KSU BEEF STOCKER

FIELD DAY

September 19, 2019
KSU Beef Stocker Unit

PROCEEDINGS
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Welcome to the 20th annual KSU Beef Stocker Field Day. We appreciate your attendance and support of this educational event. We are fortunate to have assembled an outstanding list of presenters and topics that we believe are relevant to your bottom line.

As always, if you have any questions on the program or suggestions for future topics, please let us know. Our strength in delivering relevant information lies in working closely with you, our stakeholder.

Sincerely,

Dale A. Blasi, PhD
Extension Beef Specialist
Department of Animal Sciences and Industry
College of Agriculture

THANK YOU

We would like to express a special “THANK YOU” to Bayer Animal Health for their support of today’s educational program and activities for the beef stocker segment. With their financial assistance, we are able to deliver the caliber of programming that today’s events have in store for you. Please take a moment to stop by their display to see the line of products that they have to offer.
9:30 am  Registration/Coffee

10:15 am  Introductions

10:30 am  Beef Cattle Market Outlook
Dr. Glynn Tonsor, KSU Agricultural Economist

11:15 am  Changing Industry Structure in Forging a Closer Relationship Between Grow Yards and Feeders
Don Close, Rabo AgriFinance

12:00pm  Niman Ranch CAB® Natural Prime Ribeye Lunch – View posters

1:00 pm  Internal Parasite Management
David Pugh, Southern Traxx Farm and Forge

2:00 pm  Humane Euthanasia Practices
Dr. AJ Tarpoff, KSU Extension Beef Veterinarian

2:45 pm  Break

3:15 pm  BeefBasic: Better Information for Better Marketing Decisions
Brett Crosby, Custom Ag Solutions

4:15 pm  Health Management of High Risk Calves
Dan Thomson, KSU College of Veterinary Medicine

5:00 pm  Panel Discussion: Beef Parasite Control
Wes Ishmael, moderator
Ty Brunswig, Animal Medical Center
AJ Tarpoff, KSU Extension Beef Veterinarian
David Pugh, Southern Traxx Farm and Forge

5:30 pm  Cutting Bull's Lament 2019
Beef Cattle Market Outlook

Glynn Tonsor, Ph.D.
Kansas State University

Overarching Beef Industry Economic Outlook

• Supplies
  – Commercial Beef Production Up, Increases Moderating
  • +3.8% in 2017, +2.6% in 2018, +1.2% in 2019, +1.0% in 2020
Overarching Beef Industry Economic Outlook

• Supplies
  – Commercial Beef Production Up, Increases Moderating
    • +3.8% in 2017, +2.6% in 2018, +1.2% in 2019, +1.0% in 2020

• Demand
  – Key to supporting prices

Consider Price Changes (vs. prior year)
- 5-mkt Live avg: 2017 (+1%), 2018 (-4%), 2019f (0%)
- 7-800# SP: 2017 (+2%), 2018 (+1%), 2019f (-4%)
- 5-600# SP: 2017 (0%), 2018 (+3%), 2019f (-4%)

All-Fresh Beef Retail Demand Index
(Monthly, Jan 1988=100)

http://agmanager.info/livestock-meat/meat-demand
All-Fresh Beef Retail Demand Index
(Monthly, Jan 1988=100)

Since Jan 2018, demand has grown in 12 of 19 months (5 of 7 in 2019)

http://agmanager.info/livestock-meat/meat-demand

All-Fresh Beef Retail Demand Index
(Monthly, Jan 1988=100)

July 19 domestic per capita cons.: 13% lower than they would have been if demand @ Jan 1988 levels

http://agmanager.info/livestock-meat/meat-demand

Beef Demand Overview
Glynn T. Tonsor
Dept. of Ag. Economics
Kansas State Univ.
gtonsor@ksu.edu @TonsorGlynn

Committee Leadership Summit
Denver, CO
December 11, 2018

https://www.agmanager.info/beef-demand-overview
Holcomb-Tyson Plant Fire

- Date: August 9th
- Processing Capacity Involved: 6k/day
  ~5% of US Capacity (~24% of KS Capacity)
- Processor Map

<table>
<thead>
<tr>
<th>Processor Map</th>
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</table>

Holcomb-Tyson Plant Fire

**Livestock Markets Jolted by Tyson Beef Plant Fire**

- Retail buyers are in a bidding frenzy, facing shortfalls
- Packer beef may be coming to consumers sooner than expected

Holcomb-Tyson Plant Fire

- Price Impact on Cattle
  - Expected:
    - Derived Demand Decline = Cattle Price Decline
  - Realized:
    - CME limit down 1st two days
    - LC Cash down $5-$7 1st week; FC Cash down ~$10
Holcomb-Tyson Plant Fire

• Price Impact on Beef
  – Expected:
    • Processing Cost Up = Beef Price Increase
  – Realized:
    • Two largest daily cutout price increases on-record (post-MPR)

![Graph showing beef price changes](image)

CATTLE SLAUGHTER
FederaIy Inspected, Weekly

![Graph showing cattle slaughter data](image)

Data Source: USDA-AMS & USDA-NASS Livestock Marketing Information Center
HEIFERS HELD AS BEEF COW REPLACEMENTS
July 1, U.S.

Data Source: USDA-NASS; 2013 Was Unreported – LMIC Made Estimates

Livestock Marketing Information Center

MED. & LRG. #1 STEER CALF PRICES
500-600 Pounds, Southern Plains, Weekly

Avg. 2013-17

Data Source: USDA-AMS
Livestock Marketing Information Center

BeefBasis.com, Salina, KS 2019 Projections (as of 9/18/19):
Oct. 16: $156

ESTIMATED AVERAGE COW CALF COSTS
Total Cash Cost Plus Pasture Rent, Annual

$859 Cash Cost = Cash Break-Even
Sales $156/cwt Price (550#)
y = 20.63x + 220.35
R² = 0.8562

Data Source: USDA & LMIC, Compiled by LMIC
Livestock Marketing Information Center
**ECONOMIC OUTLOOK OVERVIEW: POST WEANING**

*Forward-Looking Margin Perspective*

http://www.beefbasis.com/VOG.aspx

- Salina, KS 9/18/19 Backgrounding situation:
  - Buy/Retain 550 lb steer on 10/16/19 ($156)
  - Sell 750 lb steer on 1/15/20 ($136) {2.2 ADG}
- **VOG: $80/cwt**
  - Compare to COG & Assess “stomach” for volatility
**Economic Outlook Overview: Stockers**

**Historical Margin Perspective**

**BUY/SELL MARGINS**

S. Plains, Mar. 7-800 lb. Steer as % of Nov. 5-600 lb. Steer

Data Source: USDA-AMS, Compiled and Analysis by LMIC

Livestock Marketing Information Center

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**USDA LRP Changes July 1**


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The Agriculture Improvement Act of 2018 (the 2018 Farm Bill) authorized the Livestock Indemnity Program (LIP) to provide benefits to eligible livestock owners or contract growers for livestock deaths in excess of normal mortality caused by eligible loss conditions, including eligible adverse weather, eligible disease and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. In addition, LIP provides assistance to eligible livestock owners that must sell livestock at a reduced price because of an injury from an eligible loss condition.

**Yes, Republic County, Kansas has about 110 Notice of Losses filed for 2019 LIP – compared to last year with zero Notice of Losses filed under LIP.** The majority of the Notice of Losses were filed due to the extreme cold, there are a few losses due to blizzard as well,” said Sarah Heeger, County Executive Director/Republic County FSA in Belleville, Kansas.

