


Parasites of Sheep/Goat

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Management

Most important aspect of sheep/goat production

Applies to the following:

- Nutrition
- Housing/environment
- Parasites
- Pathogens/diseases




Parasites

- Parasites are a major cause of losses to the livestock industry

Over the past 20-30 years :

- dependence on anthelmintic use has increased
- anthelmintic resistance has emerged as a problem
- parasite epidemiology has changed
- there is new understanding of AR and its control
- some of the strategies which have been recommended for worm control select for AR




The Parasites

- Coccidia
- Round worms
- Flukes
- Tapeworms


} Internal

- External




Parasite Life Cycles

- Why life cycles are important?
 - To mitigate control strategy
 - To understand hosts (intermediate host & dead host)
 - To kill the immature parasites before they become adult to stop the damage
 - To plan rotational grazing
 - To choose the medication because not all drugs kill both immature as well as adults



Coccidiosis

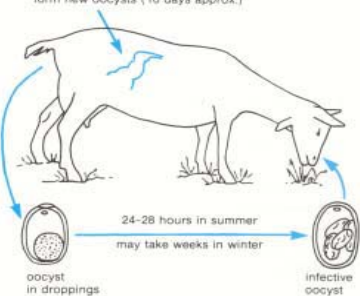
- 'Scours' bloody diarrhea effects young
- Oral Transmission
- Signs develop after 17 days of ingestion
- Increased incidence in Warm and wet conditions
- Does not respond to dewormers
- May not be found in fecal exam

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Coccidia Lifecycle

- Direct lifecycle < 21 days, usually 2 weeks
- Coccidia multiply in intestines
- Oocyst becomes infective on the pasture in about 3 days

coccidia multiply in intestine and form new oocysts (10 days approx.)




oocyst in droppings 24-28 hours in summer
may take weeks in winter infective oocyst

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Coccidia Prevention

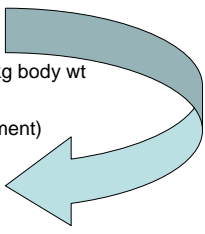
- Prevent animals from ingesting infective oocysts by moving the animals to the next paddock
- Oocysts are susceptible to Sanitation, Dry weather, Sunlight
- Elevated water troughs and feeders
- Reduce stress


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Rx: Coccidiostats

- Slows down oocyst development, does not kill
- Mixed in feed or water
- 21 days before kidding and continue 2 weeks afterwards
- Rumensin – 1.0 mg/kg body wt
- Deccox 6% Premix – 0.5-1.0 mg/kg body wt
- Bovatec – 1.0 mg/kg body wt
- Amprolium 9.6%– 10mg/kg (treatment)


Veterinarian's Prescription Only



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Bottle Jaw/Barber Pole


- Round Worms
- Most common
- Pale eyes and
- Occurs mainly
- Winter frost m
- Early pastures
- Winter or spring flock



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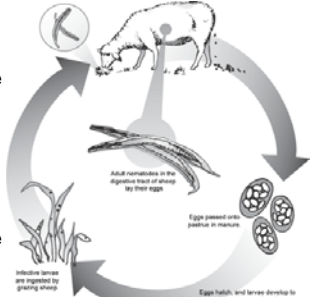


Courtesy Dr Jean-Merrie Luginbuhl, NCSU

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Barber Pole Lifecycle

- Direct 21-28 days cycle
- Higher number of larvae in lower part of pasture
- Eggs/larvae can survive for months on pasture
- Need 14 days inside the abomasum




