Internal Parasites - Sheep

Internal parasite (worm) control

In most sheep production areas, internal or gastro-intestinal parasites (i.e. worms) are usual

They graze close to the soil surface and to their feces. They are slow to acquire immunity. I

Heavy stocking rates and insufficient pasture rest periods further contribute to the incidence

In the past, sheep producers relied heavily on anti-parasitic drugs, called "anthelmintics" to c

In the U.S., few anthelmintics are FDA-approved for use in sheep and lambs, and no new d

The Parasites

Gastro-Intestinal Worms (roundworms, nematodes, stomach worms)

In warm, moist climates, the parasite that causes the most problems to she*Haemonchus Co*

Females are identified as barber pole worms because their white ovaries are wound arounc

The symptom most commonly associated with barber pole worm infection is anemia, charac

A female barber pole worm can produce 5,000 to 10,000 eggs per day. The barber pole wo

The stomach worms usually of secondary importance are *Trichostrongylus*

In the southern United States, *Ostertagia circu*

Nematodirus is not usually a

Tapeworms (***Moniezia***

Because tapeworm segments can be seen in sheep feces, they often cause alarm to produ

In extreme cases, tapeworms may cause intestinal blockages. There is some evidence that

Lungworms (***Dictyocaulus fi***

Wet, low-lying pastures and cool, damp weather favor the development of lungworm diseas

Liver Flukes (***Fasciola hepati***

Liver flukes can cause death in sheep and lambs or liver damage in sub-acute cases. In the

Meningeal Worm (	***Paralaphostron***
The meningeal (deer or brain) worm is an internal parasite of	white tailed deer. The life cycl
The neurological signs observed in infected sheep depend upon	the number of larvae prese
Meningeal worm infection cannot be diagnosed in the live animal.	Treatment usually involve
Fencing sheep away from likely snail and slug habitats (e.g.	ponds, swamps, wetlands, low

Coccidia (	***Eimeria***
Coccidia are single-cell protozoa that damage the lining of	the small intestine. They are hos
Lambs in lambing pens, intensive grazing areas, and feedlots	are at greatest risk. Transmis
Clinical signs include diarrhea (sometimes containing blood	or mucous), dehydration, fever,
Outbreaks of coccidiosis are usually treated with sulfa drugs	and amprolium (Corid). These
Monensin requires a veterinary prescription. Preventive medications	such as monensin, las

Integrated Parasite Management (IPM)

Good Management	
Internal parasite control starts with good management and common	sense. Sheep should n

Use of Clean or Safe Pastures	
Clean or safe pastures are pastures which are not contaminated	with the worm larvae that a

Pasture Rest and Rotation
It is a common misconception that rotational grazing helps to control internal parasites in sh

Researchers in the Netherlands found that it takes three months of rest for an infected past

Grazing Strategies
Approximately 80 percent of the worm larvae can be found in the first two inches of grass. T

Multi-species Grazing
Sheep (and goats) are generally not affected by the same internal parasites as cattle and h

There are numerous other benefits to multi-species grazing. Each species has different gra

Alternative Forages
Some pasture plants have anthelmintic properties, such as those containing condensed tan

Forage species which contain high levels of condensed tannins include sericea lespedeza,

Healthy Soil
Earthworms have been shown to ingest worm eggs and larvae, either killing them or carryin

Nutritional Management
Supplemental feeding should not be overlooked as a means to control parasites. Sheep an

Zero Grazing
Keeping sheep and/or lambs in confinement (i.e. "zero grazing") is a means of reducing par

Genetics
Genetics is probably the best long term weapon against internal parasites in sheep. Some s

Regardless of the breed raised, producers can also breed sheep which are less resistant to

In New Zealand, it is possible to select rams that shed 60 to 70 percent fewer parasite eggs

Proper Anthelmintic Use

Anthelmintics are still an important part of parasite control. However, they must be used pro

Flocks should be divided into groups for deworming or drenching equipment should be calib