**Economic Outlook Overview: Feedlots**

- 2019 remains rough
Historical and Projected Kansas Feedlot Net Returns (as of 9/13/19)

Table 1. Projected Values for Finishing Steers in Kansas Feedyards

<table>
<thead>
<tr>
<th>Month</th>
<th>Feeder Return</th>
<th>CDFD™</th>
<th>Feed Price</th>
<th>Feed Futuros</th>
<th>Feed Basis</th>
<th>Feeder Price</th>
<th>IntraDayNet</th>
<th>IntraDay</th>
<th>IntraDayNet</th>
<th>IntraDay</th>
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<tbody>
<tr>
<td>Aug 19</td>
<td>-106.47</td>
<td>88.81</td>
<td>195.67</td>
<td>159.52</td>
<td>3.15</td>
<td>172.45</td>
<td>-58.81</td>
<td>120.17</td>
<td>172.45</td>
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<tr>
<td>Sep 19</td>
<td>-267.99</td>
<td>89.31</td>
<td>205.82</td>
<td>164.58</td>
<td>4.25</td>
<td>179.56</td>
<td>-77.77</td>
<td>127.08</td>
<td>159.40</td>
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<tr>
<td>Nov 19</td>
<td>-231.20</td>
<td>90.83</td>
<td>205.43</td>
<td>164.38</td>
<td>2.90</td>
<td>184.23</td>
<td>-86.90</td>
<td>125.95</td>
<td>153.66</td>
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<tr>
<td>Dec 19</td>
<td>-85.40</td>
<td>96.83</td>
<td>212.60</td>
<td>161.13</td>
<td>1.50</td>
<td>183.00</td>
<td>-66.15</td>
<td>167.46</td>
<td>160.70</td>
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<tr>
<td>Jan 20</td>
<td>-96.40</td>
<td>98.60</td>
<td>212.63</td>
<td>161.13</td>
<td>1.50</td>
<td>183.00</td>
<td>-76.40</td>
<td>154.50</td>
<td>164.40</td>
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<tr>
<td>Feb 20</td>
<td>-67.64</td>
<td>97.86</td>
<td>217.80</td>
<td>163.96</td>
<td>3.84</td>
<td>189.14</td>
<td>-92.30</td>
<td>172.14</td>
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<tr>
<td>Mar 20</td>
<td>-86.49</td>
<td>97.36</td>
<td>219.00</td>
<td>165.00</td>
<td>4.00</td>
<td>189.14</td>
<td>-90.27</td>
<td>167.13</td>
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<td>May 20</td>
<td>-91.91</td>
<td>99.53</td>
<td>216.50</td>
<td>165.00</td>
<td>3.00</td>
<td>185.10</td>
<td>-92.30</td>
<td>172.14</td>
<td>172.14</td>
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</tr>
</tbody>
</table>

Data Source: USDA-AMS
Livestock Marketing Information Center

SLAUGHTER STEER PRICES
5 Market Weighted Average, Weekly

Historical and Projected Kansas Feedlot Net Returns (as of 9/13/19)

Figure 1. Historical & Projected Average Net Returns for Finishing Steers in Kansas Feedyards

July 19’ - $77/sheer
### Quarterly Forecasts (LMIC: 7/28/19)

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>Comm’l Slaughter Weight</th>
<th>Year Ago</th>
<th>% Chg.</th>
<th>Comm’l Production from Beef</th>
<th>Year Ago</th>
<th>% Chg.</th>
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<tbody>
<tr>
<td>2018</td>
<td>I</td>
<td>7,479</td>
<td>878</td>
<td>2.1</td>
<td>682</td>
<td>0.5</td>
<td>2.6</td>
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<tr>
<td></td>
<td>II</td>
<td>8,149</td>
<td>106.3</td>
<td>0.3</td>
<td>7,365</td>
<td>2.5</td>
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<td></td>
<td>III</td>
<td>8,220</td>
<td>105.5</td>
<td>-0.1</td>
<td>7,365</td>
<td>1.0</td>
<td>1.5</td>
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<tr>
<td></td>
<td>IV</td>
<td>8,341</td>
<td>102.7</td>
<td>-0.3</td>
<td>7,365</td>
<td>1.0</td>
<td>1.8</td>
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<tr>
<td></td>
<td>Year</td>
<td>33,005</td>
<td>814.2</td>
<td>0.1</td>
<td>26,872</td>
<td>2.6</td>
<td>2.6</td>
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<td>2019</td>
<td>I</td>
<td>7,634</td>
<td>894.4</td>
<td>-1.5</td>
<td>6,414</td>
<td>-0.8</td>
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<tr>
<td></td>
<td>II</td>
<td>8,516</td>
<td>798.8</td>
<td>0.5</td>
<td>6,814</td>
<td>1.3</td>
<td>0.3</td>
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<tr>
<td></td>
<td>III</td>
<td>8,409</td>
<td>817.2</td>
<td>0.2</td>
<td>7,027</td>
<td>3.1</td>
<td>1.2</td>
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<td></td>
<td>IV</td>
<td>8,303</td>
<td>829.0</td>
<td>0.8</td>
<td>6,926</td>
<td>0.9</td>
<td>0.9</td>
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<tr>
<td></td>
<td>Year</td>
<td>33,461</td>
<td>812.3</td>
<td>-0.2</td>
<td>27,182</td>
<td>1.2</td>
<td>1.2</td>
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<td>2020</td>
<td>I</td>
<td>7,506</td>
<td>805.1</td>
<td>1.2</td>
<td>6,342</td>
<td>2.0</td>
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<td></td>
<td>II</td>
<td>8,499</td>
<td>780.9</td>
<td>1.6</td>
<td>6,814</td>
<td>0.8</td>
<td>0.8</td>
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<tr>
<td></td>
<td>III</td>
<td>8,480</td>
<td>806.9</td>
<td>1.6</td>
<td>7,054</td>
<td>0.4</td>
<td>0.4</td>
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<tr>
<td></td>
<td>IV</td>
<td>8,247</td>
<td>847.8</td>
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<td>6,992</td>
<td>0.9</td>
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<td></td>
<td>Year</td>
<td>33,212</td>
<td>826.6</td>
<td>1.8</td>
<td>27,453</td>
<td>1.0</td>
<td>1.0</td>
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</table>

### Quarterly Forecasts (LMIC: 7/28/19)

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter</th>
<th>Live Sltr. % Chg.</th>
<th>Feeder Steer Price 7-800#</th>
<th>Southern Plains 7-600#</th>
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<tbody>
<tr>
<td>2018</td>
<td>I</td>
<td>125.60</td>
<td>148.73</td>
<td>180.01</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>116.72</td>
<td>144.52</td>
<td>170.11</td>
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<td></td>
<td>III</td>
<td>111.00</td>
<td>156.00</td>
<td>170.00</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>115.00</td>
<td>151.00</td>
<td>166.00</td>
</tr>
<tr>
<td></td>
<td>Year</td>
<td>117.00</td>
<td>150.00</td>
<td>171.00</td>
</tr>
<tr>
<td>2019</td>
<td>I</td>
<td>125.27</td>
<td>142.87</td>
<td>171.41</td>
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<td></td>
<td>II</td>
<td>118.79</td>
<td>143.23</td>
<td>167.22</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>110.00</td>
<td>143.00</td>
<td>163.00</td>
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<td>IV</td>
<td>114.00</td>
<td>143.00</td>
<td>161.00</td>
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<td></td>
<td>Year</td>
<td>117.00</td>
<td>143.00</td>
<td>163.00</td>
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<tr>
<td>2020</td>
<td>I</td>
<td>122.00</td>
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<td>III</td>
<td>106.00</td>
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<td></td>
<td>IV</td>
<td>113.00</td>
<td>146.00</td>
<td>163.00</td>
</tr>
<tr>
<td></td>
<td>Year</td>
<td>116.00</td>
<td>144.00</td>
<td>163.00</td>
</tr>
</tbody>
</table>

### Trade & Total Meat Context Update
July 19 exports: 128% higher than they would have been if demand @ Jan 2010 levels

Since Jan 2018, demand has grown in 17 of 19 months!
2018 Beef Exports were stellar!

