USING CLINICAL SIGNS TO DIAGNOSE PARASITISM IN SHEEP & GOATS

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Which Clinical Signs?

- Animal is sick from the effects of parasites
- Consistency of the manure
  - Diarrhea
  - Soiling of breech (Dag score)
- Poor weight gains / weight loss
  - Decreased appetite
- Anaemia
  - FAMACHA scores / Haematocrit
  - Blood in faeces
- Hypoproteinaemia
  - Bottle jaw
- Signs on post mortem
Which Parasites?

- **Haemonchus contortus**
  - Anaemia
  - Hypoproteinemia
  - Death

- **Teladorsagia / Trichostrongylus**
  - Diarrhoea
  - Weight loss
  - Hypoproteinemia
  - Death

- Most often mixed Infections
Consistency of the faeces

- Normal stool
  - Pelleted
  - Affected by diet
    - E.g. lush pasture
  - Affected by other disease
    - E.g. coccidiosis

- Soiling of breech
  - Indicates degree of diarrhea

- Not all heavily parasitized animals have diarrhea
  - Haemonchus
Evidence of Diarrhea

Is this diarrhoea due to gastrointestinal nematode parasites?

Courtesy N. Sargison
Poor Weight Gains

- GIN will suppress appetite
  - Animal feels sick
  - Poor weight gains
- Severe GIN infection will interfere with digestion
  - Damage to abomasal glands
  - Digestive juices
Poor Weight Gains

- Expected goals for gain of lambs / kids on pasture
  - Animals not making goal within the group
  - Proportion versus whole group

- Need
  - Weigh scale
  - Handling system
  - Good ID (RFID)
  - Good records
Body Condition Score

- Animals are losing weight
- Evidence they are ill
  - Should be detecting earlier
- Could be due to other disease
  - Pneumonia
  - Maedi visna / CAE
  - Bad teeth
- Could be due to poor nutrition

Courtesy S. Hart
Anaemia

- Detecting low numbers of red blood cells in the animal’s circulation
- Could be...
- Due to parasites, e.g.:
  - *Haemonchus contortus* ★ ★ ★ ★
  - Liver fluke (*Fasciola hepatica*)
- Due to blood infection, e.g.
  - *Mycoplasma ovis*
  - Transmitted by ear taggers, blood-feeding insects
- Due to poor nutrition
How do we detect anaemia?

- **Blood sample**
  - Haematocrit / packed cell volume (PCV)
  - Sheep normal: 24-45%
  - Goat normal: 22-38%

- **Colour of mucous membranes**
  - Pink – normal
  - Red – infection
  - Yellow - jaundice
  - Pale
    - Anaemia
    - Shock

- **Where to look**
  - Inside mouth, inside nose, conjunctiva
Detecting Anaemia

Correlation between colour of mucous membranes and packed cell volume – FAMACHA system

Courtesy S. Hart
USING THE FAMACHA SYSTEM TO DETECT ANAEMIA

Courtesy S. Hart
The FAMACHA © System

- Low technology technique for the assessment of *Haemonchus* infection and need for treatment.
- Developed in South Africa
- Dr. Faffa Malan Chart
- Method of targeted selective deworming
  - Reduction in the number of treatments given and the number of animals treated
  - Decreases the rate of development of anthelmintic resistance
How Does FAMACHA Work ???

- Only useful where *Haemonchus* is the primary parasite species infecting your sheep / goats

 Courtesy S. Hart
The FAMACHA© System

- Colour in chart based on conjunctival mucous membrane colour when...
  - 1 = normal (PCV 35%)
  - 2 = normal (PCV 25%)
  - 3 = mildly anaemic (PCV 20%)
  - 4 = moderately anaemically (PCV 15%)
  - 5 = severely anaemic (PCV 10%)

Van Wyk and Bath, 2002
Accuracy of the FAMACHA system

- Studies show that FAMACHA is not 100% accurate
- Anaemic animals don’t always score high
  - Low PCV can be scored as 3’s and sometimes 2’s
- Non-anaemic animals don’t always score low
  - Normal PCV can be scored as 4’s and sometimes 5’s
- It is only a guide – not the absolute truth
Reasons to misinterpret the colour

- Other causes of anemia and paleness:
  - Other parasites such as liver flukes, lice, keds
  - Nutritional deficiencies, esp. copper and cobalt
  - Shock
  - Other diseases, e.g. Johne’s disease

- Other causes of redness:
  - Environmental conditions such as dust or allergies
  - Diseases such as pinkeye
  - Septic condition
Deer Liver Fluke
Sucking Lice
Goat with Johne’s and sucking lice
Using the FAMACHA card

- In Canada – mostly for Haemonchus
How to perform the FAMACHA

- Examine in the sunlight
  - Not in the barn or in artificial light
- Press on eyelid
  - Above and below
  - Pushes out conjunctiva
- Compare colour of lower eyelid to FAMACHA chart

Courtesy S. Hart
Always Use the Card !!!

Card must be replaced annually as will fade
Other Recommendations

- Check both eyes if in doubt
  - Score animal based on highest (palest) eye score
- No ½ scores
  - Assign higher (paler) whole number score if unsure
- Do not hold eye open more than few seconds
  - Wait and retry in other eye
Detecting Low Protein (Hypoproteinemia)

- “Bottle Jaw”
- Occurs when there is insufficient protein (albumin) in the blood
- Fluid leaks into tissues
- We notice a swelling under the jaw
- Parasites feed on protein and are a major cause of hypoproteinemia
- Also causes of swelling under the jaw
  - Heart failure
  - Abscesses
  - Tumours
Bottle Jaw
What you may see on post mortem

- Animals dying on pasture should be necropsied
- Parasites can kill even when egg counts are low
- FAMACHA may miss anaemic animals
- But other diseases cause sudden death too
  - Pulpy kidney
  - Pneumonia
  - Coccidiosis
  - Lightning
Counting Worms

- Contents of abomasum
  - Measure volume
- Take a portion (e.g. $1/10^{th}$ of volume)
  - Count worms
  - Multiply back to get total worm count
Counting Worms
# Abomasal Parasite Counts

<table>
<thead>
<tr>
<th>Parasite</th>
<th># of Worms</th>
<th># of Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Teladorsagia</em></td>
<td>3000</td>
<td>1 point</td>
</tr>
<tr>
<td><em>Trichostrongylus</em></td>
<td>4000</td>
<td>1 point</td>
</tr>
<tr>
<td><em>Haemonchus</em></td>
<td>500</td>
<td>1 point</td>
</tr>
<tr>
<td><em>Nematodirus</em></td>
<td>4000</td>
<td>1 point</td>
</tr>
<tr>
<td>Immature worms</td>
<td>4000</td>
<td>1 point</td>
</tr>
</tbody>
</table>

2 points = likely affecting productivity
3 points = likely causing clinical signs and even death
Sometimes death is not due to parasites

Sudden death on pasture: This lamb died of pulpy kidney (see haemorrhages on the surface of the heart) and not parasites (empty abomasum)
Haemonchus can be seen with the naked eye

Are there enough parasites to cause disease and death?

Courtesy, N. Sargison
What did this sheep die from?
Type II Parasitic Disease

- Due to emergence of hypobiotic L4
- Usually in the spring
- May die before adult stage is reached
Teladorsagia

Worms are very small and may be buried in the mucosa
Goats in the land of Pan