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# MidAmerica Ag Research

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# Veterinary Parasitology Laboratory

*Saving your animals from parasites by Using Fecal Worm Egg Counts to Determine Deworming Strategy!*

**Test Now**

- Beef & Dairy Cattle
- Equine
- Swine
- Sheep, Goats & Camelids
- Dogs & Cats
- Deer, Elk & other Wildlife

Company Profile	Research Opportunities	Lab Services for Parasite Diagnosis	Guide to Parasites	Parasite Control Strategies	Parasite Reference Material	Comments/Questions
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3705 Sequoia Trail      Verona, Wisconsin 53593      608-798-4901      [drbliss@chorus.net](mailto:drbliss@chorus.net)

Put  
**SCIENCE**  
in your  
deworming program!

Use MidAmerica Ag Research for all your fecal checks. See mail-in instructions under Lab Services and find deworming strategies under Parasite Reference Material.



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# Gastro-intestinal Parasites can cause Serious Problem in Alpaca!

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- Thousands of small ruminants die each year from parasites ....primarily from the Barberpole Worm (*Haemonchus*).
- Other serious parasites in Alpaca are *Nematodirus*, whipworms, tapeworms and coccidia (primarily *E. mac*) .

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# Alpaca are Very Susceptible to Gastro-intestinal Parasite Problems:

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- ◆ Gastro-Intestinal parasitism impact overall health, growth, reproduction, milk production and immune status.
- ◆ Environmental contamination builds-up during summer grazing season and can be very damaging to susceptible animals.

# Level of Parasitism Related To:

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- ◆ Age of animals.
- ◆ Immune status of the animals.
- ◆ Grazing environment.
- ◆ Pasture contamination & stocking rate.
- ◆ Weather especially warm weather.
- ◆ Nutrition of the animals.

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# Parasite Control Begins with Diagnosis!

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- Owners should be more active in parasite diagnosis.
- All animals should have fecal exams conducted twice a year; once in late winter and again in midsummer.
- All animals – bought or sold should have proof of a negative fecal exam accompanying all sales receipts.

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# Importance of Fecal Worm Egg Counts in Alpaca

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- Egg counts are the only way an owner can know whether their animals are harboring internal parasites.
- Egg counts are the only way an owner knows what type of parasites are present.
- All animals – bought or sold should have proof of a negative fecal exam.

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# Fecal Worm Egg Counts Provides a Parasite Status Report

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- Parasites left untreated lead to substantial production loss.
- Worm egg counts primarily determine numbers of worm eggs shed back in animal's environment.
- Worm egg counts can help you eliminate parasite from your operation all together.

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# Importance of Using an Accurate Fecal Worm Egg Count

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- Many clinics use the “Fecalizer” or “McMasters” techniques which are inaccurate, especially with low egg-shedding worm species.
- These techniques tend to high shedding parasite like *Haemonchus* (barberpole worm).

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# Only One Fecal Exam is Trustworthy:

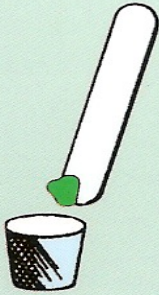
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- The “Modified Wisconsin Sugar Flotation” is the only technique to be trusted.
- The fecal exam identifies the species of parasite present and how many eggs per pound of manure are being shed back into the environment of the animals being tested.

# Modified Wisconsin Sugar Flotation Technique

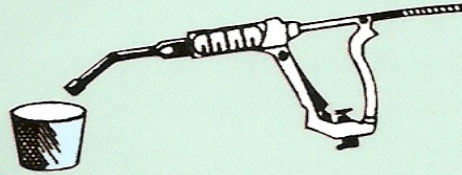
1

Measure 3 grams of fecal material into a 3-5 oz. paper cup



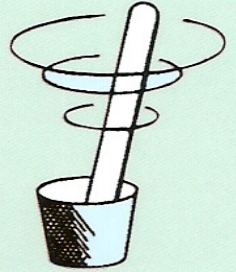
2

15ml sugar solution is added to fecal matter



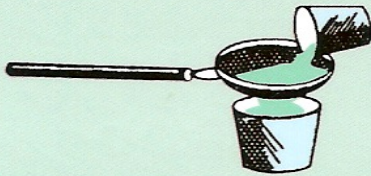
3

Stir solution and fecal matter until material has even consistency



4

Pour mixture into tea strainer and collect in 3-5 oz. cup



5

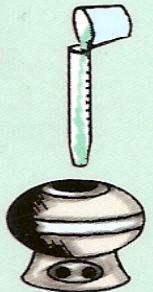
Use a tongue depressor to press as much material through strainer as possible



6

Pour strained mixture into a conical/graduated 15 ml centrifuge tube

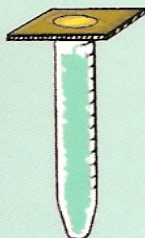
Place tube into centrifuge at 800-1000 rpm for 5-7 mins



7

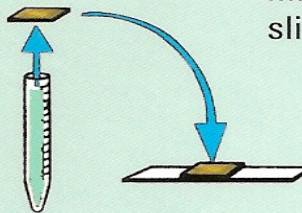
Place tube in rack and top off with sugar solution (forms a meniscus)

Cover with 22x22 mm cover slip and set aside for 2-4 mins



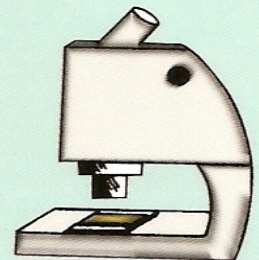
8

Lift cover slip directly upward and immediately place on microscope slide

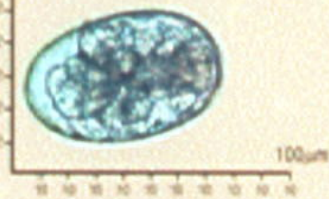


9

Use microscope to scan entire cover slip for egg count



# Color Atlas of Cattle Worm Eggs



**Ostertagia**  
(brown stomach worm)



**Cooperia**



**Moniezia**  
(tapeworm)



**Bunostomum**  
(hookworm)



**Haemonchus**  
(barberpole worm)



**Nematodirus**  
(threadneck worm)



**Trichostrongylus**



**Oesophagostomum**  
(nodular worm)



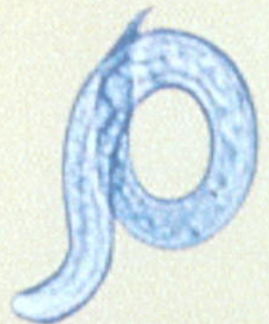
**Trichuris**  
(whipworm)



**Strongyloides**  
(threadworm)



**Capillaria**



**Dictyocaulus**  
(lungworm)



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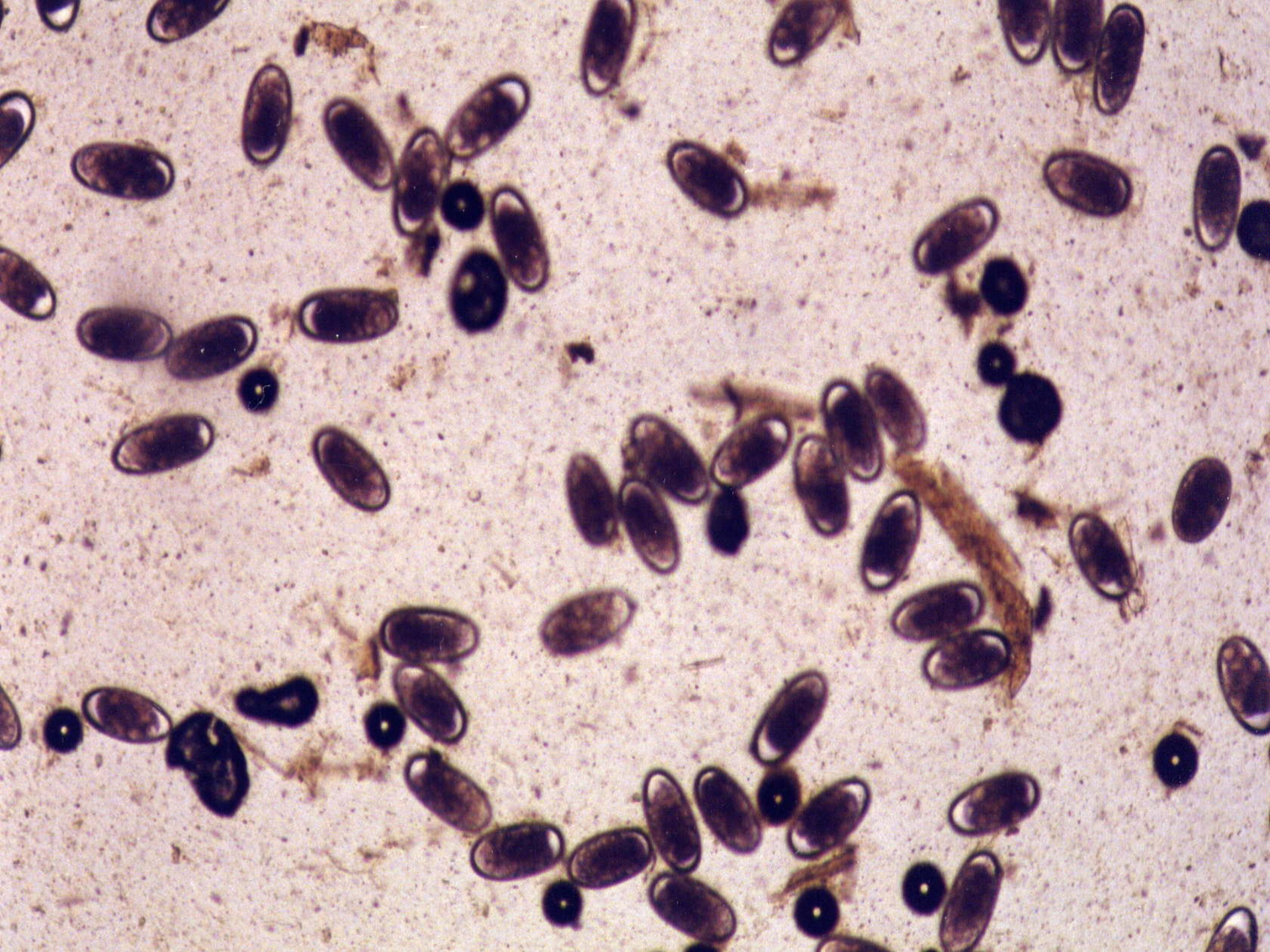
## The 7 Most Important Parasites in Alpacas