- USMEF, 2018 (estimated) vs. 2017:
  - U.S. exports +15% in value (~ $8.3 Billion)
    - U.S. export growth: Korea, Japan, & Taiwan

- Global trade value +9%
  - China accounts for 80% of global trade growth
    - Dominated by South America & Australia (U.S. ~2% share)


**USDA Long-Term projections**


### Per capita meat consumption, retail weight
<table>
<thead>
<tr>
<th>Item</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2028</th>
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</thead>
<tbody>
<tr>
<td>Beef</td>
<td>57.2</td>
<td>58.8</td>
<td>59.7</td>
<td>58.4</td>
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<tr>
<td>Pork</td>
<td>50.9</td>
<td>51.1</td>
<td>53.4</td>
<td>54.3</td>
</tr>
<tr>
<td>Total red meat</td>
<td>109.1</td>
<td>113.3</td>
<td>113.1</td>
<td>112.7</td>
</tr>
<tr>
<td>Broilers</td>
<td>92.4</td>
<td>93.4</td>
<td>93.7</td>
<td>94.2</td>
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<tr>
<td>Turkey</td>
<td>16.2</td>
<td>16.4</td>
<td>16.4</td>
<td>15.5</td>
</tr>
<tr>
<td>Total poultry</td>
<td>110.6</td>
<td>111.1</td>
<td>111.2</td>
<td>111.2</td>
</tr>
<tr>
<td>Red meat &amp; poultry</td>
<td>219.3</td>
<td>224.3</td>
<td>225.6</td>
<td>225.2</td>
</tr>
</tbody>
</table>

Note: Totals may not add due to rounding.

**Projections INCLUDE export maintenance & growth**
**Additional Fodder for Thought...**

- **When/will the ASF-Asia “export boost” occur?**

![Map of ASF-Asia](image)

---

**Additional Fodder for Thought...**

- **What is role of “alternative proteins” in future of U.S. livestock?**

**Reuters**

Plant based meat alternatives crowd U.S. grocery stores:

1. Beyond Meat (Whole Foods, Kroger, Albertsons)
2. Impossible Foods (July 31st FDA approval to sell in grocery stores)
4. Tyson Foods (Vegetarian-Mixed Protein lines; nuggets in already)
5. Smithfield Foods (Plant-based burgers – Kroger, Sprouts, Target)

---

**Additional Fodder for Thought...**

- **What is role of “alternative proteins” in future of U.S. livestock?**

**Reuters**

Plant based meat alternatives crowd U.S. grocery stores:

& IMO: 

*Role in Food Service is even greater...*
Outlook Wrap-Up

- Broad Profitability Outlook
  - Supply side factors are "well established"
  - Herd size plateau (?)
  - Demand factors are key and uncertain
    - What will be beef (and meat broadly) export situation?
    - When will next U.S. recession occur?
    - Will favorability of high-protein diet (and cattle’s role) persist?

More information available at:

This presentation will be available in PDF format at:
http://www.agmanager.info/about/contributors/individual/tonsor.asp

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Utilize a Wealth of Information Available at AgManager.info

About AgManager.info

AgManager.info website is a comprehensive source of information, analysis, and decision-making tools for agricultural producers, agribusinesses, and others. The site serves as a clearinghouse for applied outreach information emanating from the Department of Agricultural Economics at Kansas State University. It was created by combining departmental and faculty sites as well as creating new features exclusive to the AgManager.info site. The goal of this coordination is to improve the organization of web-based material and allow greater access for agricultural producers and other clientele.
Receive Weekly Email Updates for AgManager.Info:

http://www.agmanager.info/about/contact-agmanagerinfo

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**BOXED BEEF CUTOUT VALUE**
Choice 600-900 Lbs., Carcass, Negotiated, Weekly

Data Source: USDA-AMS Livestock Marketing Information Center

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**CHOICE MINUS SELECT BEEF PRICES**
Carcass Cutout Value 600-900 Lbs., Negotiated, Weekly

Data Source: USDA-AMS, Compiled by LMIC Livestock Marketing Information Center
SLAUGHTER COW PRICES
Southern Plains Auction, 85-90% Lean, Weekly

Data Source: USDA-AMS
Livestock Marketing Information Center

SOUTHERN PLAINS CALF PRICES vs TEXAS CORN PRICES

Data Source: USDA-AMS, Compiled by LMIC
Livestock Marketing Information Center
Changing Industry Structure in Forging a Closer Relationship Between Grow Yards and Feeders

Don Close
Rabo AgriFinance

Conventional Role of Grow Yards
• Care for High Risk Cattle
• Residual Housing for When the Market Became Out of Balance
  • Poor Grazing Conditions
  • Feed Yards Became Backed up
  • Calf Prices Extremely Under Valued

Drivers Behind the Change
• Growth Potential in the Cattle
• Labor Availability
  • Feed Yards are Bigger, Often Multiple Locations Making Handling Light-Weight and High-Risk Cattle a Bigger Challenge
• Formula Marketing has Feeders Needing More Assurance of Gains, Costs and Out Dates
• Efficiencies and Economy of Scale
**Benefits for Commercial Feeders**

- A Central Collection Point for Cattle
- A Place to Enable Cattle to Mature and Grow Structurally
- A Pre-Conditioning Area to Get Cattle to Desired Weight and Condition to be Ready to Perform
- Enables the Opportunity to Identify and Pull Non-Performing Cattle Early

**Benefits to Commercial Feeders (Cont.)**

- Expands Purchase Weights to Take Advantage of Seasonal Cattle Movement
- Enables Buying Staff to Have Cattle In Inventory
- Earlier Ownership Enables Cattle Feeders to Identify Hedge Opportunities
- Better Determines Cost and Projected Out Dates to Commit to Limited Hook Space

**Grow Yard Owners**

- Currently Grow Yards Say Their Best Spot is to Have 2 to 4 Commercial Feeders to Assure an Active Buyer
- Multiple Feed Yard Clients Allows Targeting Specific Cattle Types to Specific Feeders
Rabo Projects Stronger Alliances Coming

• Drive to Increased Efficiencies
• Improves Economy of Scale
• Allows Use of Same Nutritionist and Veterinarians
• Enables Almost Seamless Transition to Feed Yard

Challenges to Alignment

• Fair Compensation to Grow Yard Owners
• Clear Expectations for Grow Yard and Feeders
• Clear Understanding of Death Loss Accountability
• Determination of Accepting Stressed or High-Risk Cattle

Industry Impacts

Cow/Calf Sector

• Increases Bidders for Cow/Calf Sector
• Allows Moving Away From Periods of Peak Sales
• Potentially Eases Pressure On Grazing Lease Rates
Industry Impacts

Conventional Stocker

- Increases Competition for Calves
- Potentially Eases Competition for Available Grass, Slowing Increase in Grass Lease Rates

Cattle Feeders

- Eases Labor Requirements for Feed Yards
- Cattle are Pre-Conditioned to Bunk Feeding & Water
- Eases Risk of Pen Pulls in the Feed Yard
- Identifies Non-Performing Cattle Before Yard Placement
- Increases Chances of Cattle Meeting Performance Expectations
- Better Project Daily Gains, Cost and Potential Out Dates
- Eases Pressure on Procurement Teams

USDA Choice + Prime Grading Rate

- Graph showing trends in USDA Choice + Prime Grading Rate over time
Thank you

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VP, Food and Agribusiness Research, Animal Protein

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Don.Close@RaboAg.com
Internal Parasite Management

David Pugh
Southern Traxx Farm and Forge
### Herd Health
- Nutrition
- **Parasite Control** (Internal & External)
- Biosecurity
- Reproduction (cows, heifers, bulls, calving management, etc)
- Vaccination
- Genomic
- Stress Management

### Value added Forage Producers

### What do Cattle Producers Do?
- “WE ARE GRASS FARMERS” (Gordon Hazard, DVM)
- We are **Green**
“The FAQ, which Alexandria Ocasio-Cortez’s office removed from her website amid online backlash (although it is still available on NPR’s website)”: https://apps.npr.org/documents/document.html?id=5728035-Green-New-Deal-FAQ

LAUNCH: Thursday, February 7, at 8:30 AM.
Overview
We will begin work immediately on Green New Deal bills to put the nuts and bolts on the plan described in this resolution......

