“Making the Most of the Big Dollar Cattle Treatments: Antibiotics and Dewormers”

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DIFFERENT NAMES
SAME DISEASE

- PNEUMONIA
- SHIPPING FEVER
- BRDC (BOVINE RESPIRATORY DISEASE COMPLEX)
- SICK
Bovine Respiratory Disease Complex

- Nose
- Throat
- Windpipe
- Lung
Bovine Respiratory Disease Complex

- Viruses: IBR, PI₃, BRSV, BVD
- Viruses: dozens of other viruses (like the human cold)
- Viruses are most important in the upper tract
- Don’t respond to antibiotics, seldom kill cattle alone
Bovine Respiratory Disease Complex

- **Bacteria** - *Mannheimia hemolytica, P. mutocida, Haemophilus, Mycoplasma bovis*
- Live in upper tract in normal cattle
- Multiply in upper tract in stressed cattle
- Important when invade lung
- Death!!!
Bovine Respiratory Disease Complex
Bovine Respiratory Disease Complex

Pneumonia - filled or consolidated lung

“Normal” Lung
Signs of Respiratory Disease

- Depression
- Fever
- Decreased appetite
- Coughing
- Nasal discharge
Signs of Respiratory Disease

- Depression - Other causes: exhaustion, digestive disorders, variations in normal behavior
- Fever
- Decreased appetite
- Coughing
- Nasal discharge
DEPRESSED

- EARS DOWN
- HEAD EXTENDED
- AWAY FROM OTHER CATTLE
- CALVES DON’T STRETCH WHEN THEY GET UP
Signs of Respiratory Disease

- Depression
- Fever - Cattle are poor regulators of body temperature: environmental effects
- Decreased appetite
- Coughing
- Nasal discharge
Signs of Respiratory Disease

- **Fever**
  - Normal temperature of cattle 101°F-102°F
  - Critical temperature 102.5°F to 103.5°F

- **Temperature Considerations**
  - Time of day: temperatures increase up to 1.5°F through the day and are less reliable
  - Ease of handling before temperature taking
Signs of Respiratory Disease

- **Fever**

- **Temperature Considerations**
  - Environmental temperature
  - Wet?
  - Prior intramuscular treatment
  - Treatment with Banamine, Aspirin?
Signs of Respiratory Disease

- **Fever**

- **Taking Temperatures**
  - Digital thermometers - Durable
  - Rapid electronic thermometers
  - Routine temping off truck?, during processing?
Signs of Respiratory Disease

- Depression
- Fever
- Decreased appetite - Judging appetite on a new ration and in a new environment may be difficult:
  Body fill
- Coughing
- Nasal discharge
Signs of Respiratory Disease

- Depression
- Fever
- Decreased appetite
- **Coughing** - Cattle cough normally after getting up in the morning, after exercise
- Nasal discharge
Signs of Respiratory Disease

- Depression
- Fever
- Decreased appetite

- **Coughing** - Cattle with just colds (viral infections of the nose, throat and windpipe) will cough

- Nasal discharge
Signs of Respiratory Disease

- Depression
- Fever
- Decreased appetite
- Coughing

- Nasal discharge - Cattle with just colds (viral infections of the nose, throat and windpipe) will have nasal discharges
Signs of Respiratory Disease

- Too late!
  - Rapid breathing
  - Hard breathing
  - Dehydration
  - Death
Summary: Identifying Respiratory Disease

- How good are your “sick-finding” skills, systems?
- Thermometer is a tool to check your detection skills, monitor treatments
### DRUGS APPROVED FOR TREATING BRDC

#### BEFORE 1993
- PENICILLIN
- OXYTET-100
- TYLAN
- LA-200 (Generics)
- ERYTHROMYCIN
- AMPICILLIN
- AMOXICILLIN
- NAXCEL
- SULFA PILLS

