



NSW Agriculture



Turning the Worm

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Welcome to this issue of TTW. The main purpose of this informal newsletter is to share information with those particularly interested in the management of endoparasites of farmed animals, including sheep, goats and cattle.

Worms in alpaca

**Stephen Love and Gareth Hutchinson,
NSW Agriculture**

Following is an article Gareth and I wrote for an alpaca industry newsletter. We hope TTW readers find it of use.

Dr Gareth Hutchinson is the Research Officer, Parasitology, NSW Agriculture, Elizabeth Macarthur Agricultural Institute, Camden. His email address is gareth.hutchinson@agric.nsw.gov.au – Ed.

Alpaca are susceptible to both cattle and sheep internal parasites including liver fluke (*Fasciola hepatica*). Their use of dunging “latrines” helps to control roundworm

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parasites, and worm burdens are not usually of pathogenic (disease-causing) proportions. Occasional heavy *Haemonchus* (barber's pole worm) burdens are reported, especially in high rainfall coastal areas. Other types include black scour worm (*Trichostrongylus*) and small brown stomach worm (*Ostertagia*, also known as *Teladorsagia*).

Worms in alpaca - 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?

Visual appraisal of animals is a notoriously unreliable way of assessing worm burdens. This is especially so in alpaca where the fleece can hide their true body condition. By the time animals 'look wormy', they can 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 can help you find out if your alpaca have worms or not.

WormTest - What is it?

WormTest is used to monitor internal parasites of alpacas as well as cattle, sheep or goats. Worm egg and fluke egg counts are done on dung samples submitted to the laboratory in a WormTest Kit. Egg count results are faxed or mailed to farmers within 24 hours 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, so a further 10 days is required for the result.

WormTest kits - availability and cost

WormTest faecal collection kits are free and available from Rural Lands Protection Boards, stock and station agents and NSW Agriculture. Private laboratories also provide a similar service.

Prices for laboratory testing vary according to the tests required. Call your laboratory for current charges. (See below for contact details.)

Sample collection and using the kit

To collect dung samples, muster a number of the 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 and clean. Animals used to being handled can be sampled direct from the rectum. (A glove is supplied in the WormTest kit).

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

Where is the testing done?

WormTests are done at NSW Agriculture's Veterinary Laboratories. Other laboratories offer a similar service. Following are the contact details for some NSW laboratories:

NSW Agriculture Regional Veterinary Labs

www.agric.nsw.gov.au/reader/das-laboratory

“NATA accredited (to ISO 17025) and unsurpassed for breadth and quality of services”.

✚ Camden/Menangle (at Elizabeth Macarthur Agricultural Institute):

tel (02) 4640 6327

✚ Orange: tel (02) 6391 3858

✚ Wollongbar: tel (02) 6626 1261

Some private laboratories

✚ Veterinary Health Research, Armidale
tel (02) 6771 1358

www.vhr.com.au

✚ New England Veterinary Centres, Armidale
tel (02) 6771 2022

Interpreting Worm Egg Counts

Results will be faxed or posted to you within 24 hours of samples being received by the laboratory, and a copy sent to your nominated veterinarian. Worm egg counts in alpaca are usually low (less than a few hundred eggs per gram faeces [epg]), and significantly less than values commonly found in sheep or cattle. Results should be discussed with your vet or animal health advisor to determine the need for any worm treatments.

Benefits of regular WormTesting

WormTest is good value for money:

- It could save you the expense of unnecessary drenching.
- It can help forestall a disaster due to heavy worm infection.
- It can be used to check whether a drench is working, by collecting samples 10 to 14 days (longer for ‘long-acting’ drenches) after using a particular drench.

- It is a useful tool for monitoring your worm control program.

Don’t guess! Worm Test!

Drenches for alpaca

There are no anthelmintics (drenches) registered for use in alpaca. This means the only way they can be used legally in NSW in these animals is under veterinary direction. See your vet for more information.

As to dose rates of drenches for alpacas, experts have varying opinions. Some state that cattle or sheep dose rates are effective. However, one authority from New Zealand suggests that sheep dose rates of ivermectin, for example, or oxfendazole (a benzimidazole (BZ) or ‘white’ drench) are unsuitable, and that ivermectin needs to be given at 1.5 times the sheep dose rate and oxfendazole at twice the sheep dose rate. Again, it is important to get advice from your vet.

‘Organic’ drenches

Organic drenches, for example plant-based remedies, have been used for many centuries in traditional agriculture in various parts of the world. There is increasing interest in these alternative methods of worm control in western agricultural systems. A difficulty is getting reliable information on the efficacy and safety of organic remedies as well as residues if any following their use. Some of them doubtless have some efficacy, but in the absence of good data, animals should be carefully monitored.