“We set a goal to get to net-zero, rather than zero emissions, in 10 years because we aren’t sure that we’ll be able to fully get rid of farting cows and airplanes that fast......”

What do Cattle Producers Do?
• “WE ARE GRASS FARMERS” (Gordon Hazard, DVM)
• We are Green
• Converting Grass to Beef
• Feeding People
What do Cattle Producers Do?

Help feed the World

Source of greatest amount of Dis-Ease

GI Nematodes can cause dramatic performance loss without overt signs of disease

Most of production loss is due to decreased appetite
Gastro-intestinal Parasites

- Appetite suppression
- Protein loss
- Host expenditures
  - Tissue repair
  - Mounting an immune response

- Bottle jaw
- Scours
- Weight loss
- Poor hair coat

Parasites Generally

- Have more impact on younger animals in the herd
  - Calves > replacement heifers = second calf heifers > adult animals
- Most parasitism is SUBCLINICAL in nature
  - Clinical parasitism is rare
**BENEFITS OF DEWORMING**

- Improved Health - Better Immune Status, feed efficiency  
  (Gasbarre and Stromberg, 1994)

- Increased Weaning Weights - >17-37# ..... Milk 
  production & calf growth  
  (L Jones, WVC 2014)

- Increased Breeding Efficiency - Fertility, Onset of Puberty

- Reduced Pasture Contamination

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**Strongyle Parasites in Cattle**

ML resistance in cattle documented 2003, and suspected in Al, 
Tn, Fl, La, SC, NC, ???... But inj IVM still >90% 
reduction

Strategic Deworming...deworm early in the grazing season.

Poor-ons poorly absorbed 

C puncta, Nematodirus, Haemonchus the most significant internal 
nematode parasites

And ... Ostertagia less significant.  
( Gasbarre , AVC, Denver 2012)

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**How to Recognize a Resistance Problem**

The warning signs:

- Lower than expected weight gain 
- Diarrhea 
- Rough hair coat 
- Delayed conception 
- Increased incidence of disease

If you suspect a resistance problem 
=> Fecal Egg Count Reduction Test (FECRT) 
14 days after the last treatment.
Resistance in Cattle Worms
Does it Occur in USA?

- Resistance is reported to benzimidazoles (albendazole, fenbendazole) and ivermectin based on <90% reduction in parasites or FEC
- Species involved in USA include *Cooperia*, *Ostertagia* and *Haemonchus* in Ohio, *Haemonchus* and *Cooperia* in the Midwest, and *Ostertagia*, *Trichostrongylus* in Georgia (6 treatments of IVOMEC and 1 each of EPRINEX and DECTOMAX in a single year)
- True resistance must be differentiated from mis-dosing, mis-use or mis-diagnosis

Increase resistance by the parasites to a de-wormer - Deworm entire group & move to a 'clean' pasture
Graze stocker calves on a permanent pasture

“Now, we are forced to accept the reality that chemical control of helminths is not, by itself, sustainable.

Strategically and effectively applied chemical intervention, coupled with a raft of non-chemical measures designed to lessen ‘economic parasitism’ is the recommendation that most parasitologists appear to be advocating.”

(Yazwinski et al, Proceed KVMA, 2018)
Endectocides Pour-On fly control?

NO

Use Arthropod control drugs & programs

DUH ......

U of Arkansas Heifer Stocker Study

• 42 mixed breed heifers, for 56 d
• ADG (lb/d)
  Cooper Mec - 1.21
  Ivermectin Pour On - 1.28
  Top Line - 1.30
  CONTROL - 1.30
  Ivercide - 1.36
  Ivomec Pour On - 1.42

Note: NO Significant difference in ADG between groups

Yazwinski et al. U of Arkansas 2005

Parasite control

- Avoid Generic pour-ons, dose accurately, handle drugs properly

- Maintain Refugia
  Avoid deworming all prior to turn out onto clean pastures (worse with ML’s)
  Avoid deworming adult cows going into summer

Treat Replacement heifers differently than stockers

Avoid permanent pastures for stockers, yr after yr

If use LA products +++ feedlot, till ground, use for hay, and keep replacement heifers off Stocker pastures (?)
"Important" Nematodes

*Haemonchus placei* & *Cooperia sp*

Mature cows will have low numbers and may serve as source of pasture contamination

*Cooperia* & *Haemonchus* spp resistant to ML’s are Dx in > 50% of cattle operations, when examined (reduced feed intake → reduced productivity → economic losses)

(Gasbarre, Vet Parasit, 2014)

Anthelmintic resistance has continued to increase over the past ~15 years

*Cooperia* & *Haemonchus* spp resistant to ML’s are Dx in > 50% of cattle operations, when examined (reduced feed intake → reduced productivity → economic losses)

(Gasbarre, Vet Parasit, 2014)

**Why do we now see anthelmintic resistance?**

Probably the use of very effective nematode control programs

(improved the productivity)

Programs which place selective pressure on the parasite genetics → Resistance

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**Why do we now see anthelmintic resistance?**

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(improved the productivity)

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“Important” Nematodes

• #1 *Ostertagia ostertagi*
  • Can impact Young & Mature cow productivity
  • Cool season lover & do not survive well in hot environments
  • Arrested development in animal
    - Hypobiosis - Summer in South
    - Winter in the North

Some Bulls with Type II Ostertagia will have scarred gut, poor condition and low FEC (r/o Johnes)

Brahama and x’s have very poor immunity to Ostertagia

“Important” Nematodes

*Haemonchus placei* & *Cooperia sp*

Calves Stocker (mostly)

Warm Season parasite

Cattle develop immunity by yearlings (usually)

Mature cows will have low numbers and may serve as source of pasture contamination

*Cooperia* & *Haemonchus* spp resistant to ML’s are Dx in > 50% of cattle operations, when examined (reduced feed intake, reduced productivity, economic losses)

(Gasbarre, Vet Parasit, 2014; Kaplan, NAVC, 2010)

“Important” Nematodes

*Haemonchus placei*

Barber pole worm

Likes it hot

Ivermectin resistance (Kaplan, 2010)

*Cooperia* species

Prolific egg producers

Not notorious pathogen, but …stockers

White wormers – good control

Ivermectin resistance (Kaplan, 2010; Yazwinski, 2014)

(Driven by pour-on’s) (Jones, 2014)
Parasite Problems in Cattle

Stocker operations => buildup of anthelmintic resistance parasites

Intensive rotational grazing + young animals + frequent deworming + Cooperia
=> Resistant Parasites

ML resistant Cooperia & Haemonchus spp can survive a single TX with a single ML and be transported in the calf from southeastern USA to Mid western states.

A combo of ML & levamisole was very effective in decreasing the transport of ML surviving parasite to the upper Mid west
(LL Smith, 2013)

Topical generic Ivermectin efficacy (%'s) against:
Cooperia oncophora - 93.0
C. punctata - 73.4

Topical moxidectin efficacy (%'s) against:
Cooperia oncophora - 99.3
C. punctata - 99.9

Injectable moxidectin efficacy (%'s) against:
Cooperia oncophora - 46.1
C. punctata - 93.6

This data suggest Tx of calves soon after weaning with topical moxidectin is effective (>90% efficacy) for all common nematodes in cattle; where, injectable MOX & Topical IVM have limited effectiveness against Cooperia spp.