#### SINCE 1993
- MICOTIL
- NUFLOR, Gold, Resflor
- EXCENEL/ EXCEDE
- BAYTRIL
- ADVOCIN
- Draxxin
- Zactran
- Zuprevo
SINCE 1993

- VETERINARY LABEL
- Caution: Federal Law restricts this drug to use by or on the order of a licensed veterinarian.
MICOTIL

- ONE DOSE PROVIDES 72 HOURS OF THERAPY
- 1/97 APPROVED FOR TREATMENT OF CATTLE AT HIGH RISK OF DEVELOPING BRDC - Metaphylaxis
As a result of improved health, Micotil metaphylaxis at 3 mL/cwt also delivered higher net returns per head at closeout:

- $126 advantage compared to nontreated controls
- $39 advantage compared to Micotil at 1.5 mL/cwt

Table 1. Animal Health Data, Texas Trial*

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Micotil 1.5 mL</th>
<th>Micotil 3.0 mL</th>
<th>P-value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRD morbidity, % (n)</td>
<td>34.0 (68)a</td>
<td>24.3 (97)b</td>
<td>16.8 (67)c</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>BRD mortality, % (n)</td>
<td>13.5 (27)a</td>
<td>7.5 (30)b</td>
<td>6.0 (24)b</td>
<td>0.02</td>
</tr>
<tr>
<td>BRD removals, % (n)</td>
<td>3.5 (7)</td>
<td>2.5 (10)</td>
<td>1.5 (6)</td>
<td>0.33</td>
</tr>
<tr>
<td>Total BRD loss***, % (n)</td>
<td>17.0 (34)a</td>
<td>10.0 (40)b</td>
<td>7.5 (30)b</td>
<td>0.01</td>
</tr>
<tr>
<td>Net return/hd</td>
<td>-41.41a</td>
<td>45.19b</td>
<td>84.61b</td>
<td>0.02</td>
</tr>
</tbody>
</table>

*Data presented as an arithmetic means and analyzed on a pen means basis.
**P-values are from the assessment of the overall treatment effect.
***Total loss = mortality + removals.
abc Different superscripts in same row differ P<0.05.
NUFLOR

- APPROVED
  JUNE 1996

- DOSE
  - 3CC / 100 LBS
  - REPEAT IN 48 HOURS

- WITHDRAWAL
  - 28 DAYS
NUFLOR

- LATER APPROVAL
- “ONE DOSE SUBQ”
- DOSE
  - 6 CC / 100 LBS
- WITHDRAWAL
  - 38 DAYS
NUFLOR

- Metaphylaxis APPROVAL
  - TREATMENT OF CATTLE AT HIGH RISK OF DEVELOPING BRDC
  - TREATMENT OF FOOTROT
Figure 1. Mean Florfenicol Plasma Concentration versus Time Following SC Injection of NUFLOR GOLD Injectable Solution or NUFLOR Injectable Solution in Cattle
Resflor Gold

- **Combination Drug:** Nuflor and Banamine
  - Syringability Issue
  - Mycoplasma label
EXCENEL

- SAME ACTIVE INGREDIENT AS NAXCEL
- SESAME SEED OIL SUSPENSION
- DOSE
  - 1-2 CC / 100 LBS ONCE A DAY
- WITHDRAWAL
  - 2 DAYS
EXCEDE

- SAME ACTIVE INGREDIENT AS NAXCEL, EXCENEL
- Slower release form
- DOSE
  - 1-.5 ML / 100 LBS
  - Single Dose
- WITHDRAWAL
  - 13 DAYS
BAYTRIL

• APPROVED FOR TREATMENT OF BRDC IN BEEF CATTLE OR HOLSTEIN STEERS ONLY

• MAY NOT BE USED FOR ANYTHING ELSE UNDER ANY CIRCUMSTANCES
BAYTRIL

- SINGLE DOSE
  - 3.4-5.7 CC / 100 LBS
  - ONE TIME

- MULTIPLE DAY DOSE
  - 1.1-2.3 CC / 100 LBS
  - ONCE A DAY X 3

- WITHDRAWAL
  - 28 DAYS

- Mycoplasma label
ADVOCIN

● SINGLE DOSE
  ■ 1.5 ml / 100 LBS, repeat in 48 hours
  ■ 2 ml / 100 LBS Single dose