Legal implications also need to be considered. Under the NSW Stock Medicines Act of 1989, the use of unregistered products or medicines in animals that produce food for human consumption or are used for human consumption is illegal. Permits for such products can and should be obtained, for example, by a producer organisation, from the

Australian Pesticides and Veterinary Medicines Authority (www.apvma.com.au).

However drenches registered for use in sheep, for example, can be used in alpaca under written veterinary direction.

Integrated parasite management (IPM)

As with other animals, integrated worm control is better than relying solely on frequent treatments, whether ‘synthetic’, ‘chemical’ or ‘organic’.

IPM involves having a number of ‘strings to your bow’. These include:

- **effective use of drenches.** Use drenches no more than necessary, and be careful with your choice of drench. See your local vet.
- **grazing management.** Set-stocked animals are more likely to get wormy. Move animals to fresh pasture from time to time. Although alpaca are susceptible to cattle (and sheep) worms, rotational grazing using adult cattle, for example, is likely to reduce exposure to worms.

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

With respect to liver fluke, avoid grazing known ‘flukey’ areas in danger periods (eg dry autumns). Wet areas such as slow flowing streams and drainage ditches where the necessary vector aquatic snails live are potentially ‘flukey’ areas.

- **nutrition.** Well-nourished animals generally tend to have stronger immunity and less 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.

(Resistance of sheep worms to drenches is common). Get good advice, especially sound information relative to your local area.

Refer to the NSW Agriculture web site for further information on worms and drenches. [www.agric.nsw.gov.au/reader/sheep-internal].

Cook slugs before eating

The following delightful piece is from New Scientist (25 October 2003 p12)

‘If you want to eat slugs, you must cook them first.

A young man in Australia was recently taken to hospital with severe meningitis. At first the cause was a mystery. But “repeated questioning revealed that the patient had ingested, five weeks earlier, for a dare, **two slugs**”, reports John Walker of Sydney University in *The Medical Journal of Australia*.

Slugs, it turns out, harbour the larval stage of a rat parasite, *Angiostrongylus cantonensis*. This **can crawl out of the gut** up to your brain, causing inflammation. The risks of eating raw slugs are well known in Asia but cooking kills the parasite.’

Measly sheep

Stephen Love, NSW Agriculture

The following is a newspaper (‘The Land’) article written particularly for farmers. Many thanks to Gareth Hutchinson and Bill O’Halloran of NSW Agriculture for helpful comments.

‘Sheep measles’ has been in the news of late because of some condemnations of sheep and lamb carcasses at abattoirs.

‘Sheep measles’ (*Cysticercus ovis*) are parasitic cysts that can occur in the muscles, especially the heart and diaphragm, of sheep and goats, apparently without ill-effects. These cysts are the larval form of a particular tapeworm, *Taenia ovis*, which occurs in the small intestine of dogs.

Unlike hydatids, sheep measles are not a human health risk, but are viewed as a quality defect.

Sheep and goats are 'intermediate hosts' and become infected when they eat pasture contaminated by faeces from dogs carrying the adult form of the tapeworm. Eggs can survive on pasture for several months.

Dogs are the 'final or definitive hosts' and they are infected by eating raw meat or offal from sheep or goats with 'sheep measles'.

Taenia ovis is one of a number of tapeworm species that dogs can carry in their intestines. Others include the common dog tapeworm and, more importantly for public health, the hydatid tapeworm. Intermediate hosts for the hydatid tapeworm include sheep, cattle, goats, pigs, wallabies, kangaroos and man, with cysts most commonly occurring in the lungs and liver.

Taenia ovis and the hydatid tapeworm in dogs have similar lifecycles, so controlling one should control the other. Control of these two tapeworms hinges on treatment and prevention of infection in the final host. Dogs should be regularly treated with a 'tapewormer' that is highly effective. Your vet can help you with the details. Prevention is most simply achieved by denying dogs access to offal and meat from intermediate hosts.

FAMACHA® **- the eyes have it!**

Stephen Love, NSW Agriculture

The following was written in the first place for 'Skirting the Issues' (STI), newsletter of the Australian Sheep Veterinary Society. Many TTW readers will not see STI, so the article is reproduced here.

Some of you already know about FAMACHA®, perhaps a lot more than me. However, here is an outline.

FAMACHA is a system developed in South Africa for categorising eye colour in sheep and goats in *Haemonchus* (barber's pole worm)-endemic areas. The idea is that conjunctival colour correlates reasonably well with haematocrit. This in turn reflects the animal's ability to withstand current challenge by bloodsuckers (*Haemonchus contortus*) in the abomasum.