**ML’s**

- **PO** – reduced systemic availability → high conc at site of GI parasite
  → enhanced parasite exposure to active drug at mucosa and GI lumen
  → **Improved clinical efficacy** against GI resistant nematodes

- **SC** – enhanced absorption, increased systemic availability/reduced drug conc in GI lumen
  → reduced exposure to GI located nematodes to active drug
  → **Limited efficacy** (Lamsoe et al, Vet Parasit, 2014)

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**Evaluation of long-acting eprinomectin compared to conventional anthelmintics in cow/calf production**

**MOX + OXF (PO & Orally) vs LAE in fall born, weaned heifer calves over 182 d **

**OXF vs LAE in Spring calving cows** were treated, weaning weights were lower (P=0.03) for LAE compared to OXF.

(Backes, PHD dissertation UA, ProQuest Dissertations Publishing, 2016)

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**122 yearling pastured heifers with a history of anthelmintic resistance (California), moved to dry lot (Idaho)**

Fifty highest FEC were examined for Tx and FECRT

**Ivermectin treatment (SC)** resulted in no reduction in adult *Cooperia* spp.

vs

**Moxidectin TX (SC)** caused an **88% parasite reduction**

(Edmonds K, Vet Parasit 2010)
2017 Stocker cattle study:
Cattle were treated w/ saline, OR doramectin (INJ) +
albendazole (PO) OR eprinomectin extended-release injection
then continuously grazed by treatment group for 118d

This study cattle were treated with Injectable ivermectin,
doramectin, and moxidectin

Day 15 post TX FEC were:

<table>
<thead>
<tr>
<th>FEC</th>
<th>FECR</th>
<th>Drug</th>
</tr>
</thead>
<tbody>
<tr>
<td>177</td>
<td>57%</td>
<td>Ivermectin</td>
</tr>
<tr>
<td>335</td>
<td>41.2%</td>
<td>Doramectin</td>
</tr>
<tr>
<td>28</td>
<td>91.2%</td>
<td>Moxidectin</td>
</tr>
</tbody>
</table>

Coproculture larval populations were mostly *Haemonchus placei* & *Cooperia punctate* (Yazwinski ++ Bovine Practitioner, 2017)

**Parasites Problems in Cattle**

Cow-calf herds are less likely to experience resistance (although documented)

Stocker heifers redirected back to cow-calf may intro resistant parasites

Deworming all prior to turnout to summer pastures unused (refugia killer)

**Parasite control**

- Maintain Refugia
  - Avoid deworming all prior to turn out onto clean pastures
    (worse with ML’s)
  - Avoid deworming adult cows going into summer
  - Treat Replacement heifers differently than stockers
Parasite control

Avoid permanent pastures for stockers, yr after yr
If use LA products ++> feedlot, till ground, use for hay, and keep replacement heifers off Stocker pastures (?)

Parasite control

- Cull poor doers
- Avoid Generic pour-ons, dose accurately, handle drugs properly

Parasite control

- Graze adult cows (or horses/goats) after calves…
  Thus using adult cows as ‘vacuum cleaners’ for calf parasites
- Avoid ‘resistant worms’ being introduced to the herd
- Deworm with multiple classes of dewormer (or MOX)
  ➔ drylot for 2 day
  ➔ then move to contaminated pasture
- Proper nutrition (enhance overall immunity)
Parasites in Cattle

Rotate pastures to maximize nutrition and pasture use, not to control parasites

(but... will help with parasites)

Drylot for 24-48 hours then turn out onto contaminated pasture

Smart grazing management:

Avoid graze below about 5-6 cm (2-3 inches) pasture height. Over 80% of larvae are within 3 cm of the soil surface.

Manage pasture quality:

To ensure high quality regrowth for next time it is grazed
1. Goat to cattle system: 5-6 cm deep pasture left behind by the goats, it is acceptable to production from cattle.

2. Goats + cattle Integrated system: cattle and goats prefer different species of forage.
   - Goats + cattle
     (do not share the same parasite species)
   - Goats + sheep
     (share the same parasite species)
   - Cattle + Sheep

Parasites in Cattle

Do not under-dose animals
& (teach) follow label directions for storage

Never deworm all animals pre turnout onto clean pastures (ML's worst) => Refugia Killer

Never deworm older cows pre summer in the south
Post de-worming, turn out onto contaminated pasture

Never keep replacement heifers that are dewormed and placed on clean pasture

Never use permanent pastures for young stock

Use long-acting dewormers for stockers going to feedyards **ONLY**!

Parasites in Cattle

Pastures grazed by other livestock species

Cows ‘clean’ stocker pastures

Non-permanent pastures (tilled & planted, hay pastures, crops) are clean

(Parvare, personal communication, 2017)

Macrocyclic lactones have been available for >30 years in the USA

ML resistance has been reported and appears to be increasing in U.S.

**Obstacles to change**

Cattle producers are traditionally reluctant to abandon historical practices

Veterinary Practitioners have not traditionally worked with parasite epidemiology

Pharmaceutical companies stockholders have “strong economic incentives for maintaining the status quo”

(McArthur & Reinemyer, Vet Parasit 204:34, 2014)
Heritability for GIT resistance by cattle is ~0.3

What can we do?
Develop sustainable parasite control protocols which place less selective pressures on the parasites but maintain good productivity

ex: simultaneous use of multiple classes of anthelmintics with different modes of action

targeted/selective treatment of different classes of animals avoid blanket treatment

(Gasbarre, Vet Parasit 204:3, 2014)

In Southern USA Deworm
-- 1st to 2nd calf Heifers (unless Zebu x)
  (Zebu & x’s have very poor immunity to Ostertagia)
-- Adult cows with <5 BCS
-- Spring born calves in Mid Summer near or at Weaning
-- Fall born calves near or at weaning
-- Bulls pre breeding
  (Some Bulls with Type II Ostertagia will have scarred gut, poor condition, and low FEC - r/o Johes)
**Beef Cow BCS**

-- BCS 6 ➔ pregnancy rate should approach 100%
  
  (if bulls, mineral, etc. etc are normal...???, Spitzer, 1995)

-- BCS 5 ➔ pregnancy rate should approach 94%

-- <BCS 5 ➔ deworm (?)

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**Fecal Egg Counts (FEC)**

**Fecal Egg Reduction Test (FERT)**

- 90+ % ➔ good
- 85 % ➔ OK
- <70 % ➔ BAD

**Fecal Egg Count (FEC)**

- Adult cow ➔ 10 - 20 (Bagley, Navarre)

At calving FEC will rise (Immune suppression)

- Usually
- Lush feed intake ➔ increase FEC
- Dry feed intake ➔ decrease FEC

- Stocker & Replacement Heifers have highest FEC from 6-18 mo of age ➔ then immunity

**Fecal Egg Count**

- Calf ➔ 50 - 500

Young/new calves will shed few eggs until mid summer

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**To detect Anthelmintic Resistance in Cows**

- Collect 20 fecal samples from rectum into plastic bag of similar aged animals at time of deworming. Remove excess air & refrigerate

- Perform a McMasters

- In 14 d collect sample from the 10 highest initial EPG cows

- Sample 1 EPG - Sample 2 EPG
  
  \[
  X \times 100 = \text{% reduction in EPG}
  \]

- Consider pooled samples for coproculture and sp ID

  (C. Navarre, 2017)
Perform McMaster’s technique for quantitative fecal egg counts. If sample is 0 on McMaster’s, perform a Wisconsin Double Centrifugal Sugar Flotation.

Consider turning pooled fecal samples pre and post treatment for parasite species identification via coproculture (C Navarre, 2017)

Fecal Egg Count – In cattle, McMasters & Modified Wisconsin double centrifugation have good correlation.