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- Haemonchus (barberpole worm)
- Nematodirus (threadneck Worm)
- Moniezia (tapeworm)
- Strongyloides (threadworm)
- Trichuris (whipworm)
- Nodular worm (nodular worm)
- Coccidia (protozoan parasite)

## Parasite problems are different for adults versus young animals:

- ◆ Adults have barberpole worms, tapeworms and nodular worms.
- ◆ Young animals have coccidia, tapeworms, whipworms and *Nematodirus* and then barberpole worms (as they graze).

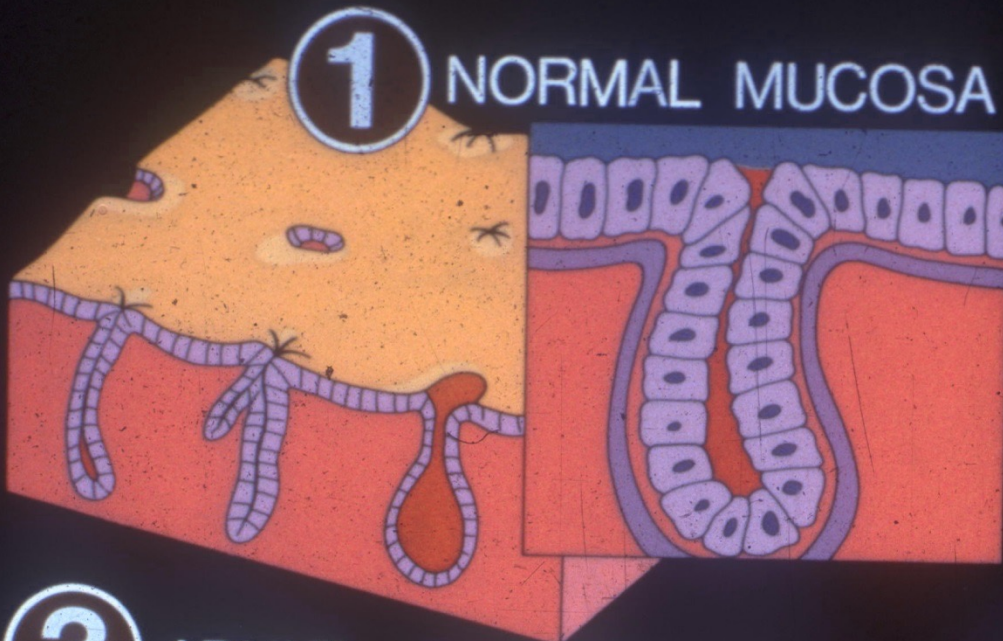




**Barbers Pole Worm**

1

NORMAL MUCOSA



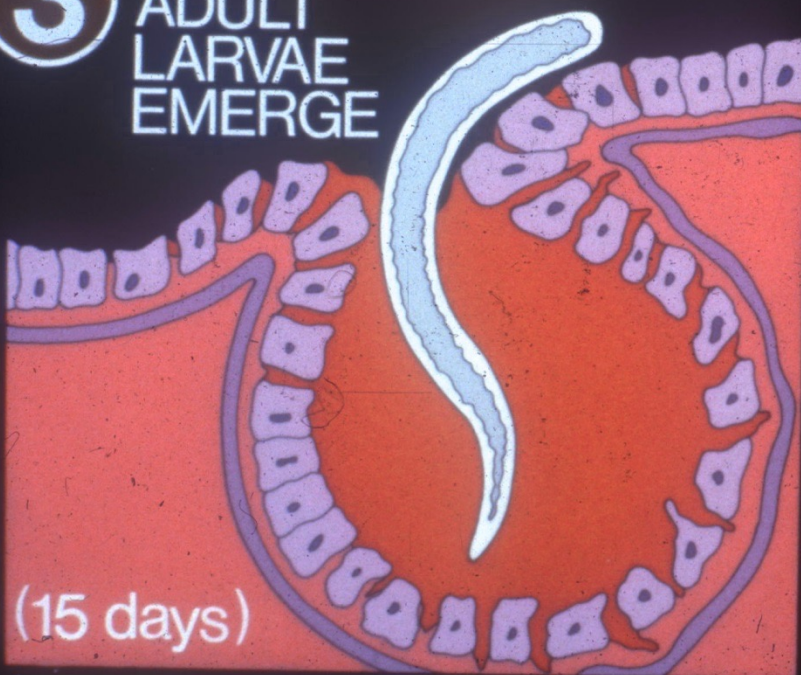
2

LARVAE  
ENTER  
GLANDS



3

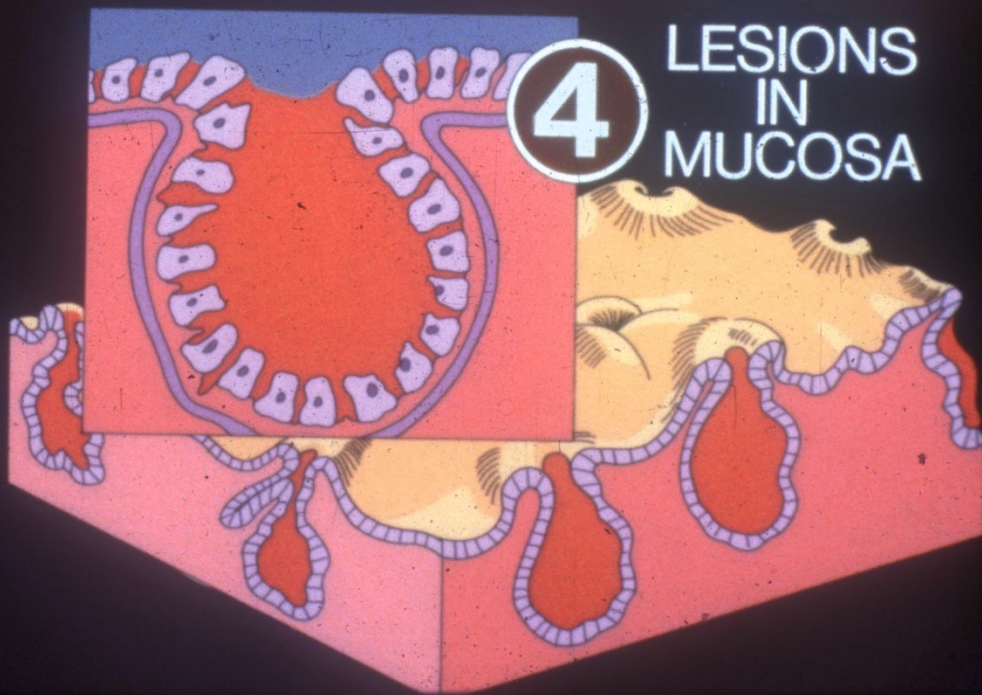
ADULT  
LARVAE  
EMERGE



(15 days)