● WITHDRAWAL
  ■ 4 DAYS
Draxxin

- **Single Dose Treatment**
  - 1.1 ml/100 lb. BW
- **WITHDRAWAL**
  - 18 Days
- **Mycoplasma label**
- **Foot rot and Pinkeye**
Zactran

- **SINGLE DOSE**
  - 2 ml/ 110 lb

- **WITHDRAWAL**
  - 35 days

- Mycoplasma label
Zuprevo

SINGLE DOSE
- 1 ml/ 100 lb

WITHDRAWAL
- 21 days

Long term tissue levels claim
## Time in Lung Tissues for Mannheimia

<table>
<thead>
<tr>
<th>Product</th>
<th>Dose</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxytetracycline (LA200, etc)</td>
<td>4.5 ml/ 100 lb</td>
<td>48 hours</td>
</tr>
<tr>
<td>Nuflor</td>
<td>6 ml/ 100 lb</td>
<td>80 hours</td>
</tr>
<tr>
<td>Micotil</td>
<td>1.5 ml / 100 lb</td>
<td>65 hours</td>
</tr>
<tr>
<td>Micotil</td>
<td>3 ml / 100 lb</td>
<td>5 days</td>
</tr>
<tr>
<td>Excede</td>
<td>1.5 ml/ 100 lb</td>
<td>7 to 10 days</td>
</tr>
<tr>
<td>Draxxin</td>
<td>1.1 ml / 100 lb</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Baytril</td>
<td>5 ml / 100 lb</td>
<td>10 to 14 days</td>
</tr>
<tr>
<td>Zactran</td>
<td>2 ml / 110 lb</td>
<td>12 to 16 days</td>
</tr>
<tr>
<td>Zuprevo</td>
<td>1 ml/100 lb</td>
<td>28 days</td>
</tr>
</tbody>
</table>
Antibiotic Costs

- Older antibiotics can be very economical (generic oxytetracycline as low as $1) but effective???
- Newer antibiotics significantly more expensive
- Newest antibiotics compared to Draxxin
  - Zactran 15% less
  - Zuprevo 15% more
BANAMINE (Flunixin)

- NON-STEROIDAL ANTI-INFLAMMATORY DRUG (NSAID)
- SIMILAR TO ASPIRIN
- LABELED TO REDUCE FEVER AND INFLAMMATION ASSOCIATED WITH BRDC
BANAMINE

- **DOSE**
  - 1-2 CC / 100 LBS ONCE A DAY FOR 1-3 DAYS IV

- **WITHDRAWAL**
  - 4 DAYS
Antibiotics plus Flunixinin
Mycoplasma
Mycoplasma: The organism

- Mycoplasma: a group of the smallest free-living organisms, unlike the bacteria and virus.
- Bacteria have a solid cell-wall structure (many antibiotics work here).

Mycoplasmas: like a jelly-fish with a very pliable and sticky membrane.
Mycoplasma Problems

- Pneumonia
  - Just as deadly as other bacteria: often have the two together
- Joint Problems
  - Severe lameness
- Ear Infection: drooped ear, may break and drain
Mycoplasma Treatment

Products Specifically approved for *Mycoplasma bovis*:

- Draxxin ®
- Resflor Gold ®
- Baytril 100 ®
- Zactran®

Prolonged treatment often necessary
DEVELOPING A TREATMENT PROTOCOL

- RECOGNITION OF BRDC
- WHY DO CALVES DIE?
- WHEN DO I TREAT
- WHAT ANTIBIOTIC SHOULD I USE?
- WHAT OTHER SUPPORTIVE DRUGS SHOULD I USE?
- WHAT ELSE CAN INCREASE THE CALF’S CHANCE OF SURVIVAL?
Treatment Success

- A joint result of calves’ defenses and drug treatment
- No antibiotic good enough without help from the calf
WHY CALVES DIE

- BAD LUCK (LAS VEGAS DISEASE)
- BOUGHT SICK
- TREATED TOO LATE
- USED THE WRONG DRUG
WHEN DO I TREAT?