(Divide cow number by 2.3 to compare more favorably with Double Centrifugation Tech’s)

• Short grass favors more aggressive parasite transmission.
  – Cows and especially calves
• Cattle concentration from feeding further increases parasite loads
• Malnutrition diminishes parasite resistance
  – Calves may require additional deworming in early summer.

• Dewormers will not perform well in malnourished cattle
• If cattle are in poor condition deworming, protein (& E) supplementation, and good quality forage are all needed
• Early wean calves on particularly thin cows
Parasitism & Nutrition

- Poor nutrition (protein specifically) diminishes acquired resistance to parasites.

- PPRI periparturient relaxation of immunity
  - Post Patum loss of GIT Immunity


- Heavy fecal pat density increases parasite deposition and survival (overstocking)

Parasites in Cattle

Proper nutrition => Increase herd immunity => healthy cows => Better Productivity

Use adult cows as “vacuum cleaners”

Feeding protein at 130% of the required level to ewes will actually abolish the periparturient rise (PPR) in fecal egg count.


Ewes that were fed high quality protein early in pregnancy developed more body fat. Near lambing time, ewes supplemented with protein early in their pregnancy were able to prevent establishment of an experimental larval challenge better than the unsupplemented counterparts, even though their nutritional plane at time of challenge was the same. The “fatter” more resistant ewes had higher serum leptin levels, suggesting that leptin might be a link between nutritional status and immune function.

Nematode infected ruminants have higher protein requirements, caused by anorexia, the predominant effect of helminth infections (sheep) (Coop and Holmes, 1996).

Cattle benefit from anthelmintic treatment and/or protein supplementation.... But the added value of protein supplementation was unclear from the study. (Veronique, Veterinary Parasitology, 235: 15, Pages 113-122)

Protein supplementation and anthelmintic treatment in cattle resulted in higher weight gains than in cattle receiving an anthelmintic treatment only.

Between those groups, no significant differences could be observed in fecal worm egg counts and hematocrit (Magaya et al., J. S. Afr. Vet. Assoc 71, 2000, pp. 31-37).

**Diet Effects on Immunity**

**Protein**

During disease or infection, proteins and amino acids are diverted from normal functions to support the synthesis of immunoglobulins and T-cell- and B-cell-mediated immunity, and they are catabolized for energy production (Scrimshaw and SanGiovanni 1997).

Inadequate protein nutrition impairs cell-mediated immunity and immunoglobulin production.
**Protein**

Blocks, lick tubs and cubes are the most convenient ways to feed. Care should be taken to prevent overeating. Overeating can be partially controlled by feeding plenty of roughage and supplying plenty of fresh water.

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**Aqueous Humor**

*Cows Not suspected of Ammonia Toxicity*

- 295 µg/dl
- 495 µg/dl
- 524 µg/dl

*Cows suspected of Ammonia Toxicity*

- 3,736 µg/dl
- 6,101 µg/dl
- 4,118 µg/dl
- 4,671 µg/dl
- 2,631 µg/dl
- 1,479 µg/dl

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**Mechanical Methods**

*Non-chemical prevention and control*

- **Drag harrow or Chain**
  - Pro: Cowpats unsuitable for fly development
  - Con: Pasture less attractive to cattle (harm dung beetle)
Decreasing Exposure

- harrowing of unoccupied pastures
  - hot dry summer – safe in 2 – 3 weeks
  - cool wet fall/winter - not safe until spring

(C. Taylor, personal communication, 2013)

Cattle can produce enough **Dung** to cover 5% to 10% of an acre each year. If the **Dung** is allowed to set on top of the soil ~ 80% of nitrogen will be lost. By burying manure, the dung beetle helps save or recycle nitrogen, improving the plant health and pasture production of forage is made available for plant use.

**A 650 lb animal will produce 60 lbs of wet manure daily.**

One animal - 12 fecal mounds per day

One animal - 4300 fecal mounds per year (over 10 tons)

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**What is a dung beetle, and why should we care?**

Dung beetles consume, burying, breed in, and lay eggs in animal fecal waste, improve nutrient recycling and soil structure, help protect livestock from flies and internal parasite.

It is estimated that Dung beetles save the US cattle industry ~$380 million/yr

(Jones, A. Vaughn, Entomology, 2004)
Dung Beetle Fun Facts


Dung Beetle Activity Decreasing

Dung beetles reduce viable populations of Cryptosporidium oocysts ...58-10% (Ryan Exp Parasit 129:1-4, 2011)

Chinese researchers showed that tunneling Dung beetles increased the amount of inorganic nitrogen found in the soil, enhanced forage production, and promoted dung decomposition. (Yamada et al, Grassland Sci, 2007)
In the 1980’s, studies showed the use of avermectins (ivermectin, eprinomectin, doramectin) adversely affected dung beetle larvae. Mortality of larvae occurred in dung from several days to several weeks after treatment. These drugs are commonly used to control internal parasites in livestock. After routine deworming of livestock with avermectins, the breeding capacity of further generations is reduced for many species of Dung Beetles.

Macrocyclic Lactones

- Avermectins
- Milbemycins
- Moxidectin (CYDECTIN)

Bio-synthetic Doramectin (DECTOMAX)
Semi-synthetic Ivermectin (IVOMEC)
Eprinomectin (EPRINEX)

Semi-synthetic Milbemycin Oxime (INTERCEPTOR)

Semi-synthetic Moxidectin (CYDECTIN), 64x Less Toxic


Any Questions?
Drug Resistance

Refugia – The proportion of the population
(Haemonchus - goats & sheep, Ostertagia & Cooperia – cattle)
that is not selected by drug treatment

It provides a pool or reservoir of drug-susceptible genes and dilutes the prevalence of resistant genes, and maintains biodiversity within a species

Humane Euthanasia Practices

A.J. Tarpoff
KSU Extension Beef Veterinarian

“As unpleasant as it is, humans have a moral responsibility to act in the best interests of animals in situations that may require ending their life, keeping in mind that no one is absolved of the obligation to use the most humane methods available whenever possible.”

AVMA Guidelines on Euthanasia 2013
Introduction

- The humane termination of an animals’ life
- Use of firearms, captive bolts, or veterinary euthanasia drugs

Euthanasia means good death

Goals

- Performed in a timely manner
- Method of euthanasia should minimize
  - Pain
  - Distress
  - Anxiety prior to loss of consciousness
- Methods should be:
  - Rapid
  - Performed correctly
Animal Selection

- Severely injured and unable to recover e.g. broken leg, broken jaw
- Chronic, severe, or debilitating pain and distress from chronic disease
  - Chronic pneumonia, septic arthritis, poly-arthritis
- Show continuous weight loss or emaciation
  - BCS < 2
- Non ambulatory and nonresponsive for more than 24 hours
  - Nonambulatory animals are not to be dragged

Decision Making

1. Pain & distress of animal
2. Likelihood of recovery
3. Ability to get to feed & water
4. Medications used on the animal
5. Drug withdrawal time
6. Economics
7. Condemnation potential
8. Diagnostic information
Animal Selection for Euthanasia

• It's better to be a week early than a day late!!!
• Euthanasia is meant to end animal suffering
• Does not = failure

Approved Methods and Equipment

• Firearms
• Penetrating captive bolt
• IV barbiturate overdose

Considerations

• Human Safety
• Animal Welfare
• Restraint
• Practicality
• Skill
• Cost
• Aesthetics
• Carcass Disposal
Equipment: Firearms

- Firearms used for euthanasia in feedlots may include:
  - Rifles
  - Shotguns
  - Pistols
- Storage may include a locked gun cabinet or trigger lock

Equipment: Captive Bolts

- There are several types of captive bolt tools.
  Two common types are
  - Penetrating or Non-penetrating
- Some captive bolts are designed to stun, where a secondary kill step must be used.
  - Often called a stun gun
- Others are designed as a single step euthanasia method
Euthanasia
Gunshot

Box 1: Safety considerations for firearm use
1. Always treat firearms as though they are loaded.
2. Always be sure that the firearm is pointed in a safe direction.
3. Avoid contact with the trigger until you are ready to fire.
4. Be sure of your target and what is beyond it.
5. Keep bystanders a safe distance behind the shooter at all times.
6. Be sure you are familiar with the firearm and how it functions.
7. To avoid possible explosion of the barrel, never hold the muzzle of a firearm flush against the skull.
Caliber Choice?