4

LESIONS  
IN  
MUCOSA



2

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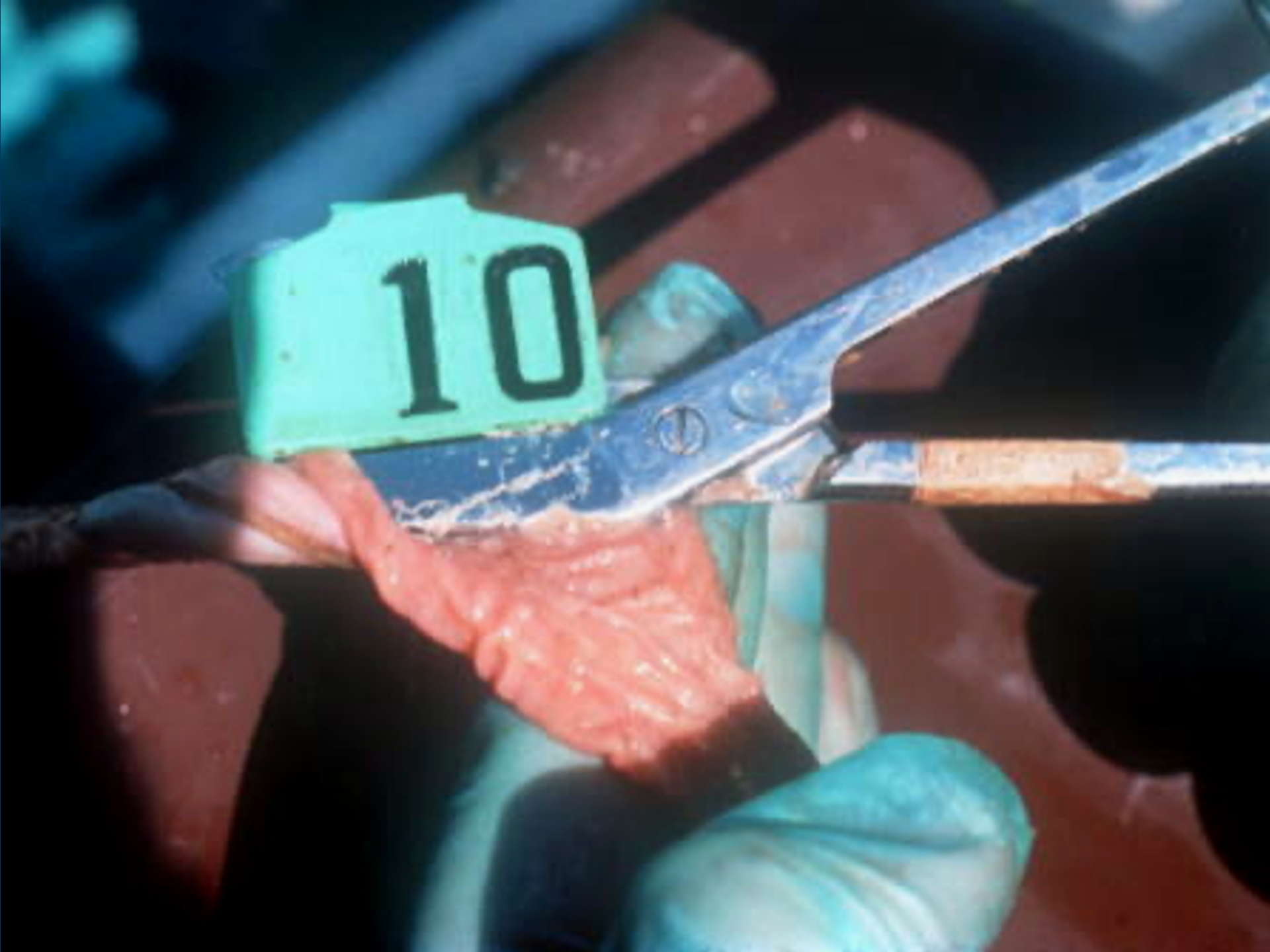
# *Haemonchus* Inhibition

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- ◆ Seasonal pattern due to parasite challenge
- ◆ High worm burden influences inhibition
- ◆ It's not in the best interest of the parasite to kill it's host
- ◆ Inhibition allows the parasite to develop months later during winter when conditions within the host have improved