- IF CALVES ARE TREATED EARLY IN THE COURSE OF THE DISEASE ALMOST ANY DRUG WILL WORK

- IF CALVES ARE TREATED LATE IN THE COURSE OF THE DISEASE IT DOESN’T MATTER WHICH ANTIBIOTIC YOU USE
WHAT ANTIBIOTIC SHOULD I USE?

- Tetracycline, sulfas, ampicillin, and amoxicillin are less powerful drugs and will often not be effective but may be useful in some cases. Economical.

- Penicillin, tylosin and erythromycin will generally not be effective.
WHAT OTHER DRUGS MAY HELP?

- Flunixin
  - REDUCE FEVER AND LUNG DAMAGE
  - HELP GET CALVES BACK ON FEED
- ORAL FLUIDS
  - STIMULATE APPETITE
  - CORRECT DEHYDRATION
- VIT B AND PROBIOTICS ??
  - STIMULATE APPETITE
WHAT ELSE WILL HELP THIS CALF?

- EXCELLENT QUALITY FEED
  - GRAIN (carefully)
  - HAY
- GRASS OR RYE
- SUNLIGHT
- TLC
WHAT ELSE WILL HELP THIS CALF?

- Feeding antibiotics?
  - Even at high levels don’t get “treatment” levels in cattle tissues
  - Depress build up of Pasteurella in upper respiratory tract? Depress mycoplasma, histophilus?
  - Many testimonials of value
SWITCHING ANTIBIOTICS?

CALF BASIS

- **SWITCH ANTIBIOTICS IF CALF DOES NOT IMPROVE IN 24-48 HOURS**
- **MONITOR**
  - TEMPERATURE
  - CALF’S APPETITE
  - CALF’S ATTITUDE
SWITCHING ANTIBIOTICS?
HERD

- GOOD RECORDS
- GOOD RECORDS
- NECROPSIES
- IMPORTANT FOR ALLOWING YOU AND YOUR VETERINARIAN TO MAKE GOOD DECISIONS
SWITCHING ANTIBIOTICS?

HERD

- **MORBIDITY ( # CALVES SICK ) ?**
- **MORTALITY ( # CALVES THAT DIE ) ?**
  - < 48 HOURS
  - > 48 HOURS
- **CASE FATALITY RATE ?**
  - NUMBER OF TREATED CALVES THAT DIE
when to quit - Clay Center, Dr. Griffin

- Consider two things …
  1) How long ago did the “stress” start ???
     - Auction market … days received + 3 days
  2) How long have you been treating animal?

- If 1 is over $21_{\text{days}}$ & 2 is over $7_{\text{days}}$ … QUIT
- If 2 is greater than 10 … QUIT
TREAT ALL CALVES?

- MASS MEDICATE
- METAPHYLAXIS - treatment of all calves on arrival
- TREAT CATTLE AT HIGH RISK OF DEVELOPING BRDC
Metaphalaxis
What is Metaphalaxis

- Mass Medication
- Treatment of all animals at high risk of developing BRDC
Antibiotic Metaphylaxis for BRD in High-Risk Calves

- **Does it work?**
- **Does it reduce BRD pull rate (morbidity rate)?**
- **Does it reduce BRD death losses (mortality rate)?**
- **Does it pay to use it?**
# Effects of Micotil Metaphylactic Medication - 15 Trials

