Canadian Bison Association Annual Convention
November 17-20, 2007
Regina, Saskatchewan

The Control of Internal Parasites in Bison

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Are bison are more susceptible to internal parasites than cattle?

• The Myth:
  – bison were pelagic and didn’t pick up parasites because they roamed
  – didn’t build an immunity

[Image: Bison in nature]

• The Truth:
  – bison in nature have their own species of the same worms that infect cattle
  – bison are affected by cattle parasites, no more - no less
Why should we use anthelmintics in “natural” bison?

• Helps maintain cows, lower feed costs,
• Improves body condition at breeding
• Improves calf rate of gain and weaning wts
• Cows do better on low-cost forage when their nutritional needs peak
• Parasitism leads to nutritional deficiency
  – poor absorption of protein and trace minerals
• Improves feed efficiency and ADG in feeders
  – important for the 30 month export rule?
Parasite control programs depend on the unique situation found on each farm.
Management and environmental conditions are different on each farm

• Moist climate with moderate to high stocking density?
  – treat 2-3 times a year and monitor fecal egg counts twice a year (spring and fall)

• Dry, cold climates with low stocking density?
  – treat and monitor fecal egg counts once a year (summer and fall)
Important bison internal parasites

- **Lungs**
  - Lungworm shed larvae on pasture

- **Stomach**
  - Ostertagia (eggs resistant to freezing)
    - one of the few parasites that occur in adults as well as young animals

- **Intestines**
  - Nematodirus, Cooperia other species
  - Not proven detrimental ??

- **Large intestine**
  - coccidia - management issue?
Clinical signs of parasitism

- Initially no clinical signs
- Poor growth, rough hair coat
- Diarrhea & wt loss (protein loss)
- Part of the herd affected - young ones
- Lungworms - weight loss (coughing)
- Lack of appetite
- Death with few lesions at gross postmortem
Ostertagiosis
(Brown stomach worm)

Image by Dr Russ Hobbs, Murdoch University, Australia
Ostertagiosis
(Brown stomach worm)

• Type I - runny feces
• Type II
  – Stomach glandular cells are damaged - replaced by scar tissue
  – reduces acid content in the stomach (raises pH)
    • digestive enzymes are not activated
    • protein is not denatured and digested
    • copper not absorbed
    • protein loss into gut
Ostertagiosis (Type II)  
(Brown stomach worm)

Parasites imbedded in the stomach wall

Thickened, abnormal stomach lining
Fecal egg counts

- The only accurate way to diagnose worm infestations before productivity losses have occurred
- Followed by a larval culture and identification ???

- Use a small handful of manure (keep chilled)
- Sample 10% of the herd
- Sample poor looking animals
- Egg count is seasonal - fewer eggs in winter
- Use Paracount EPG
• Known amount of feces (2gm)
• Known dilution of flotation solution
• Counted in a known volume in chamber (eggs/gm of feces)

• Microscope and ID source
• Flotation solution
• Special counting slide with grid

Paracount EPG™
### Occurrence of gastrointestinal helminth eggs in bison from northwestern Alberta

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Herd prevalence (%)</th>
<th>epg (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongyle-type</td>
<td>100</td>
<td>0 - 258</td>
</tr>
<tr>
<td>Capillaria</td>
<td>63.6</td>
<td>0 - 7</td>
</tr>
<tr>
<td>Nematodirus</td>
<td>50.0</td>
<td>0 - 21</td>
</tr>
<tr>
<td>Trichuris</td>
<td>40.9</td>
<td>0 - 19</td>
</tr>
<tr>
<td>Strongyloides</td>
<td>9.1</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

What do fecal egg counts tell you?

• Estimates the amount of pasture contamination
• Egg counts are not correlated to the worm numbers or severity of parasitic disease
• Monitor and maintain low egg counts - deworm to keep pasture contamination low
• Determine the effect of anthelmintic treatment by comparing samples from the same animals
• Indicates development of anthelmintic resistance
  – <60% reduction in eggs = moderate resistance
  – < 90% reduction in eggs = severe resistance
What is anthelmintic resistance?