# Nematodirus Eggs in Alpaca





# Nematodirus



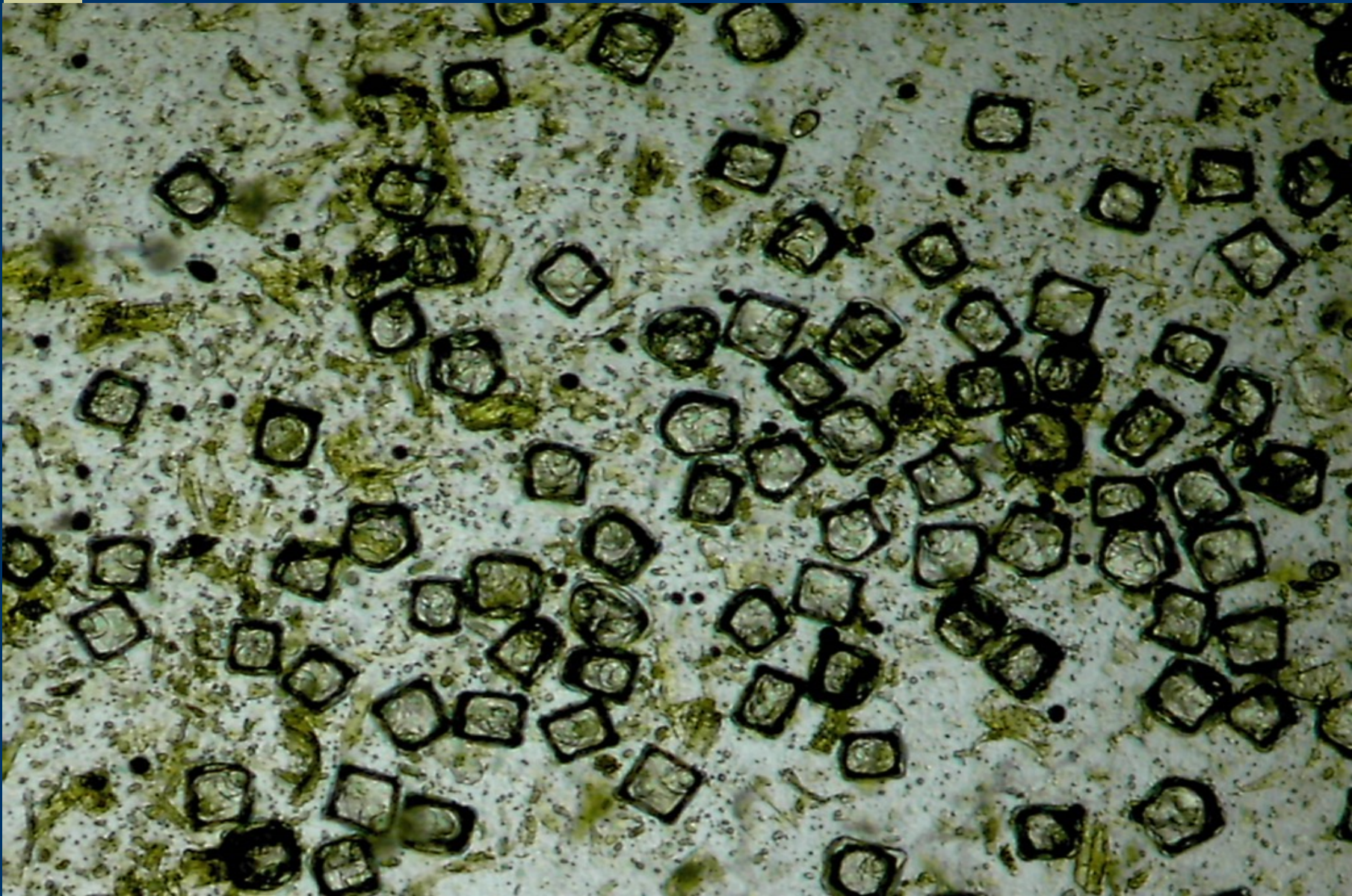
# Nematodirus in Small Intestine



# Tapeworm Eggs in Alpaca



# Heavy Tapeworm Infections



# Threadworm in Alpaca



# Nodular Worm in Alpaca



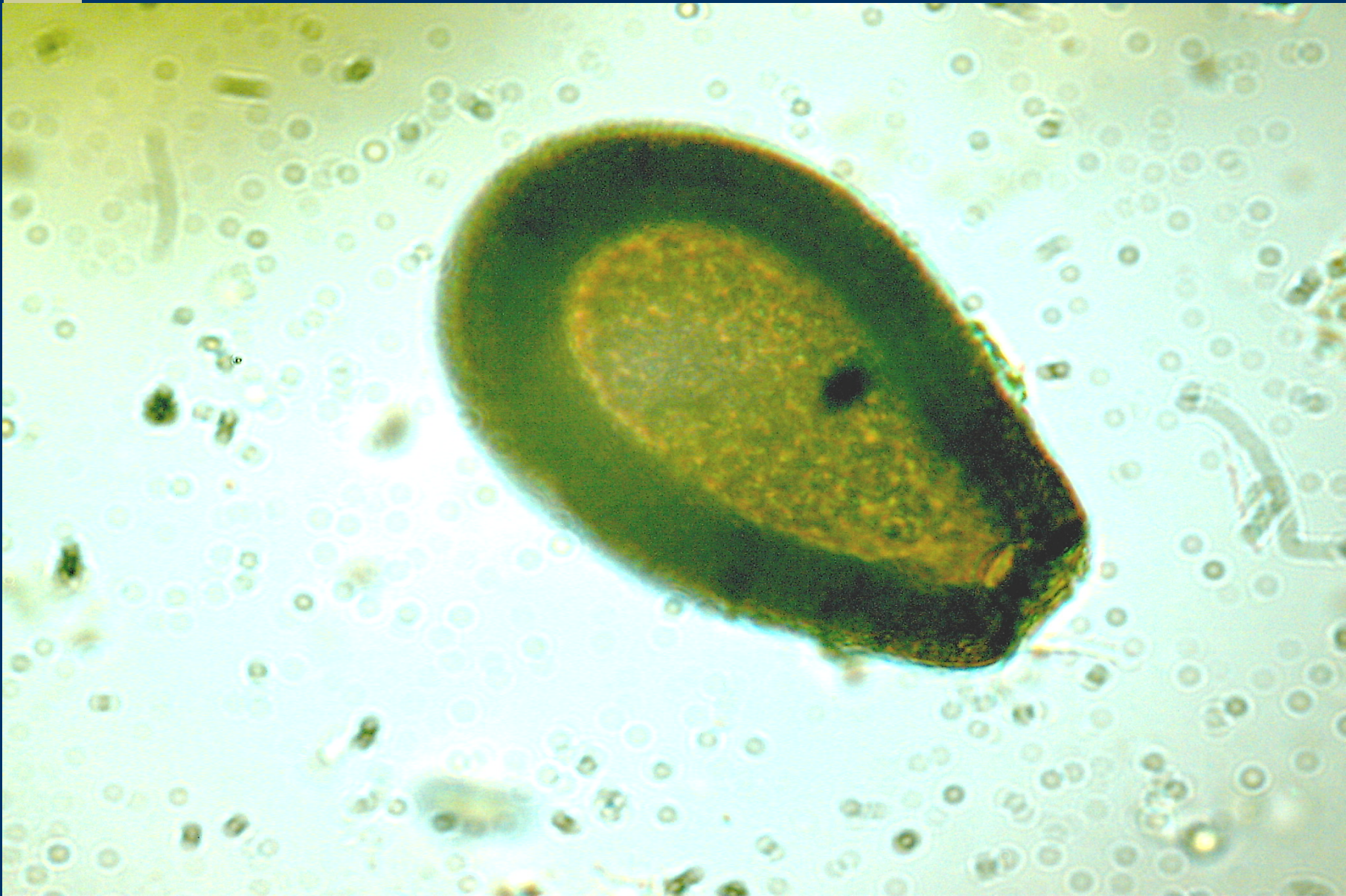
# Whipworm in Alpaca



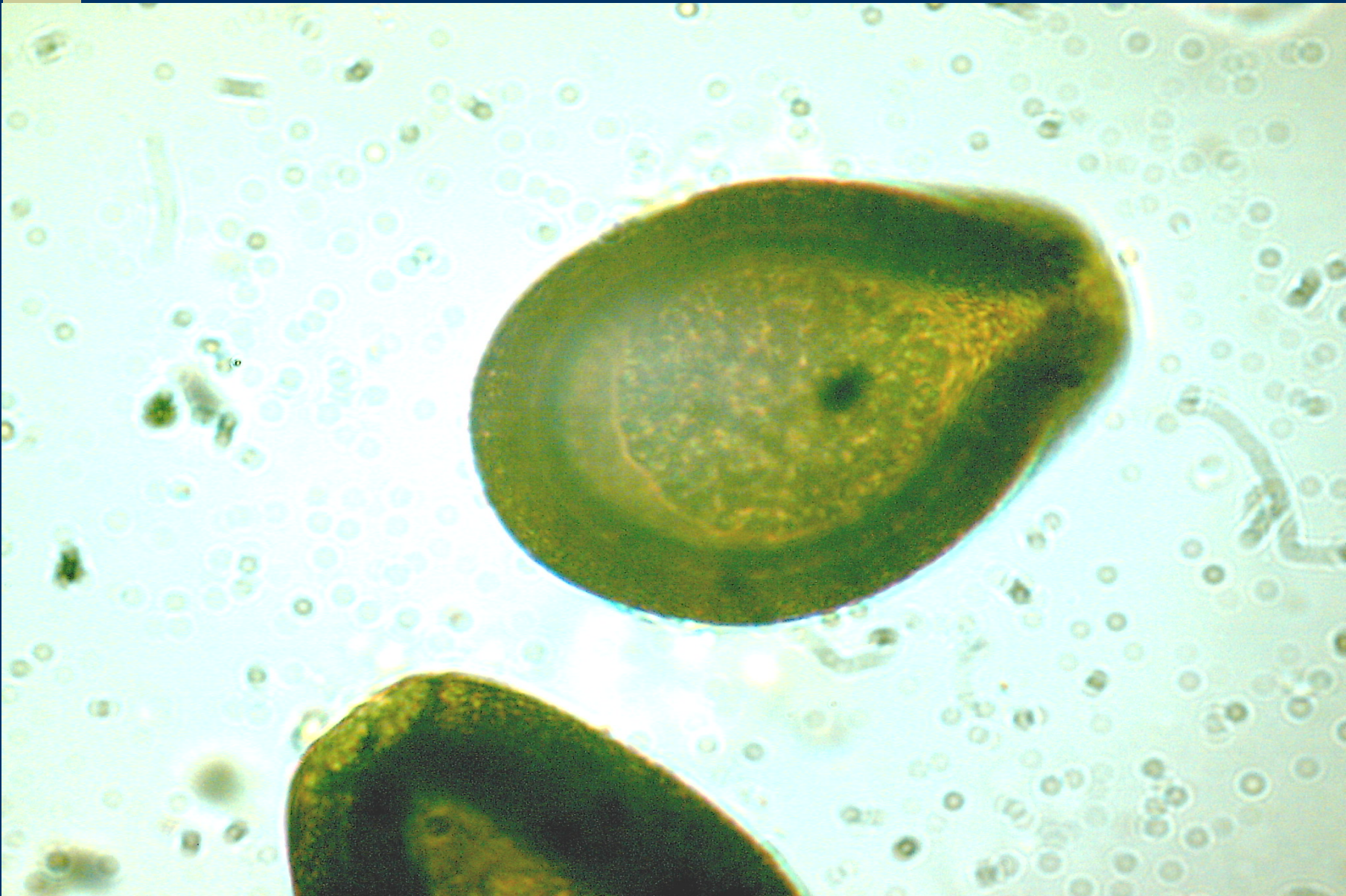
# Don't Forget About Coccidia!

- ◆ Coccidia is a non-mobile parasite so contamination is through fecal contamination.
- ◆ Heavy worm burdens most often make the coccidia problems worse.
- ◆ Major problem in young animals.
- ◆ Most goat herds need coccidia control even when held in confinement especially on dirt lots.