<table>
<thead>
<tr>
<th>Trial</th>
<th>Morbidity (%)</th>
<th>Mortality (%)</th>
<th>ADG (lb)</th>
<th>Trial Length (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Micotil</td>
<td>Control</td>
<td>Micotil</td>
</tr>
<tr>
<td>Mechor</td>
<td>85.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>17.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.3&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Kreikemeier</td>
<td>79.2</td>
<td>59.4</td>
<td>1.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Brazle 1</td>
<td>75.6&lt;sup&gt;c&lt;/sup&gt;</td>
<td>59.7&lt;sup&gt;d&lt;/sup&gt;</td>
<td>8.1&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.2&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>Duff</td>
<td>71.9&lt;sup&gt;c&lt;/sup&gt;</td>
<td>46.9&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Brazle 2</td>
<td>65.1&lt;sup&gt;c&lt;/sup&gt;</td>
<td>39.8&lt;sup&gt;d&lt;/sup&gt;</td>
<td>6.3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.9&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Vogel</td>
<td>58.7&lt;sup&gt;c&lt;/sup&gt;</td>
<td>34.5&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.5&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.7&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Galyean 1</td>
<td>46.4&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.0&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.0</td>
<td>0.0</td>
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<td>Gaylean 2</td>
<td>43.6&lt;sup&gt;c&lt;/sup&gt;</td>
<td>11.9&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Morck</td>
<td>42.0&lt;sup&gt;c&lt;/sup&gt;</td>
<td>19.0&lt;sup&gt;d&lt;/sup&gt;</td>
<td>2.8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.5&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>McCoy 1</td>
<td>33.7&lt;sup&gt;a&lt;/sup&gt;</td>
<td>11.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.2</td>
<td>0.5</td>
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<td>Gaylean 3</td>
<td>32.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12.1&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>0.0</td>
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<tr>
<td>Schuman 1</td>
<td>23.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Klemesrud</td>
<td>22.3&lt;sup&gt;e&lt;/sup&gt;</td>
<td>12.9&lt;sup&gt;f&lt;/sup&gt;</td>
<td>1.2</td>
<td>0.4</td>
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<td>2.0&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td>McCoy 2</td>
<td>16.1&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.8</td>
<td>0.4</td>
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<tr>
<td>Average</td>
<td>47.7</td>
<td>22.6</td>
<td>2.3</td>
<td>0.5</td>
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<sup>a,b</sup> Row means with different superscripts differ (P< 0.01)
<sup>c,d</sup> Row means with different superscripts differ (P< 0.05)
<sup>e,f</sup> Row means with different superscripts differ (P< 0.10)

Guthrie CA et al: Comp on C.E., March, 2000
# Micotil Metaphylaxis - 15 Trial Summary

*(n = 6284)*

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CONTROL</th>
<th>MICOTIL</th>
<th>% OVER CONTROL</th>
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</thead>
<tbody>
<tr>
<td>MORBIDITY</td>
<td>47.7</td>
<td>22.6</td>
<td>52.6%</td>
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<tr>
<td>MORTALITY</td>
<td>2.3</td>
<td>0.5</td>
<td>78.3%</td>
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<tr>
<td>DAILY GAIN, LB</td>
<td>2.26</td>
<td>2.45</td>
<td>8.4%</td>
</tr>
</tbody>
</table>

Guthrie CA et al: Comp on C.E., March, 2000
Difference in ADG in Micotil Metaphylaxis vs. No Metaphylaxis for Varying Trial Length

ADG = 0.5*\( \text{Exp}(-0.012 \times \text{days}) \)

Where \( \text{Exp} = 2.71828… \)
When is the best time to give an antibiotic for metaphylaxis?