- Handguns generally for close proximity only
- Rifles/shotguns give more flexibility
- 450-800lbs: **350ft-lb of ballistic energy**
  - Feeder cattle
- Mature Cattle: at least **500 ft-lb of ballistic energy**

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Handguns</th>
<th>Rifles</th>
<th>Shotguns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calves/pregnant</td>
<td>.32 or larger caliber</td>
<td>.22 long rifle or larger caliber</td>
<td>.410-20 gauge 4-6 birdshot or buckshot (within 3-4 ft)</td>
</tr>
<tr>
<td></td>
<td>Solid-point bullet (within 2-3 ft)</td>
<td>Solid-point bullet (at close range)</td>
<td>(within 3-4 ft)</td>
</tr>
<tr>
<td>Adult cattle</td>
<td>.32-.45 caliber</td>
<td>.22 magnum or higher caliber</td>
<td>.20-12 gauge buckshot or slug (within 3-4 ft)</td>
</tr>
<tr>
<td></td>
<td>Solid-point bullet (within 2-3 ft)</td>
<td>Solid-point bullet (at close range)</td>
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<td>.22 magnum or higher caliber</td>
<td>.20-12 gauge buckshot or slug (within 3-4 ft)</td>
</tr>
<tr>
<td></td>
<td>Solid-point bullet (within 2-3 ft)</td>
<td>Solid-point bullet (at close range)</td>
<td>(within 3-4 ft)</td>
</tr>
</tbody>
</table>

https://doi.org/10.1016/j.cvfa.2018.03.004

CT scan of the mid-sagittal view of a representative skull from the .22 solid point treatment group.

CT scan of the mid-sagittal view of a representative skull from the .22 hollow point treatment group.

Euthanasia
Gunshot

A .22 caliber solid point bullet from pistol or rifle is sufficient for young animals

Hollow point .22 caliber bullets are NOT recommended
Larger calibers – .357mag/Rifle/Slug

CT scan of the mid-sagital view of a representative skull from the 9mm pistol treatment group.

CT scan of the mid-sagital view of a representative skull from the 12 gauge 1 oz slug treatment group.
Euthanasia

Euthanasia

Euthanasia
Euthanasia means 'good death'.

Gunshot
Euthanasia
Captive Bolt

Dangerous in field situations or may not gain results you want

Euthanasia
Captive Bolt

Euthanasia means good death

Euthanasia
• IV injection of euthanasia solution administered by a registered veterinarian
Barbiturate Overdose

- 60-80 mg/kg sodium pentobarbital IV
- Administer quickly. Bolus dose IV
  - Keep in mind, this may be multiple 60cc syringes
  - Need easy access to IV
- Carcass disposal concerns
  - Rendering?
  - Wildlife concerns

Euthanasia by either technique results in involuntary movement

Therefore, when possible, it is recommended that such procedures be performed in areas out of the public view

Confirmation

- Lack of corneal reflex
- Large dilated pupil (returns to center of socket)
- Lack of rhythmic respiration
  - Agonal breaths are expected
- Absence of vocalization
- Lack of heart beat (stethoscope)/Pulse
- No attempt to rise or right itself
- Rigor Mortis
Confirmation of Unconsciousness/Death

Confirmation of Death:
- Lack of a heartbeat
- Lack of respiration
- Lack of corneal reflex
- Presence of rigor mortis

Euthanasia

Confirmation of Death
Euthanasia
Confirmation of Death

Euthanasia means good death.

Confirmation of death:
- Lack of heartbeat
- Lack of respiration
- Lack of corneal reflex
- Presence of rigor mortis

Secondary Kill Step

• Used as an adjunct method to ensure death
• Must be used with some equipment (captive bolt)
  - Second shot
  - Exsanguination
  - Pithing

Pithing

Fig. 2: Pithing procedure. (A) Euthanasia through the use of a penetrating CB, (B) base matter is visible protruding through the hole in the skull produced by the bolt, (C) a metal pithing rod is inserted into the body of the skull and driven toward the cerebellum, (D) through base matter into the spinal cord.
Secondary Kill Step

- Potassium Chloride/Magnesium Sulfate
  - Produces cardiac arrest
  - **Not acceptable** to use in a conscious animal
  - Xylazine has **not** been shown to induce anesthesia
  - Could be used after Captive Bolt
  - ~250cc of saturated KCL
    - Continue giving until desired effect
  - Mg Sulfate, similar to KCL, but much slower effects

Unacceptable methods of euthanasia

- Manually applied blunt trauma to the head
- Injection of any non approved chemical substance
- Injection of air into a vein
- Electrocution as with 120 or 220 volt electrical cord

Summary

- Timely, effective, and efficient euthanasia is essential
  - Technique is crucial (landmarks/trajectory)
  - Confirmation of death
- There is a wide array of euthanasia equipment that could be used at feedlots
BeefBasic: Better Information for Better Marketing Decisions

Brett Crosby
Custom Ag Solutions

BeefBasis.com
Decision Support For Cattle Producers

Brett Crosby
Custom Ag Solutions
September 19, 2019
K-State Beef Stocker Field Day
Manhattan, KS

Brett Crosby

• 5th generation rancher
• Cow-calf and stocker operation
• Partner in Custom Ag Solutions
• Accredited Rural Appraiser
Key Risk Management Tools for Livestock Producers

- Common Insurance Products (life, health, etc.)
- Crop Insurance Programs
  - Livestock Risk Protection (LRP)
  - Pasture, Rangeland, Forage (PRF)
  - Whole Farm Revenue Protection (WFRP)
- Management Strategies (diversify, etc.)
- Hedging Instruments (futures and options)
- Analytical Tools like www.BeefBasis.com

Management Practices

- The best risk management is good management
- "The difference between a good farmer and a poor farmer is two weeks"
- Ranchers who have survived this long understand the science of production
- Successful ranchers are efficient, and most have specific goals (weaning weight, preg rate, etc.)
- Successful ranchers are production-oriented because production is something they can control

Two Universal Rules

1. People will do anything to keep themselves and the environment healthy
   Except take a science class
2. People will do anything to succeed financially
   Except math
How Will You Be Affected?

- Sell cattle 10% lighter
- Preg rate drops from 90% to 80%
- Price drops 10%
- Feed costs increase by 10%
- Total expenses increase 10%

How Will You Be Affected?

<table>
<thead>
<tr>
<th>Cow-Calf Operation</th>
<th>Stocker Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calves</td>
<td>100</td>
</tr>
<tr>
<td>Weight</td>
<td>600</td>
</tr>
<tr>
<td>Price</td>
<td>$150</td>
</tr>
<tr>
<td>Slide</td>
<td>$10</td>
</tr>
<tr>
<td>Heifers</td>
<td>($90)</td>
</tr>
<tr>
<td>Replacements</td>
<td>$1,350</td>
</tr>
<tr>
<td>Feed Cost$/hd</td>
<td>$200</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$800</td>
</tr>
</tbody>
</table>

| Steers            | 100               |
| Weight            | 800               |
| Price             | $140              |
| Slide             | $6                |
| Feed Cost$/lb     | $0.55             |
| Total Cost$/lb    | $0.85             |
| Total lbs         | 300               |

How Will You Be Affected?