The name 'FAMACHA' is derived from 'FAffa MAlan' and 'CHArt'. Dr Malan was one of the scientists involved in developing the system. He came up with the idea of categorising anaemia clinically so that individual animals unable to cope with worm challenge could be identified and treated.

FAMACHA is a way of achieving 'individualised animal management' (an area being examined currently in the Australian Sheep Industry Cooperative Research Centre). When sheep are yarded, their eyes are compared to a colour chart which shows several eyes ranging from 'normal red' to extreme pallor (almost dead from anaemia). Sheep are assigned to a particular eye colour category and treated or not treated for haemonchosis accordingly. Further, each sheep gets a leg band when it is treated. At the end of the *Haemonchus* season the animals with the most leg bands become candidates for culling.

In the South African context at least, FAMACHA is a nice way of only treating those sheep for *Haemonchus* that probably need it. Compared to randomly selecting sheep to be left untreated, it is also a safer way of keeping a reasonable proportion of a farm's worm population 'in refugia'. This then would reduce selection for drench resistance. Additionally, by culling 'repeat offenders', there is likely to be genetic progress in a flock towards greater host resilience or resistance to sheep worms. Limited trials in South Africa have indicated a heritability of the FAMACHA system similar to haematocrit and faecal egg counts in animals submitted to a relatively severe *Haemonchus*

challenge (J van Wyk, personal communication).

It is doubtful that FAMACHA can be simply transplanted from South Africa to Australia. However, some District Veterinarians in the *Haemonchus*-endemic area of northern New South Wales have begun to examine the feasibility of FAMACHA here.

Well known South African veterinary parasitologist, Dr Jan van Wyk, has suggested some references for further reading and made some comments. These follow:

'The FAMACHA© system is reviewed in

- **Van Wyk & Bath 2002.** *The FAMACHA© system for managing haemonchosis in sheep and goats by clinically identifying individual animals for treatment. Veterinary Research 33:509-529. [This contains a wide selection of the references].*

Other papers:

- **Vatta et al. 2001.** *Testing for clinical anaemia caused by Haemonchus spp. in goats farmed under resource-poor conditions in South Africa using an eye colour chart developed for sheep. Veterinary Parasitology 99; 1-14.*
- **Malan et al. 2001.** *Clinical evaluation of anaemia in sheep: early trials. Onderstepoort Journal of Veterinary Research 68:165-174).*
- **Bath et al. 2001** *Managing haemonchosis in sheep and goats. Final Report of FAO Technical Cooperation Project No. TCP/SAF/882(A) 2001).*

These papers are probably the most important for understanding the system and how it was developed. The report by Bath and others (2001) (which contains a number

of practical aids), and the paper by Van Wyk & Bath (2002), also attempts to simplify the application of FAMACHA, mainly by reducing the labour component which is a stumbling-block for many countries. The article by Malan et al (2001). contains initial results, before the FAMACHA© chart was developed Accordingly, the results are from a variety of persons who had to classify the colour of the conjunctivae as "red", "red-pink", "pink", "pink-white" or "white" without reference to a standard. '

FAMACHA© review

Here is the abstract of a review by van Wyk and Barth (Vet. Res. 33 (2002):

The Famacha© system for managing haemonchosis in sheep by clinically identifying individual animals for treatment

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Abstract – Escalating anthelmintic resistance has made it essential to develop alternative ways of worm management for reducing selection for worm resistance, and one of the most promising approaches is to treat only those animals unable to cope with worm challenge, thus favouring unselected worms originating from untreated animals.

Only clinical evaluation of anaemia (FAMACHA© system) and the body condition score are regarded as being of practical value or having potential, respectively,

for repeatedly examining flocks or herds and identifying individuals for treatment. Only the FAMACHA© system has been tested well enough for use under practical farming conditions. However, further investigation is needed on its effect on animal production, and methods to reduce labour.

Trials over several seasons showed that most sheep under severe *Haemonchus contortus* challenge required no, or only one treatment over a full summer season. A small minority (usually < 5%) needed more than two treatments. Most sheep could cope without regular treatment. With sufficient training, clinical evaluation of anaemia was found reliable for practical use. The overwhelming majority of trainees (some poorly literate) were able to implement the FAMACHA© system successfully. The dynamics of haemonchosis in a flock can easily be monitored. Farmers, farm workers and veterinarians all rated the system very highly (> 80%) and treatment costs dropped by approximately 58%. The heritability of FAMACHA© values obtained by clinical evaluation was high at $0.55 \pm 0.17\%$ in a Merino stud with ± 550 young rams and ewes which were the progeny of 21 sires. The FAMACHA© may not be as applicable to goats as to sheep, but further work is necessary. The main benefits of the system are the reduction in treatments, its use for discriminating between animals of varying ability to cope with infection (thus allowing genetic selection), and its lowering of selection pressure on *H. contortus* for anthelmintic resistance.