Infection occurs when sheep graze on pasture

Adult nematodes in the abomasum of sheep lay their eggs

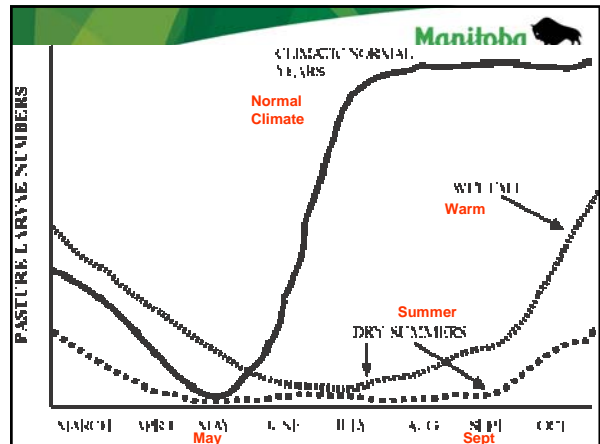
Eggs passed into pasture in manure


Eggs hatch, and larvae develop to infective 3rd stage in soil and pasture

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Parasites on Pastures


- Seasonal effects on larvae numbers
- Over wintered larvae # tend to decrease
- Dry summer reduces larvae tremendously
- Wet/rainy season predispose increase in numbers
- Parasite life cycle length depends on the climate



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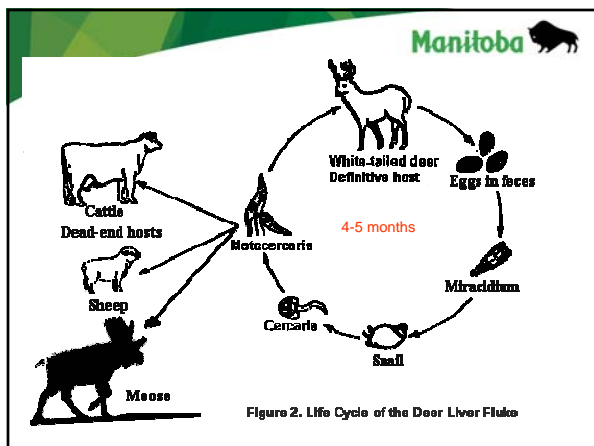
Barber Pole Control


- **Grazing Strategies**
 - Pasture rest (Yearly rotation in Manitoba)
 - Graze taller forages (80% larvae in bottom 2")
 - Wait to dry after rain
 - Sharing the pastures with cattle and horses
 - Forages (Trefoil) high in Condensed Tannin content
 - High protein diets enhances the immune system

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Liver Flukes

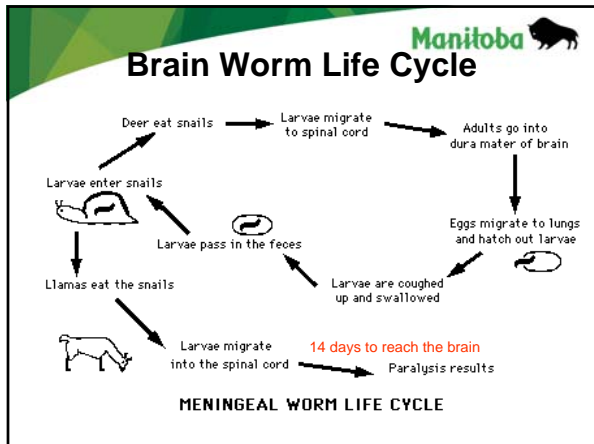
- Trematode (flatworm) are parasites of the liver
- In North America – 2 liver flukes in ruminants
 - *Fasciola magna*
 - Natural host are White Tail Deer, Elk
 - Occurs across N. America, Great lakes region
 - Only known found in Manitoba
 - *F. hepatica*.
 - Natural host are cattle
 - Occurs in Gulf States and Pacific North West




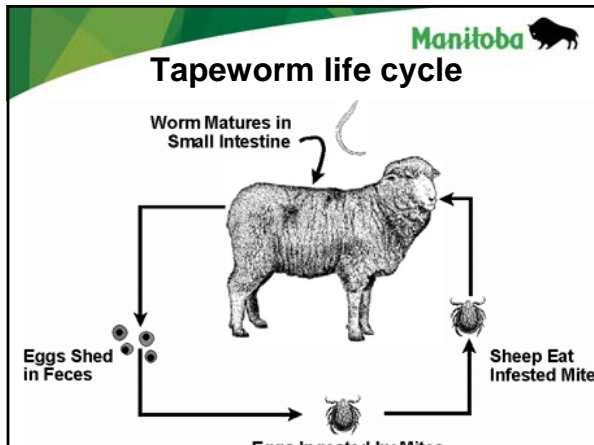
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Brain Worm (Meningeal Worm)