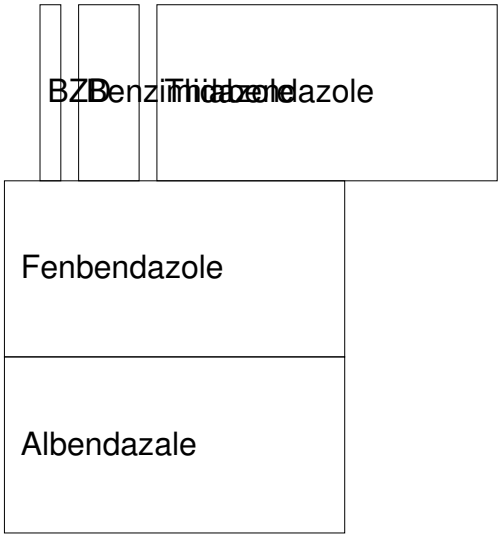
If an anthelmintic is more slowly absorbed in the gut, drug levels are prolonged and the treat

Using the same anthelmintic or drugs from the same chemical family will increase the rate a

If you do not deworm your animals much (e.g. < 3 times per year), you might not have much

To prevent the introduction of drug-resistant worms, you should deworm newly purchased a

Anthelmintics (dewormers) available in the U.S.



Oxtendazole

TBZ®
Panacur®, SafeGuard®
Valbazen®
Synanthic®

IMID	Nicotinic agonist
Imidazothiaoles	

Tetrahydropyrimidines	Levamisole
Morantel	
Pyrantel	Prohibit®, Levaso®l, Tramisol®
Rumatel®, Nematel®, Strongid®	
ML	Macrocylic lactone
Avermectins	
Milbemycins	Ivermectin
Epinomectrin	
Doramectin	
Moxidectin	Ivomec®, Primectin®

Eprinex®
Dectomax®
Cydectin®, Quest®

Only Valbazen® drench, Ivomec® drench, Levamisol® drench and oblets, and Cydectin® drench are

Alternative Dewormers

Currently, there is a lot of interest in using "natural" products as an alternative to chemical control of parasites. Such products include herbal dewormers and

diatomaceous earth. Unfortunately, there is no research to indicate that any of these products have a substantial effect on internal parasites in sheep, only testimonials. However, this is an area of increasing research interest and hopefully recommendations will be forthcoming in the years ahead.

Copper oxide particles (administered as a bolus) have been shown to reduce barber pole worm infections in sheep. They have been used with mixed results in goats. Copper oxide is available for cattle as a supplement to alleviate copper deficiency and has been used in sheep for the same purpose. Scientists are currently evaluating different dosage rates to avoid copper toxicity in sheep.

Refugia

Worms in "refugia" are those which have not been exposed to drug treatment.

They include free-living stages on pasture and worms in untreated animals.

Refugia are being viewed as an important tool to slow down anthelmintic

resistance. To increase refugia, it is suggested that a portion of the flock not be

dewormed.

Fecal egg counts and FAMACHA© scores can be used to identify which animals do not require deworming. Another strategy for increasing refugia is to return treated animals to a wormy pasture. The reason for this recommendation is because if treated animals are moved to a "clean" pasture, the only worms that will be on that pasture will be resistant to anthelmintic treatment.

Fecal Egg Analysis

Fecal egg analysis is an important part of a internal parasite control program.

Primarily, a fecal analysis tells you how contaminated your pastures are. Fecal

analysis can also be used to make selection and culling decisions by identifying

animals with both high and low egg counts. Probably the most valuable use of

fecal analysis is determining drug resistance.

The test to determine drug resistance is called the fecal egg count reduction test

(FECRT). To conduct a FECRT, animal are weighed and dewormed with the

anthelmintic you wish to test. Fecal samples are collected twice: first at the time of deworming and second, 7 to 10 days later. Six or more (ideally 10) animals should be tested for each anthelmintic. Fecal samples should also be collected and analyzed for a similar group of untreated animals.

For an anthelmintic to be considered effective it should reduce fecal egg counts by 90 percent (ideally 95%). There is severe drug resistance if treatment fails to reduce egg counts by more than 60 percent.

To do your own fecal analysis, you need a microscope, flotation solution, mixing vials, strainer, stirring rod, slides, and cover slips. You do not need an elaborate microscope. 100X power is sufficient. You can purchase flotation solution from veterinary supply companies or make your own by mixing a saturated salt or sugar solution. Your mixing vials can be jars, pill bottles, film canisters, test tubes, or something similar. You can use a tea strainer or cheese cloth to strain the feces. The stirring rod can be a pencil or popsicle stick.