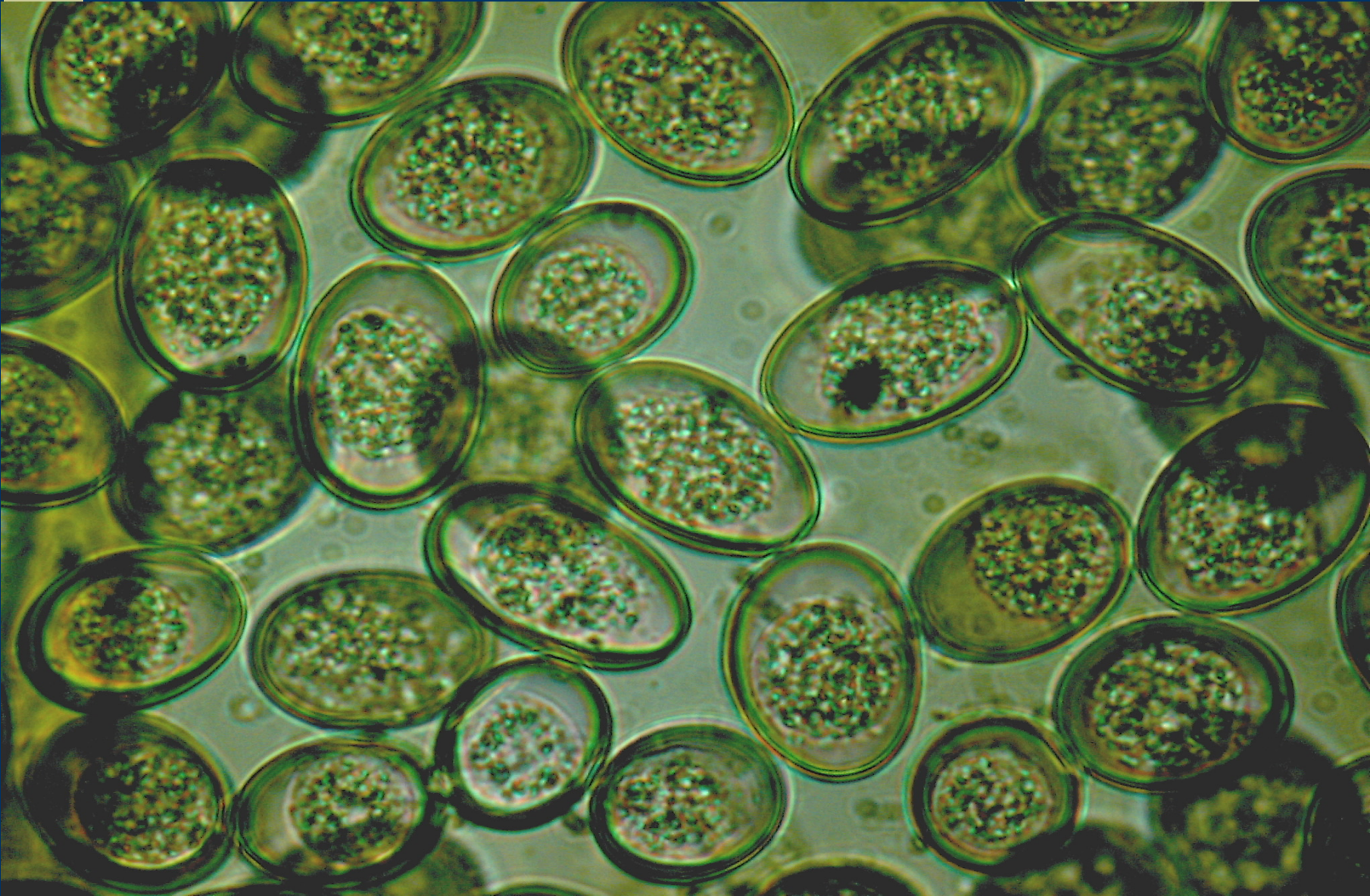
E. mac

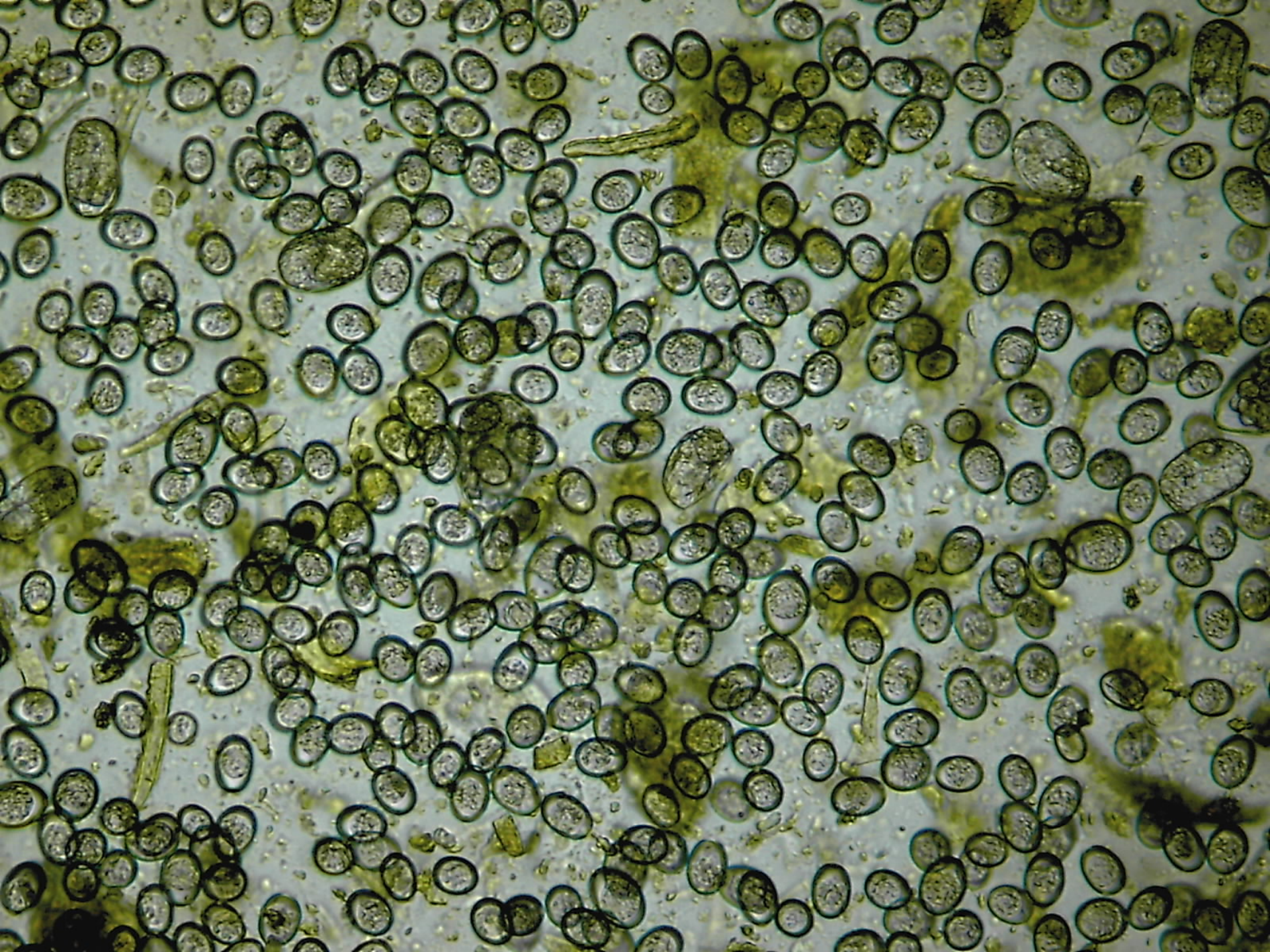


# E. Mac in Alpaca



# Coccidia in Alpaca





# Goals for Seasonal Control of Parasites in Small Ruminants:

- Create the least-cost/most-effective treatment program to prevent parasitic gastro-enteritis due to *Haemonchus*.
- Treatment strategy should be design to control environmental contamination.
- Treatment should utilize combination treatment at key times to improve product efficacy.

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# Strategic Deworming vs FAMACHA

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- FAMACHA: The art of determining when animals are anemic due to parasitic gastro-enteritis animals only after levels of environmental contamination are high.
- Animals are often close to death before treatment is administered and since contamination is high, animals become re-infected immediately after treatment.

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# 1). FAMACHA

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- FAMACHA is labor intensive since each animal needs to be examined. Impossible to use with large herds. Conditions can change daily.
- Animals are identified for treatment when they are close to death, often times, even before treatment is recommended.
- Animals are identified for treatment when they are heavily parasitized and parasite removal is often difficult and incomplete.

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## 2). FAMACHA

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- The goal with FAMACHA is to leave a “*refugia*” of susceptible parasitic larvae on the pasture to prevent “parasite resistance.”
- There’s no data to tell us at what point is the *refugia* too large such that this *refugia* is killing your animals?

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## 3). FAMACHA

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- Deworming in the face of a heavy infection may leave a large residual population; a 90% efficacy on 300,000 parasites leaves 30,000 parasites, a 90% efficacy on 10,000 parasite only leaves 1,000 parasites.
- Some of these worms left behind are the least susceptible and selection for resistance begins.

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## 4). FAMACHA

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- Heavily infected animals can harbor large numbers of inhibited *Haemonchus* larvae (larvae undergo an arrested development in the gastric gland) often missed by treatment. These parasites mature adding 1000's more parasites left behind.
- Inhibited parasites are seldom found in animals with low infection levels.

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## 5). Treating only high counts?

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- Once animals become heavily infected, the pastures are also highly contaminated and the animals will be exposed to thousands of infective larvae as soon as they begin immediately following treatment.



Animals shedding 100 eggs/gm. X 454 = 45,400/ lb. X 3 lb. manure/day =  
227,000 eggs X 100 days = 22.7 million eggs potential Infection.

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# What is Strategic Deworming?

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- Strategic Deworming: Deworming animals at strategic times of the year to reduce parasite contamination in the environment and in the animals themselves throughout the entire year.

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# Prevention is Better than Treatment!

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Deworming animals strategically to prevent heavy infections involves treating animals when parasite levels are at the lowest levels (i.e., winter and spring).

“Treatment after July 1 is a waste of time in most parts of the country except to save lives.”

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# Where do the Parasites Come From?

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- Animals are born worm-free. Parasites are acquired through environmental contamination.
- Animals ingest infective larvae which develop into egg-laying adult parasites shedding eggs back into the environment.
- Eggs shed into the environment develop into an infective stage.

# Most Parasites Come From Pasture Contamination

- As the summer season progresses, environmental contamination increases.
- When infection levels become high, incoming larvae undergo arrested development.
- Inhibited larvae begin redevelopment whenever conditions in the gut change through reduced larval intake or removal of adult parasites.

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# Parasites can Survive Winter Conditions.

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- Parasite can survive winter conditions either in the animals or on pasture protected by soil, manure and grass matt.
- Fecal worm egg counts can increase during winter months as inhibited larvae develop.
- Worm egg counts taken in the winter will determine whether animals are harboring parasites during winter months.