Haemonchus heaven!

Case Study: Use of the FAMACHA© system for a sheep flock in Brasil

Marcelo Molento 2nd Electronic conference on sustainable parasite management (Response 12) [Completed 2004/01/12], Food and Agricultural Organization (FAO)-University of Pretoria Network for Helminthology in Africa.

Jan van Wyk, Editor.

I understand the 'proceedings' of this e-conference – including Jan van Wyk's interaction with Marcelo Molento - will be available on the web in the (near?) future. – (SL) Ed.

Preliminary comments by Jan van Wyk:

'This second contribution of Marcelo Molento of Brasil .. (snip) .. in his second contribution Marcelo has some questions about application of the FAMACHA© system of clinical evaluation of anaemia (for managing *H. contortus* infection) in small ruminants. The focus of his questions is on the "challenge to field professionals and the need to change the producers' mentality with a method that is not as simple as it seems". As he says, it "needs not only training, but also a lot of background information, willingness and compromise".

Marcelo's contribution [rephrased by Jan van Wyk]:

Between May 13 and November 14, 2003 the FAMACHA© system of clinical evaluation of anaemia for haemonchosis in small ruminants has been used to manage *H. contortus* in a flock consisting of about 110 adult Ile-de France X ewes (that lambed in July/August and are now dry) and 30-40 young replacement ewes on unirrigated, natural pastures in Brasil. While the period concerned comprised late autumn, through winter to early summer, the climate is relatively wet and very mild, with temperatures over this period ranging between a minimum of 9.3 °C, to a maximum of 27.8 °C, the rainfall from 123mm in May to 174 in November, and humidity of 75-84 %. Previously, the worms had been controlled by treatment with anthelmintics every 30-45 days throughout the year.

(Haemonchus heaven! – SL (Ed.)

The stockman on the farm evaluated the animals with the FAMACHA© system, at an interval of 31 days between 13 May and 13 June and, thereafter, at consecutively 26, 13, 15, 14, 28, 9, 16, 13 and 20 d, and on each occasion only the sheep in FAMACHA© categories 4 and 5 were




treated. By 3 December 2003 none of the sheep had died from haemonchosis, and the following percentages of the ewes had been treated: 53% not at all, and 20.1%; 13.8%; 4.9%; 3.2%, 1.6%; 0.8%; 1.6%; and 0.8% from 1-8 times, respectively.

Although not tested statistically yet, the mean faecal egg counts (FEC) per FAMACHA© category showed a positive relationship (respectively 1650, 6480 and 9525 FEC for FAMACHA© categories 1-3). However, many of the highly susceptible ewes were found to be resilient (i.e. relatively insensitive to the effect of the current worm challenge), e.g. an individual evaluated to be in FAMACHA© category 1, despite an FEC of 38900. In other words, many "worm taxis" are not identified when the FAMACHA© system is used, with the negative consequence of very heavy pasture infectivity as the worm season progresses. This is potentially dangerous, especially for young animals, and considering that in this flock there appear, from FECs, to be "more resilient than resistant animals". The danger is that, while the FAMACHA© system identifies the more fit animals against *H. contortus* challenge, the

levels of pasture infectivity could become so high as to cause even the healthy animals, with FAMACHA© scores of 1 and 2, to develop life-threatening levels of anaemia. "Are we prepared to give these recommendations? Would the producers understand the risk and be prepared to take it?" The problem is compounded by some pharmaceutical companies that promise fast results through drenching with anthelmintics. Thus, "while researchers have a more practical way of dealing with the worms, the companies have a more practical way of dealing with the farmers".

As noted earlier, and to be fair to the FAMACHA© system, Jan van Wyk interacts with Marcelo on some of these points. It is intended that this and other material will be available on the web.

The bottom line:

-  *Brazil is Haemonchus heaven!*
-  *FAMACHA©, like every tool used for worm control, has its 'pros and cons'.*
-  *Marcelo's final comment was perhaps very insightful: 'while researchers have a more practical way of dealing with the worms, the companies have a more practical way of dealing with the farmers.'* – Ed.

The information contained in this publication is based on knowledge and understanding at the time of writing (January 2004). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.

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