- Pre shipment
- For retained ownership cattle
- On-Arrival
- A few days post arrival
ALL CALVES ARE NOT THE SAME

- CATEGORY 1
  - PRECONDITIONED, BACKGROUNDED CALVES
- CATEGORY 2
  - CALVES TRANSFERRED FROM FARM A TO FARM B
- CATEGORY 3
  - FRESH MARKET CALVES
- CATEGORY 4
  - STALE CALVES
## GOALS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CATEGORY 1</th>
<th>CATEGORY 2</th>
<th>CATEGORY 3</th>
<th>CATEGORY 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SICK CALVES</td>
<td>&lt;= 5 %</td>
<td>5-10%</td>
<td>&lt; 15 %</td>
<td>&lt; 25-50%</td>
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<tr>
<td>DEAD CALVES</td>
<td>&lt; 1</td>
<td>&lt; 2 %</td>
<td>&lt; 3 %</td>
<td>&lt; 5 %</td>
</tr>
<tr>
<td>REPULLS</td>
<td>&lt; 10 %</td>
<td>&lt; 10 %</td>
<td>&lt; 10 %</td>
<td>&lt; 15 %</td>
</tr>
</tbody>
</table>
Cattle Injections
Cattle Injections
Cattle Injections
QUESTIONS ????
Cattle Deworming

Wm. Dee Whittier, DVM, MS
Production Management Medicine
Virginia-Maryland Regional College of Veterinary Medicine
Bottom line deworming recommendations:

- Spring calving cow/calf: Calves Mid-summer and at weaning; 1st calvers at spring
- Fall calving cow/calf: Calves Spring and 5,6,7 weeks later or weaning
- Weaned calves, yearlings: Sequential spring deworming; fall: at purchase & after frost if grazing
- Mature Cows: Don’t need it, but…
Deworming

- Research has clearly demonstrated that appropriate internal parasite control programs return economic benefits to cattle producers.
Cattle Internal Parasites -
Cattle Internal Parasites
Deworming

- Key element is the level of contamination on pastures grazed by cattle
- Contamination = the number of developing stages or larvae of the parasites present on the plants that the cattle eat
- Larval numbers on pastures directly determine the number of worms that will be infecting cattle.
Adult and Larval Stomach worms
Parasitic larvae in a dew drop
Deworming

- The most important factors that determine how long and how well the larvae survive on pasture are:
  - Temperature
  - Moisture
  - Type of soil
  - Management

- Free living parasite larvae are known to survive on pasture for many months or even years and they certainly survive over the winter
Deworming

Pasture Larvae

Dry Season
12” Pasture Stand
Canopy protects lower levels from drying, maintains favorable environment for Ostertagia larvae.
Arrested Development:

- During periods favorable for development, larvae picked up by the grazing animal will develop normally into adult parasites.
- Larvae picked up during times preceding severe conditions cease development inside the lining of the stomach.
- Ostertagia ostertagi is the most important.
- Arrest may last up to 16-24 weeks (no damage being done to the digestive tract).
- As large numbers of these larvae resume development, damage is done to the animal.
Arrested Development:

- As with parasitism other times of the year, the most common outcome is an unnoticed decrease in production.
- Occasional severe outbreaks of parasitic diarrhea may occur in late winter and early spring.
- Outbreaks may not be recognized as a parasitic disease since parasitic disease is not expected during the time of year when cattle aren't grazing.
- Winter inhibition is typical of northern climates, the summer inhibition of southern climates.
Strategic Deworming