# Timing of Treatment is Key for Creating Parasite-safe Grazing!

- ◆ All animals should be worm-free during winter to prevent worm egg shedding on spring pastures.
- ◆ Aggressive dewormings during first 60-days of grazing to break the cycle on pasture.
- ◆ Late season deworming has little or no effect on pasture contamination.

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# How Does Strategic Parasite Control in Pastured Animals Work?

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## GOAL

***Prevent pasture contamination from occurring during the first 90 days of the grazing season***

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# Control of Internal Parasites

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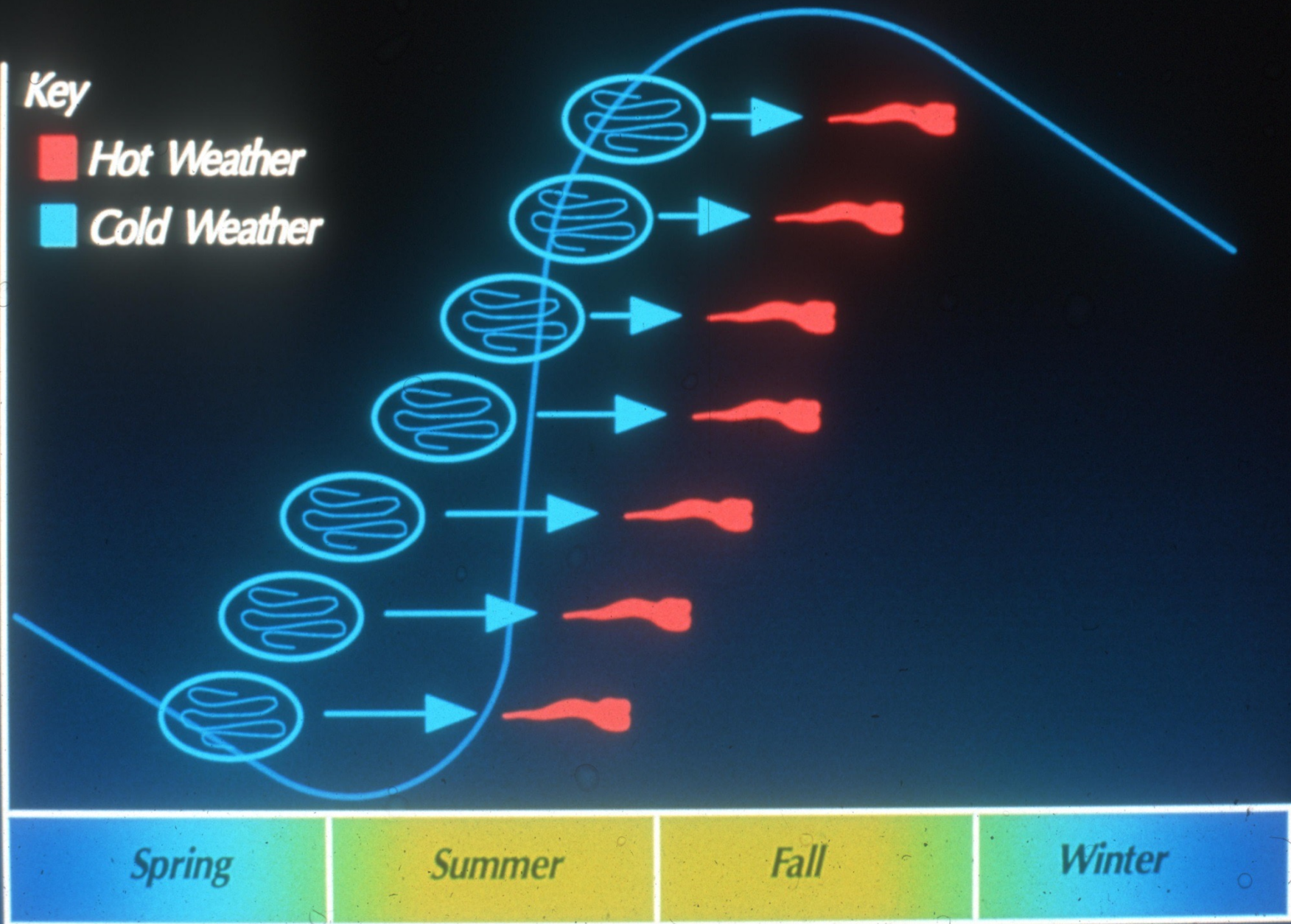
- ◆ Once consumed by goats, larva mature to egg laying adults in approximately 2-3 weeks.
- ◆ Over-wintered larva will die off within first 2-3 months of the season if not consumed.