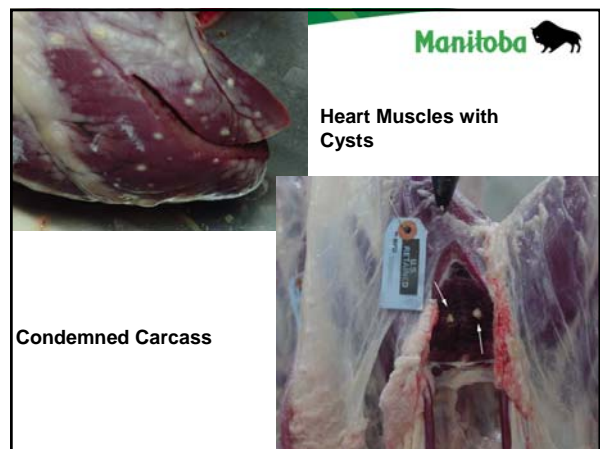
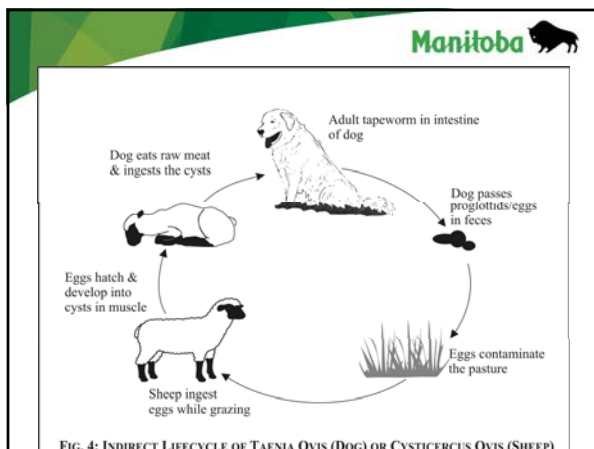
- Lama, Sheep, Goat are dead hosts
- Red tail deer, snail intermediate hosts
- Mild infection starts with lameness
- Severe infection – paralysis and death
- Anthelmintics do not work once the larvae enter brain except high doses of Ivomec
- Control Deer and Snail population



- Manitoba** 
- ## Tapeworms
- Long flat ribbon like worms
 - Segmented body
 - Broken segments pass in feces
 - Weight and wool loss
 - No typical signs



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- ## Dog Tapeworms (Sheep Measles)
- *Cyrtocercus Ovis* in Sheep intermediate stage of *Taenia Ovis* (tapeworm) of Dog
 - Dog/coyotes can be a source of this disease
 - Localize in muscle (cheek, heart, skeletal) forms cysts
 - Cause of carcass condemnation
 - No food safety issue



Control



External Parasites

- Lice, Ked, Mange, Nose Bot Fly
- Signs:
 - Wool loss, skin rashes, skin discoloration, weight loss, severe itching, scratching with the walls or poles
- Ivomec is the treatment of choice
- Delice or Permethrin preparations

The Anthelmintics

Broad-spectrum anthelmintics

1. **BZ - Benzimidazoles** - products that end in “zole” (Fenbendazole) – White dewormers
 - Drench, feed premix
2. **LM - Levamisole and morantel**
 - Drench, feed premix
3. **ML - Macrocyclic lactones (Ivomec)**
 - Drench, Injectable

What is anthelmintic resistance (AR)?

- AR exists if
- the parasite can tolerate anthelmintic doses which are normally lethal
 - the ability to do so is heritable

How does resistance appear?