Begin Grazing

Deworm

Begin egg shedding

Worm development

Traditional Dewormers
0, 3, 6 weeks

Begin egg shedding
3 wk

Begin egg shedding
6 wk

Begin egg shedding
9 wk
<table>
<thead>
<tr>
<th>Drug</th>
<th>Trade Name(s)</th>
<th>Route</th>
<th>Cost for 500 lb. animal</th>
<th>Gets important Virginia worms?</th>
<th>Gets inhibited worms?</th>
<th>Special Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levamisole phosphate</td>
<td>Tramisol, Injectable Solution</td>
<td>Injectable</td>
<td>$1.00</td>
<td>Yes</td>
<td>No</td>
<td>Pour-on convenience</td>
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<tr>
<td>Levamisole phosphate</td>
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<td>Pour-on</td>
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<td>Safe-Guard, Panacur</td>
<td>Drench, Paste</td>
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<td>At high dose</td>
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<td>Fenbendazole</td>
<td>Safe-Guard pellets, mineral, etc., Moorman's Moorguard Minerals</td>
<td>Oral consumable</td>
<td>$1.50 to $2.00</td>
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<td>Probably not</td>
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<td>Grub and lice control, Residual Effect</td>
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<td>Injectable</td>
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<td>Yes</td>
<td>Grub and lice control, Residual Effect 2 weeks, Pour-on convenience</td>
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<td>Ivomec Pour-On</td>
<td>Pour-on</td>
<td>$2.00</td>
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<td>Yes</td>
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<td>Many generics</td>
<td>Pour on</td>
<td>$0.50-$0.80</td>
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<td>Sustain Release Bolus</td>
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<td>Yes</td>
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<td>Cydecin</td>
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<td>$2.50</td>
<td>Yes</td>
<td>Yes</td>
<td>Grub and lice control, Residual Effect of 4 weeks</td>
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- Levasole™

Drench

Each packet contains 46.8 grams of levamisole hydrochloride activity.

FOR ORAL USE IN CATTLE AND SHEEP

Administer as a standard drench with standard drench syringe or administer as a concentrated drench solution with an automatic drenching syringe.

RECOMMENDATIONS:

LEVASEOLE (levamisole hydrochloride) is a broad-spectrum anthelmintic and is effective against the following nematode infections in cattle and sheep:

STOMACH WORMS: (Haemonchus, Trichostrongylus, Ostertagia)

INTESTINAL WORMS: (Trichostrongylus, Cooperia, Nematodirus, Bunostomum, Oesophagostomum)

(Chabertia—sheep only)

LUNGWORMS: (Dictyocaulus)

WARNING: Keep out of reach of children.

Net Wt. 1.8 oz. (52 g)
Deworming

Plasma drug concentration (ng/mL)

Days post-treatment

Ivomec
Dectomax
CYDECTIN®

Pour-On

It’s time for a pour-on that offers more.

✓ Broader control of both lice and mange
✓ Longest lasting efficacy against Ostertagia
✓ 1st rainfast pour-on endectocide
✓ Unique oil-based formula
✓ Non-flammable formulation
✓ Shorter 36 day meat withdrawal
✓ Always comes with veterinary advice

COMPOSITION

CYDECTIN® Pour-On for Cattle comes ready to use as a violet solution containing 5 mg/mL (0.5% w/v) moxidectin.
Persistent Activity: In cattle, CYDECTIN® Pour-On for Cattle prevents reinfection with Ostertagia ostertagi and Dictyocaulus viviparus for at least 28 days following a single application at the recommended dose rate.

DOSAGE AND ADMINISTRATION

Dosage and administration: EXTERNAL USE ONLY. CYDECTIN® Pour-on for Cattle should be applied to healthy skin along the top of the back from the withers to the base of the tail. Use 1 mL per 10 kg bodyweight to administer a dose of 0.5 mg/kg.
Strategic Deworming

**Begin Grazing**
- 5 wk
- Deworm
- Begin egg shedding
- 10 wk
- Deworm
- Worm development

**Ivomec Inj. 0.5**

**Persistent Activity**
Strategic Deworming

Dectomax® Pour On, Cydectin® 0,7

Persistent Activity

Begin egg shedding

Begin Grazing

Deworm

7 wk

14 wk

Worm development
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<th>DRUG</th>
<th>PRODUCT</th>
<th>HOW SUPPLIED</th>
<th>INDICATION</th>
<th>DOSE</th>
<th>ROUTE</th>
<th>PERSISTENT</th>
<th>MW</th>
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<td>3 Weeks</td>
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</table>
Deworming

