Fecal Examination for Parasites
2015 Country Living Expo Classes #108 & #208

Tim Cuchna, DVM
Northwest Veterinary Clinic
Stanwood  (360) 629-4571
nwvetstanwood@gmail.com
www.nwvetstanwood.com
Fecal Examination for Parasites

- Today’s schedule - Sessions 1 & 2
  - 1st part discussing fecal exam & microscopes
  - 2nd part Lab - three areas
    - Set-up your samples
    - Demonstration fecals
  - Last 15 minutes clean-up and last minute questions; done by 11:15
Fecal Examination for Parasites
Today’s Topics

► How does fecal flotation work?
► Introduction to fecal parasite identification
  ► Parasite egg characteristics.
  ► Handout
► Parasites of concern
► Microscope basics and my preferences
► Microscopic exam
► Treatment plan based on simple flotation fecal exam
► Demonstration of Fecalyzer set-up
How does Fecal Flotation work?

- Based on specific gravity - the ratio of the density of a substance (parasite eggs) compared to a standard (water)
  - Water has a specific gravity (sp. gr.) of 1.00.
  - Parasite eggs range from 1.05 - 1.20 sp.gr.
  - Fecal flotation solution - approximately 1.18 - 1.27 sp. gr.
  - Fecal debris usually is greater than 1.30 sp. gr.
  - Fecasol solution - 1.2 - 1.25 sp. gr.
Fecal Examination for Parasites

- Important topics **NOT** covered today
  - Parasite treatment protocols
  - Parasite management
  - Other parasites such as external and blood-borne
Fecal Examination for Parasites

My Plan
Parasite Identification

1. Animal ID (name, species, age & condition of animal)

2. Characteristics of parasite eggs, primarily looking for eggs in fecal samples
   a) Size - microns (\(\mu m\))/micrometer - 1 \(\mu m=1/1000mm = 1/1\)millionth of a meter. Copy paper thickness = 100 microns (\(\mu m\))
   b) Shape - Round, oval, pear, triangular shapes
   c) Shell thickness - Thin to thick
   d) Caps (operculum) One or both ends; smooth or protruding
Parasites of Concern

- Nematodes - Roundworms
- Protozoa - Coccidia, Giardia, Toxoplasma
- Trematodes - Flukes - Minor concern in W. WA.
- Cestodes - Tapeworms - Minor significance
- Insects - Not discussed in this class

NOTE: You will primarily be seeing and identifying parasite eggs, not actual parasites.
Parasites of Concern

- **Nematodes - Roundworms**
  - **Strongyles**
    - Haemonchus, Nematodirus, Ostertagia, Dictyocaulus, Cooperia, Trichostrongylus, Strongyloides, Bunostomum, Capillaria
  - **Ascarids**
    - Ascaris Suum, Parascaris, Toxocara
  - **Whipworm - Trichuris**
  - **Pinworms - Oxyuris equi**
Parasites of concern

- **Protozoa**
  
  - **Coccidia**
    
    - Eimeria - Practically all species
    - Eimeria macusanensis - Alpacas
    - Isospora - Cats, Dogs, Pigs
  
  - Giardia - Multiple species - Zoonotic - small, hard to isolate with simple flotation techniques, centrifuge better.
  
  - Toxoplasma - Cats - Zoonotic - ½ the size of Isospora, hard to isolate, centrifuge better.
Parasite Characteristics
- Size

- Range from 10 to 200 microns/micrometer (µm)
  - 1 µm = 0.001 mm
  - 10 microns = 0.01 mm
  - 100 microns = 0.1 mm

- X-small (10-15µm) - Giardia, Toxoplasma

- Small (20-40µm) - Coccidia, Trichuris

- Medium (60-90µm) - Strongyles, Ascarids, E. mac

- Large (100-200µm) - Nematodirus, Flukes, Tapeworm egg packets

www.spcollege.edu/hec/vt/course_resources.htm
Parasite Characteristics
Size Comparison

Section 6
PARASITES OF LLAMAS
Fecal Eggs and Oocysts

Relative Sizes of Llama Parasite Eggs

Fig. 137. Common parasite eggs and oocysts found in llama feces.