- resistance alleles pre-exist in most worm populations even before anthelmintics are ever used
- then, when the anthelmintic is used, the very few worms with resistance alleles are favored
- resistance develops slowly at first, then more rapidly as allele frequency increases

Will resistance go away if the farmer stops using the anthelmintic?

- the short answer is ‘No!’
- once resistance to an anthelmintic emerges, reversion to susceptibility is unlikely to occur

What factors influence the rate of AR development?

1. The relative size of the *in-refugia* population.
2. Frequency of treatment
3. Rate of re-infection after dosing
4. Dose rates

What can be done to delay AR?

1. Rotation of anthelmintics
2. Combinations of anthelmintics
3. Prevent the entry of resistant worms onto farms from other farms.
4. Use new strategies (FAMACHA)

Parasite Control

1. Work out a control strategy with your veterinarian or advisor.
2. Use effective quarantine strategies to prevent the importation of resistant worms in introduced sheep and goats
3. Rotational grazing
4. Test for AR on your farm
5. Administer anthelmintics effectively
6. Use anthelmintics only when necessary
7. Select the appropriate anthelmintic for the task
8. Adopt strategies to preserve susceptible worms on the farm
9. Reduce dependence on anthelmintics

Fecal Egg Count Monitoring

- Fecal egg counts (FECs) can give a useful guide to the level of parasitism in a flock of sheep
- There are important limitations to their use as a monitoring tool

FEC Monitoring

- At least 10 animals should be sampled to estimate a group mean FEC
- A 'group' is a flock of animals of the same sex, age, reproductive status and treatment history, running in the same field
- The feces from 10 sheep may be pooled at the laboratory - it should not be mixed before then

FEC Monitoring

What is a suitable group?

- Animals that are fully-fed and in satisfactory health
- Results are reported as eggs per gram of feces
- If feed intake is impaired, fecal volume is reduced, and results are impossible to interpret

FEC Monitoring

Collection of feces

- Gather the group, hold quietly in one area, then gather feces from the pasture
- Select only warm, freshly-dropped specimens.
- Keep each specimen in a separate bag or container and cool.
- Deliver to laboratory within 48 hours

FEC Monitoring

Interpretation of results

- Interpret with local knowledge
- Remember: FECs cannot 'detect' burdens of immature worms
- Consider the different relationships between worm numbers and egg numbers in
 - different worm species
 - sheep of different age and reproductive status

Fecal egg count reduction test

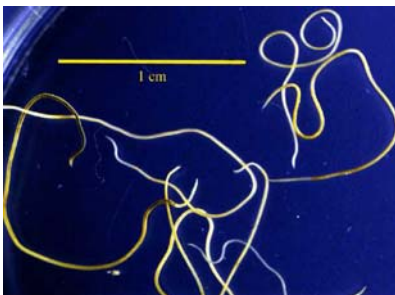
- FECs can be used to detect the presence of AR
 - Simple tests (unscientific)
 - 7 to 14 days post-treatment
- A quick and easy test for the presence of AR
 - Formal tests (scientific)
 - Set up with randomized groups, and controls
 - Calculate a percent reduction
 - < 95% reduction implies resistance

Flukes

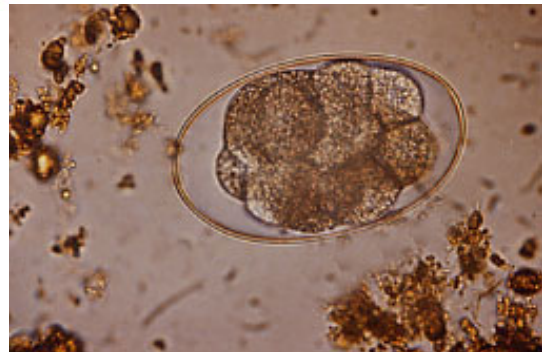
Liver Fluke (F. Magna) egg



Round Worm/Barber pole



Round Worm Egg



Tapeworm



Images

Ked



Lice



Itch Mite