**FIGURE 1. CUMULATIVE WEIGHT GAIN IN POUNDS**

- **GROUP 1**
- **GROUP 2**
- **GROUP 3**

Cumulative weight gain in pounds over the days of grazing.
Deworming

FIGURE 4. THIRD STAGE LARVAE FROM GRASS ANALYSIS.
Strategic Deworming Comparison - Bland Correctional Center
Fall-Born Weaned Heifers - 5/5/97-10/21/97

Weight Gain (LB)

Dectomax®
- 249

Ivomec SR®
- 275
<table>
<thead>
<tr>
<th>Year</th>
<th>Treatments</th>
<th>Cow Wt. +/-</th>
</tr>
</thead>
</table>
| 1-88 | **Gp 1**: Mature dams Start & Mid  
**Gp 2**: Calves only Mid  
**Gp 3**: 2 yr. old dams Start & Mid, calves Mid | No difference                                   |
| 2-89 | **Gp 1**: Mature dams Start & Mid, calves Mid  
**Gp 2**: Calves only Mid  
**Gp 3**: Control, no treatment | On June 20- **Gp 1**: 33 Kg  
**Gp 2**: 21 Kg  
**Gp 3**: 23 Kg |
| 3-90 | **Gp 1**: Mature dams Start, calves Mid  
**Gp 2**: Calves only Mid  
**Gp 3**: Control, no treatment | **Gp 2**: +177 greater than **Gp 1**: +158 greater than **Gp 3**: +141 |
| 4-92 | **Gp 1**: Mature dams Start, calves Mid ivermectin  
**Gp 2**: Calves only Mid ivermectin  
**Gp 3**: Calves only Mid fenbendazole  
**Gp 4**: Control, no treatment | No difference                                   |
| 5-94 | **Gp 1**: Mature dams Start  
**Gp 2**: Calves only Mid | No difference                                   |
| 6-96 | **Gp 1**: Deworm calves, Implant Mid;  
**Gp 2**: Deworm; no Implant  
**Gp 3**: No Deworm calves, Implant Mid  
**Gp 4**: Nontreated control  
No cow treatment any group | N/A                                             |
Cumulative weight gains for calves when cows were dewormed in spring and fall or calves only were treated mid-summer (July 13).
Craigsville, VA 1994

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<th>Date</th>
<th>Weight Gain (lbs.)</th>
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<td>4/20</td>
<td>Treat Cows 452</td>
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<tr>
<td>6/9</td>
<td>Treat Calves 381</td>
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<td>7/13</td>
<td>Treat Cows 214</td>
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<td>9/8</td>
<td>Treat Calves 381</td>
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<td>10/19</td>
<td>Treat Cows 452</td>
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</table>
Deworming

Cow Body Condition Score
Buckingham Correctional Center
Summer 1997

BCS 7/17

Treat ment

BCS 7/17

Calves 0,6

Cows Ivomec®, Calves 0

Treatment
Cowmectin Ivermectin Pour-On for Cattle

For the treatment and control of gastrointestinal roundworms, lung worms, grubs, horn flies, sucking and biting lice, and sarcoptic mange mites in cattle. Apply along back of animal at 5 ml. per 100 lbs. of body weight. Not cleared for female dairy cattle of breeding age.

A hazardous shipping charge of $20.00 will be added to the price. (This does not show up in cart.)

Two 5 liter containers will ship for one $20 Hazardous fee.

Compare to Ivomec® Pour-On and Iver-On™ Pour-On

FREE Pour-On Gun (MA-A5) $21.49 value With the purchase of two (2) 5 liter bottles of Cowmectin (MA-C1). Expires: 01/31/2008

FREE!
- 5000 ml @ $60 = .83 cents per ml
- 60 ml X .83 = $.50 per cow
- Can you find a better lice/ grb Rx for 50 cents??