If you want to count eggs, you want to get a McMaster Egg Counting slide available HERE. The McMaster slide has chambers that making egg counting

easier. The Paracount-EPG™ Fecal Analysis Kit with McMaster-Type Counting Slides is available for $40 from the Chalex Corperation.

Identifying Worm Eggs. "Strongyle-type" eggs (Haemonchus, Ostertagia and Trichostrongylus) are elliptical or oval, with smooth, thin shells. Nematodirus eggs are the largest strongyle-type eggs, but eggs of the species in the group cannot usually be identified precisely. Worming recommendations can be based on the quantity of strongyle eggs.

Since fecal counts only estimate the parasite load, there is no clear cut level at which worming is indicated. As a general guide, a level of about 500 eggs per gram of feces would indicate that worming is needed for sheep. A more effective way of deciding when to treat would be to monitor fecals every 4-8 weeks and deworm when there is a dramatic rise in egg counts.

Tapeworm eggs are square or triangular. Tapeworm (Moniezia sp.) eggs may be seen in fecal examination but they are in no way indicative of the level of infection. Since lungworm eggs hatch before being passed in the feces the eggs generally are not seen by the flotation method. Nematode larvae, when present

in the feces, are indicative of lungworm. F

luke eggs are oval and have a smooth shell with a cap or operculum at one end.

Liver flukes are prolific egg producers, but egg counts are not necessarily a good

indication of infection levels. Coccidia eggs are very small, about a tenth the size

of a Strongyle egg. Coccidia oocysts are passed in the feces of most livestock.

Oocysts are only a moderate indicator of level of infection.

FAMACHA©

The FAMACHA© system was developed in South Africa due to the emergence of drug-resistant worms. The system utilizes an eye anemia guide to evaluate the eyelid color of a sheep (or goat) to determine the severity of parasite infection (as evidenced by anemia) and the need for deworming.

A bright red color indicates that the animal has few or no worms or that the sheep

has the capacity to tolerate its worms. An almost white eyelid color a warning sign of very bad anemia; the worms present in the sheep's gut are in such numbers they are draining the animal of blood. If left untreated, such an animal will soon die.

The FAMACHA© chart contains five eye scores (1-5), which have been correlated with packed cell volumes (percentage of blood made up of red blood cells, also called haematocrit). Animals in categories 1 or 2 (red or red-pink) do not require

treatment whereas animals in categories 4 and 5 (pink-white and white) do. Animals in category 3 may or may not require treatment depending upon other factors.

FAMACHA© System

1	Red	>	28
2	Pinkish-red	23-27	No
3	Pink	18-22	Maybe
4	Pinkish-white	13-17	Yes
5	White	<	12

Mature sheep in category 3 (pink color) probably do not requiring treament,

whereas lambs or other susceptible animals should be treated if they are in

category 3. The frequency of examination depends upon the season and weather

pattern, with more frequent examination usually necessary in July, August, and

September, the peak worm season.

The FAMACHA© system results in fewer animals being treated, which slows down drug resistance. It identifies wormy animals that require treatment. Persistently wormy animals should be marked for culling. The process of inspecting the eyes is quick and can be incorporated with other management practices.

The FAMACHA© system is only effective for the barber pole worm. It should not be used in isolation. It should be incorporated into an integrated worm control program that includes other management practices, such as pasture rest, good nutrition, multi-species grazing, alternative forages, zero grazing, and strategic deworming. FAMACHA© should only be used by properly trained individuals. To get a FAMACHA© card, producers must take an approved training.

Five Point Check©

The same South African researchers who developed the FAMACHA© system have developed the Five Point Check© for targeted selective treatment of internal parasites in small ruminants.

The Five Point Check© expands the utility of the FAMACHA© system by incorporating other checks to encompass the symptoms and deworming need for other internal parasites of economic significance.

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1	Eye	Paling of ocular membranes
FAMACHA© score	Barber pole worm	
Liver fluke		
2	Back	Body condition score	All
3	Rear	

Dag score
Fecal soiling

evidence of scouring

Brown stomach worm

Hair worm

Threadworm

Nodule worm

4

Jaw

Sub-mandibular edema

"bottle jaw"

Barber pole worm

Liver fluke

5

Nose

Nasal discharge

Nasal bots

Internal parasite (worm) control

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Late updated 17-Dec-2010 by Susan Schoenian.