# Pasture Contamination

Key

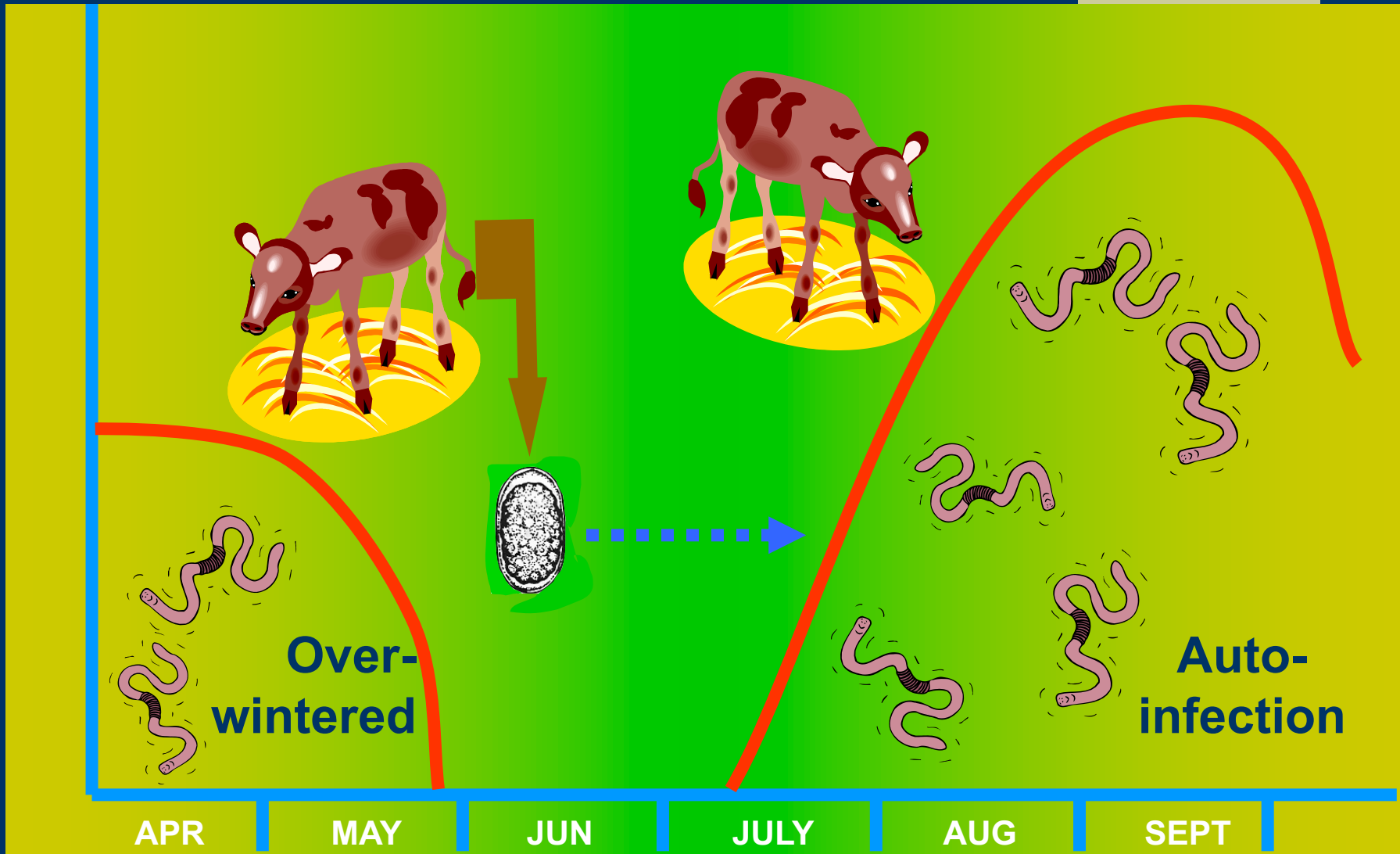
Hot Weather

Cold Weather

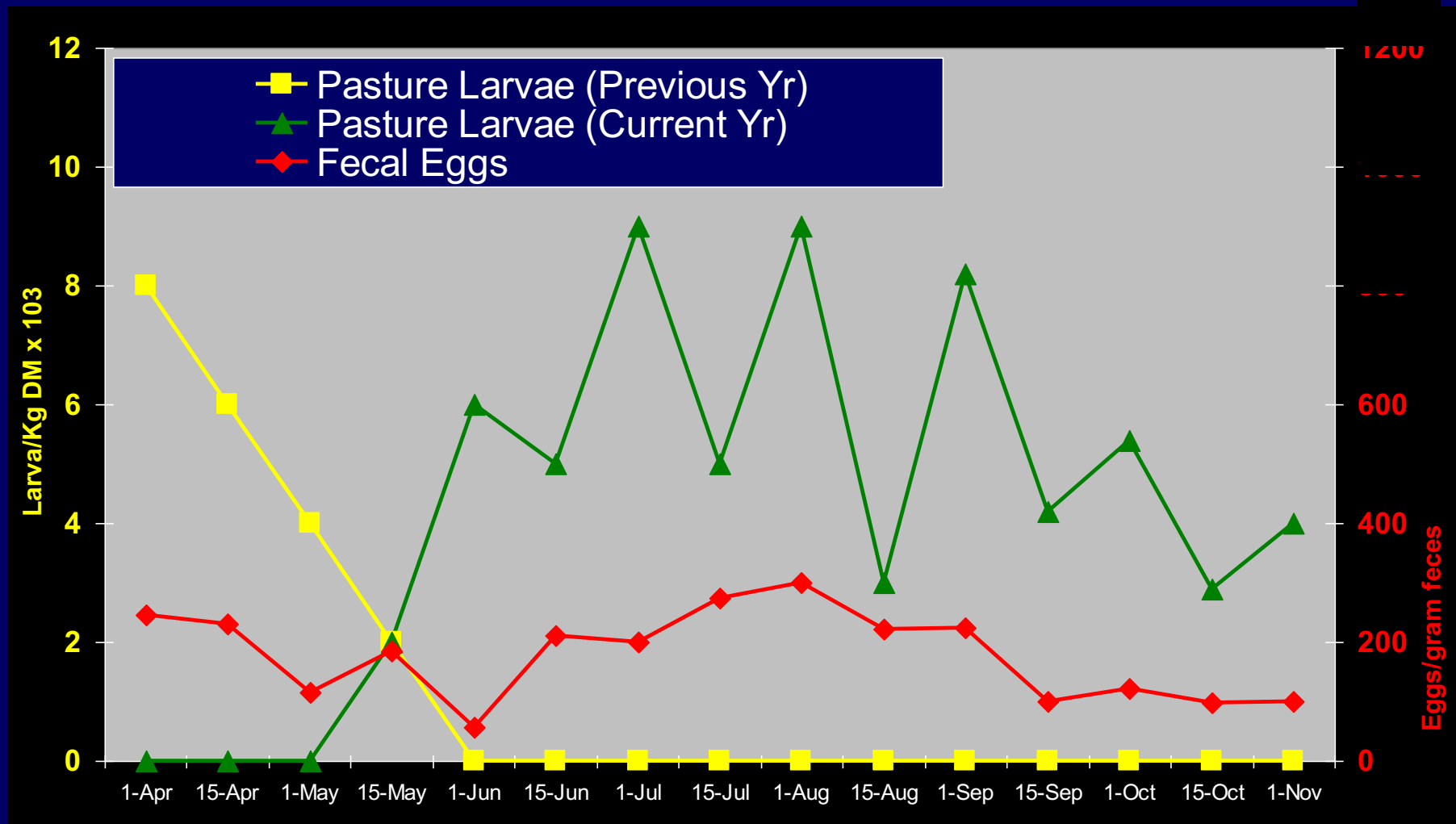




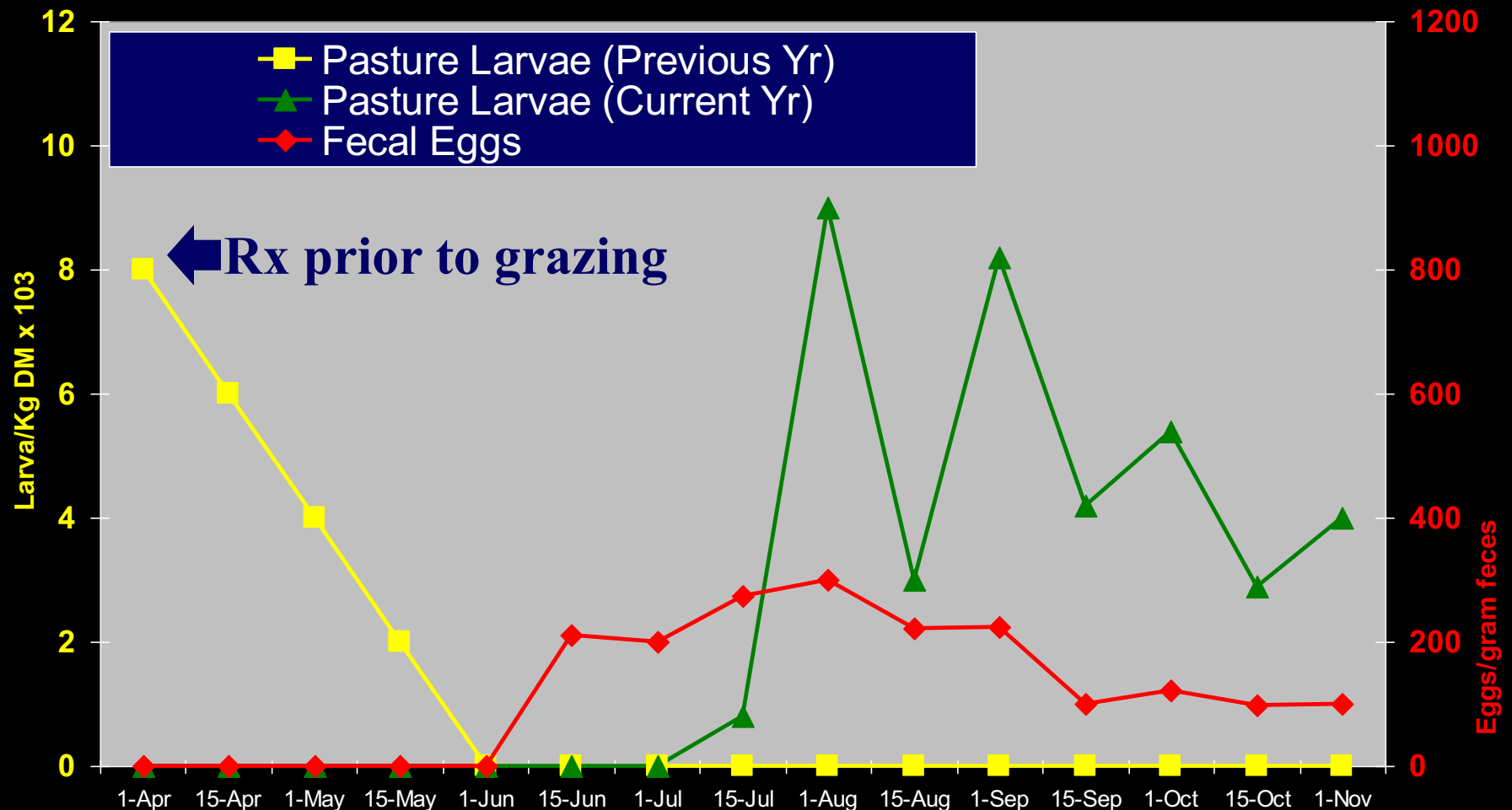
# Seasonal Parasite Development On Pasture



