY worm egg counts: see Love S, 2017a (below).

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Kahn LP, 2017. Individual or bulk worm egg counts: is there a difference? ParaBoss / WormBoss feature article, October 2017. Accessed December 2017 at <http://www.wormboss.com.au/news/articles/tests/individual-or-bulk-worm-egg-counts-is-there-a-difference.php>

Lamoid (plural lamoids): a member of the South American camelid family, a llama, alpaca, vicuna, or guanaco. Source: <https://en.wiktionary.org/wiki/lamoid>

Liver fluke: in addition to NSW DPI Primefacts on liver fluke (search at www.dpi.nsw.gov.au), also see the information at WormBoss (www.wormboss.com.au) on liver fluke.

Love S, 2017. Liver fluke – a review. NSW DPI Primefact 813. Accessed December 2017 at: <https://www.dpi.nsw.gov.au/animals-and-livestock/sheep/health/internal-parasites/liverfluke-disease-sheep-cattle>

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Love S, 2017a. D.I.Y worm egg counting. Primefact 1613, 1st edition, 5 December 2017. Accessed December 2017 at <https://www.dpi.nsw.gov.au/animals-and-livestock/sheep/health/internal-parasites/d.i.y-worm-egg-counting>

McKenna and others, 2009, New Zealand Veterinary Journal.

Tocal Skills Training (formerly Profarm): Information on course, "Faecal egg count for worms": <https://www.dpi.nsw.gov.au/content/agriculture/tocal-skills-training/courses/faecal-egg-counts>

Vaughan J. <http://criagenesis.cc/>
<http://criagenesis.cc/wp-content/uploads/2016/03/CriaGenesis-Vacc-5-in-1a-1.pdf>

WormBoss: Although specifically related to sheep and goat worms (with cattle-related material to come in 2019), WormBoss (www.wormboss.com.au) is a good resource for learning more about WormTesting, DrenchChecks and such like, as the general principles of worm control apply to all grazing livestock.

Revision history

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