Microscope Basics

YOU LOOKING THROUGH MICROSCOPE

LIGHT SOURCE

80 µm
Parasite Characteristics

Shell

- Thin - Strongyles, Coccidia
- Medium - Trichuris
- Thick - Ascarids
Parasite Characteristics

Shape
Parasite Characteristics

Caps - Operculum

- Are the caps at one or both ends?
- Protruding? (Yes/No)
- Coccidia, Trichuris, Flukes, Capillaria
Parasite Artifacts

Plant cells

Fungal spores

Air bubble

Pollen and seeds
Parasite Larvae

- Bluntly pointed tail
- Head with protuding protoplasmic knob
- Brownish intestinal granules
Parasite Larvae - ?
Parasite Comparisons
Questions
Microscope Basics

1. Ocular lens - 10X
2. Objective lenses
   - 4X, 10X, 40X, 100X
   - Multiply ocular by objective for total magnification
   - 10 X (4X, 10X, 40X, 100X) = 40X, 100X, 400X, 1000X
3. Stage
4. Light source
5. Coarse and fine focus knobs

http://www.williamsclass.com/Microscope
Microscopes
My preferences

1. Binocular ocular lens
2. Mechanical stage
3. Adjustable light source
4. Coarse and fine focus knobs together

http://www.emc.maricopa.edu/faculty/farabee/BIOBK/cmpdmic.gif
Microscopic Exam

40X Magnification
- 10X Ocular/4X Objective
- “Low power”
- 4.5mm X 4.5 mm/view
- 5 X 5 = 25 views/cover slip

100X Magnification
- 10X Ocular/10X Objective
- “High power”
- 2mm X 2mm/view
- 10 X 10 = 100 views/cover slip

400X Magnification
- 10X Ocular/40X Objective
- “High-dry” power
- 0.45mm X 0.45mm/view
- 250 views/cover slip
Microscopic Exam
“Egg Counts” from Simple Flotation

When do you become concerned or treat?

- Work with your veterinarian
- Ideally, do fecal egg counts (FEC) - qualitative
- Parasite(s) involved - Some parasites you will treat if present at all, especially Nematodirus, Eimeria macusaniensis
- Condition of animal
  - Diarrhea (+/-)
  - Body Condition
  - Other diseases
- Simple/Modified Simple are for ID, not quantitative

Northwest Veterinary Clinic treatment recommendations

- Our ‘rule-of-thumb’ is to treat when 100 - 200 eggs per slide on “normal-looking” animals
  - 40X - low power, 100-200/25 = 4-8 per view
  - 100X - high power, 200/100 = 1-2 per view
- “Abnormal-looking” animals with unexplained diarrhea or poor condition and a positive fecal get treated.
Resources

- **Books** - *Veterinary Clinical Parasitology* by Anne Zajac & Gary A. Conboy, 2006
- **Internet** - images and techniques
  - [http://parasitology.cvm.ncsu.edu/](http://parasitology.cvm.ncsu.edu/)
  - [http://instruction.cvhs.okstate.edu/jcfox/htdocs/clinpara/clinpara.htm](http://instruction.cvhs.okstate.edu/jcfox/htdocs/clinpara/clinpara.htm)
  - [http://cal.vet.upenn.edu/projects/parasit06/website/index.htm](http://cal.vet.upenn.edu/projects/parasit06/website/index.htm)
  - [http://www.provlab.ab.ca/webbug/parasite/artifact/arhome1.htm](http://www.provlab.ab.ca/webbug/parasite/artifact/arhome1.htm)
- **Supplies** - Not recommendations - search “fecal flotation supplies”
  - Livestockconcepts.com
  - Revivalanimalhealth.com
- **Microscopes** - Binocular $300+; Monocular less than $250
  - Microscopes.com
  - greatscopes.com
  - lowestpricemicroscopes.com
  - Microscopeworld.com
Fecal Exam Supplies

- Flotation solution $12-30/gallon
- Mixing containers
- Test tubes
- Fecal diagnostic kits $30 for 50
- Stirring sticks
- Strainer
- Slides $5-15 for 100
- Cover slips $5 for 100

- Microscope
- Kim-wipes
- Test tube rack
- Timer
- Centrifuge
- Hydrometer - measures Specific Gravity
- Gram scale (FEC)
Microscopic Exam
Simple Float

- Fecalyzer Demonstration
Questions?