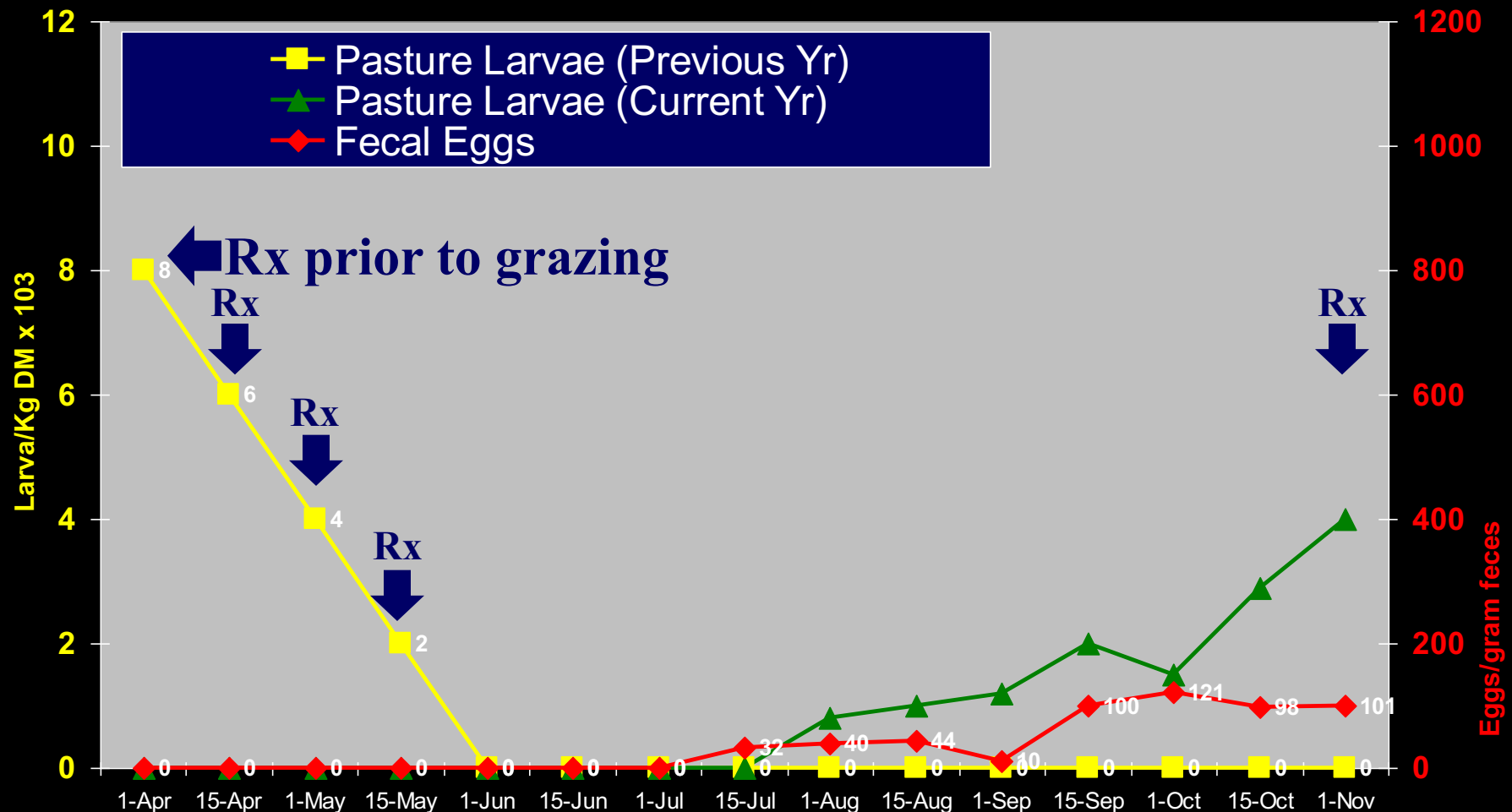
## Chart 2: Epidemiological Patterns of Worm Egg and Pasture Larval Counts in Grazing Goats:



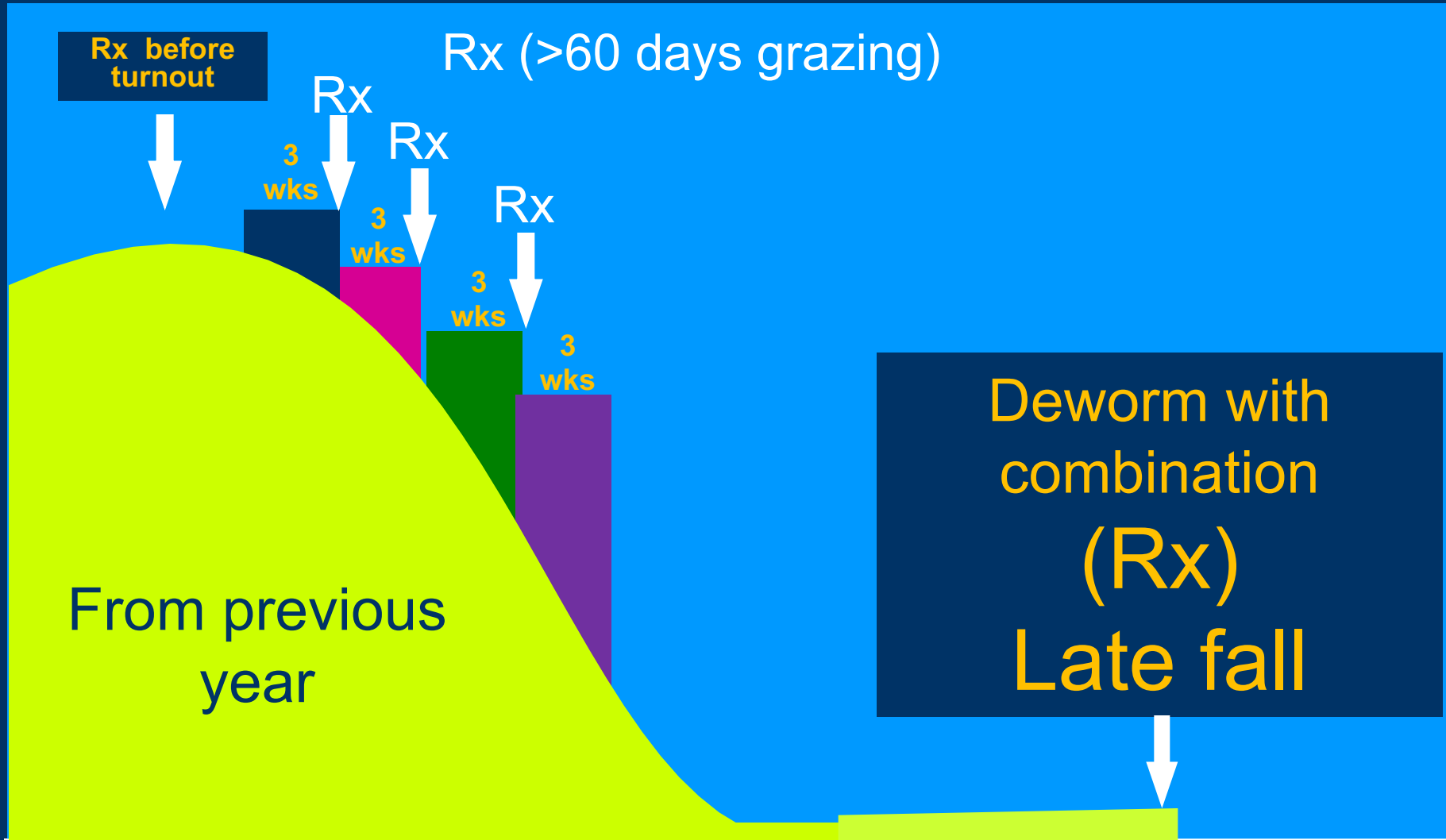
# Chart 3: Epidemiological Patterns of Worm Egg and Pasture Larval Counts in Grazing Goats:



# Chart 4: Epidemiological Patterns of Worm Egg and Pasture Larval Counts in Grazing Goats:



# Strategic Deworming for Small Ruminants: 0-3-6-9 Rx



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# Strategic Parasite Control

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**Goal = Prevent pasture contamination**

- 1. Kill adult worms before grazing.***
- 2. Kill immature worms before egg shedding begins.***
- 3. Time treatment to seasonal grazing pattern.***

# Parasitism in Alpacas

- ◆ Parasitism is all about parasitic contamination in the environment.
- ◆ Prevent parasitic environmental contamination and the problem is gone. Simple....Right?

# Strategic Deworming Summary

- ◆ Is an important management tool.
- ◆ Treats animals & pastures.
- ◆ Creates parasite safe-grazing for the entire summer grazing season.
- ◆ Cost effective.
- ◆ Improves immune system, overall health & production.
- ◆ Increases profitability.

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# Parasite Control

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## The Ideal Dewormer

Broad spectrum type II

Safe

Convenient

Cost Effective

# Deworming Products ?

- ◆ Avermectins – Ivermectin, doramectin,  
Moxidectins - Cydectin
- ◆ Bezimidazoles- Safe-Guard/Panacur, and  
Valbazen
- ◆ Morantel – Rumatel or Goat Dewormer Pellets
- ◆ Levamisole – Tramisol -

# Severely Parasitized Animals

- ◆ Severely infected animals are given Cydectin® orally 500mcg/kg @ 1cc/20 lb.
- ◆ Safe-Guard®/Panacur® can be given first if possible = 7.5 mg/kg given over three days, give Cydectin on last day of treatment.

# Safe-Guard®/Panacur®

## - Sheep, Goat and Camelid Dose -

- ◆ World-wide dose is 7.5 mg/kg
- ◆ Best results when dose is given over 3 days.
- ◆ Can be given free-choice in mineral, medicated block or feed.
- ◆ Give oral Cydectin or Ivermectin on 4<sup>th</sup> day.

# Advantages of Fenbendazole Non-Handling Formulations



- ◆ Cumulative dose properties
- ◆ Flexible feeding period
  - 3-6 days mineral
  - 3-10 days blocks
  - 1 day pellets, cubes, crumbles
- ◆ Palatability (no taste/smell)
- ◆ Safe in varied consumption situations
- ◆ Labor free administration
- ◆ Highly effective against major cattle worms

# Deworm with Science

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- ◆ Fecals !
- ◆ Fecals !
- ◆ Fecals !
- ◆ Fecals !

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# ***Know what your animal's worm burdens are.***

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Mail in to: *Mid America Ag research*  
*3705 Sequoia Trail*  
*Verona, WI 53593.*

***[www.midamericagresearch.net](http://www.midamericagresearch.net)***