• Ability of worms to survive treatments that are generally effective at recommended dose levels
• Considered a major threat to parasite control in horses and small ruminants
• Especially in NZ, UK and places where frequent worming (6x per year?) is performed but also in North America
Development of resistance

- There is genetic selection of parasites
- Treatment eliminates worms whose genetic makeup makes them susceptible to drugs
- Surviving worms live to pass on their "resistance" genetics
- Resistant worms accumulate and eventually treatment failure occurs
  - defined as < 90% reduction in egg count after worming
Causes of resistance

- Treating too often and with the same drug
- Treating all animals at the same time so that no “refugia” remain
- Treating and moving to clean pasture so that there is no dilution of resistant parasites
- Underdosing
  - worms with low level resistance survive
  - follow the directions and use accurate weights
Refugia

- Animals that are left untreated and carrying susceptible worm burdens
- Parasites are “in refuge” from the anthelmintic drug
- Provide a source of susceptible genes types to reproduce and dilute the resistant gene types in the parasite population
Slowing down drug resistance

• **Do not** overuse drugs
• **Do not** introduce resistant worms to your farm
  – isolate and deworm herd additions
• **Do not** underdose
  – weigh animals or dose for the heaviest animals
• **Do not** rotate wormers after each treatment
• **Do not** treat every animal – leave a few untreated
Treatment strategies

- Late fall or early winter
- Spring
  - Test and treat accordingly
  - Treat after turnout in summer
  - Repeat in three weeks
Relative transmission patterns of internal parasites in Canada

Treatment for parasites acquired during the first months of grazing

Strategic treatment

Craig TM, Wikse SE. Control programs for internal parasites of beef cattle. Food Animal Parasitology. The Compendium 17(4);579-587.
Products

- Injectable
- Pour-on
- Feed additive
- $H_2O$ additive
- Mineral additive
- Natural products
A word about withdrawal times and drug residues

• There are no maximum residue levels (MRL) established for drugs in bison meat
• Therefore if tested, any amount of drug will be in violation of CFIA regulations and will be considered “adulterated” and “inedible”
• Withdrawal times need to be at least as long as stated for cattle and probably twice as long
Chute treatments

- Injectable (Ivomec®, Dectomax®, Cydectin®)
- Pour-on (Ivomec®, Dectomax®, Eprinex®)
- Arguably the most efficient, most effective
- Withdrawal times ??
Feed additive in grain

• Use fenbendazole (Safeguard) crumbles at twice cattle dosage or mixed in with grain
• Use troughs or belts enough space for all bison
Water source treatment

- Make it the only water available
- Get the bison a bit thirsty first
- 5 gallons of \( H_2O \)/bison/day?
- Use Cydectin injectable
  (10ml/animal = $3-4/animal?)
- Use crushed Tramisol
  (levamisole) pellets
- Use SafeGuard suspension
  (5ml/45 kg = 50 ml/animal = $5-6/animal)
- Use circulating pump to keep in solution
Ivomec premix in pelleted ration

- Mix 5.0kg of 0.6% Ivomec swine premix per tonne of supplement pellets
- Feed at 0.33kg of medicated pellets per 45 kg of body weight (3/4 lb per 100 lbs) for 1-3 days
- Requires 6-8 lbs per head?
- Animals may not eat enough if unaccustomed to the pellets
- Use enough troughs or belts space for all the bison at the same time
SafeGuard in mineral supplement

• Use SafeGuard premix 20%
• Feed at a rate of 10mg/kg of animal
• 1 kg of 20% premix will treat 20,000kg of bison or fifty 400kg animals
• Estimate group mineral consumption over 5 days
• Add 20 gm of 20% SafeGuard to the free choice mineral supplement for each 400kg animal assuming that this amount is consumed over 5-7 days
Ivomec injectable in oats

• mix 100 mls Ivomec with 25 kg of oats in a cement mixer (4.0 mls (40mg) Ivomec/kg oats)
• turn until the alcohol smell is gone
• has 6-9 months shelf life
• feed at 2.0 kg of oats/400 kg of animal or 2 lbs/animal
Organic wormers

- Botanical dewormers (herbs, like garlic)
- Diatomaceous earth
- Shaklee Basic H (surfactant) This is a cleaning product!!!

- There is no scientific proof that ANY of them work
Why are anthelmintic licks a bad idea?
Summary - Keeping parasites under control requires an integrated approach

• Do your pastures have a parasite problem?
• Reducing exposure to infective larvae
  – reduce stocking density
  – use rotational grazing
  – change pasture environment – renovation
  – minimize stress (nutritional etc)
  – watch introduction of new bison
• Monitor parasite levels on pasture
  – specific periodic fecal sampling
May I see your licence?