<table>
<thead>
<tr>
<th>Cow-Calf Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calves</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Price</td>
</tr>
<tr>
<td>Slide</td>
</tr>
<tr>
<td>Heifers</td>
</tr>
<tr>
<td>Replacements</td>
</tr>
<tr>
<td>Feed Cost$/hd</td>
</tr>
<tr>
<td>Total Expenses</td>
</tr>
</tbody>
</table>
How Will You Be Affected?

<table>
<thead>
<tr>
<th>Cow-Calf</th>
<th>Wt</th>
<th>Price</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Income</td>
<td>600</td>
<td>$150.00</td>
<td>$90,000</td>
</tr>
<tr>
<td>Calves 10% lighter</td>
<td>540</td>
<td>$156.00</td>
<td>$84,240</td>
</tr>
<tr>
<td>Price drops 10%</td>
<td>600</td>
<td>$135.00</td>
<td>$81,000</td>
</tr>
</tbody>
</table>

$/Hd Total Cost Income

| Preg rate 10% | $750 | $7,500 | $82,500 |
| Feed costs 10% | $20 | $2,000 | $88,000 |
| Total expenses 10% | $80 | $8,000 | $82,000 |

Risk vs. Forecasts

- Forecast represents the most likely scenario
- Risk encompasses all possible scenarios
- Good risk managers plan for the best, prepare for the worst

Cattle Price Cycles

Feeder Cattle Index 1978-2019
Current Price Cycle

LIVE CATTLE $96 - $132
FEEDER CATTLE $122 - $162
Prices can break out of ranges
Most years provide opportunity

When Cattle Prices Decline, What Can You Do?

1) Search for ways to lower unit cost of production
(such as more efficient use of inputs, reduce wastes, scrutinize capital purchases, debt, etc.)

2) Identify opportunities to enhance cattle market prices (improve quality and quantity, identify economical weights, months to sell, price protection, etc.) FLEXIBILITY

Price and Price Risk

• Equal in impact to # of live calves sold (death loss)
• Likely contributes the most volatility to a budget
• One of the least controllable budget factors
• Information and knowledge are power
Information and Knowledge

Prices often approach cycle lows at the end of the cycle
Prices can have a wide range within and between years
Even bad years, there is opportunity if one has information and knowledge
Decision support tools are critical

Feeder Cattle Index

Seven day rolling sale barn average in 13-state area
Steer calves
Feeder cattle futures represent the market’s best guess of the index on a specific date.
Prices are different for different weights, locations and sex
Basis: Cash – Futures

Basis and the Information Gap

- Futures markets rely on a reliable basis forecast to be useful for risk management
- Forecasting basis enables the use of futures for
  - Hedging
  - Forecasting
  - Cost-Benefit
  - Other
BeefBasis.com

- Decision support for cattle producers
- Data resources and analytical tools and calculators
- Learning library with text and video tutorials
- Currently free to all producers
- Additional features coming soon for registered users

BeefBasis.com

- Estimate Calf Values Based on CME Futures
  - Sex, Weight, Frame, Date, Location

  Uses:
  - Make market timing decisions
  - Estimate floors for forward (ex, video) contracts
  - Estimate impact of price moves
  - Manage exposure to price risk

BeefBasis.com

DECISION SUPPORT FOR CATTLE PRODUCERS

- Interactive Dashboards
- Data and Analysis Tools
- Webinars and Training Sessions
- White Papers

We Have Your Back
- Your cattle, your data, your future.
BeefBasis.com – Value of Gain

<table>
<thead>
<tr>
<th>Date</th>
<th>SELL Price</th>
<th>Days on Feed</th>
<th>ACTL lbs</th>
<th>Total Return</th>
<th>$/Head</th>
<th>$/wt</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/15/2020</td>
<td>107.50</td>
<td>138</td>
<td>2.26</td>
<td>93,573.12</td>
<td>273.12</td>
<td>90.49</td>
</tr>
<tr>
<td>02/19/2020</td>
<td>117.00</td>
<td>133</td>
<td>2.26</td>
<td>93,029.16</td>
<td>268.54</td>
<td>89.05</td>
</tr>
<tr>
<td>03/17/2020</td>
<td>106.54</td>
<td>139</td>
<td>2.36</td>
<td>77,156.71</td>
<td>249.10</td>
<td>89.44</td>
</tr>
<tr>
<td>03/19/2020</td>
<td>105.73</td>
<td>149</td>
<td>2.06</td>
<td>77,315.77</td>
<td>247.33</td>
<td>89.9</td>
</tr>
<tr>
<td>03/24/2020</td>
<td>104.40</td>
<td>153</td>
<td>1.66</td>
<td>73,441.76</td>
<td>242.55</td>
<td>88.79</td>
</tr>
<tr>
<td>03/30/2020</td>
<td>108.15</td>
<td>141</td>
<td>1.85</td>
<td>77,558.58</td>
<td>273.58</td>
<td>92.96</td>
</tr>
<tr>
<td>04/12/2020</td>
<td>108.03</td>
<td>170</td>
<td>1.76</td>
<td>90,872.90</td>
<td>277.85</td>
<td>92.62</td>
</tr>
<tr>
<td>04/13/2020</td>
<td>107.95</td>
<td>181</td>
<td>1.57</td>
<td>90,609.17</td>
<td>277.12</td>
<td>92.34</td>
</tr>
<tr>
<td>04/18/2020</td>
<td>107.91</td>
<td>181</td>
<td>1.57</td>
<td>90,677.31</td>
<td>276.63</td>
<td>92.18</td>
</tr>
</tbody>
</table>

BeefBasis.com – Other Tools

- Stocker Cattle Index – 5-wt steers
- Ration calculator
- Historical data
- Location comparisons

BeefBasis.com – Coming Soon

- Lot tracking
- Hedge tracking
- Income forecasts
- Other
Summary
Price risk poses a substantial economic threat
Good risk managers plan for the best and prepare for the worst
Prices can have a wide range within and between years
Even bad years, there is opportunity if one has information and knowledge
Decision support tools are critical

Thank you for your attention.
I hope you have a profitable 2019!
Brett Crosby
bcrosby@casnow.com
307 272-5165
Twitter: @mbacowboy
High Risk Calf Management
D.U. Thomson, Ph.D., D.V.M.
Kansas State University

WHAT IS THE FIRST QUESTION DURING HIGH MORTALITY EPISODES?

• Morbidity problem
• Case fatality problem – the drug quit working

\[ \text{CFR} = \frac{\text{number treated that died}}{\text{total number treated}} \]
FACTORS AFFECTING MORBIDITY RATES IN NEWLY ARRIVED CALVES

CATTLE FLOW

• Cattle market dictates cattle type and flow
• Overwhelming the system
• Weather affects what cattle and people will endure in farmer feeder operations

EFFECTS OF INITIAL WEIGHT ON DEATH LOSS OF FEEDER CATTLE.
**TRANSPORTATION AND COMMINGLING**

ONE ORDER BUYER = 32 SALE BARNs

**COMMINGLING AT ARRIVAL: ADDING ON PENS**

- More large pens being built or were built?
- Increased number of add ons?
- How many days to build a pen?

**BVD PI: WHERE AND HOW MANY?**

- Estimated that 1% of cattle born in the U.S. are persistently infected with BVD
- Half of these calves die before weaning
- Prevalence on arrival at feedyard = 5 to 3%
  - Based on post-weaning management
- Half of PIs die or are railed at the feedlot
  - 4% of the dead cattle were persistently infected
  - 3.6% of the railers were PI cattle
EFFECTS OF BVD VACCINATION ON WBC DURING A BVD II CHALLENGE

Recreated from Ellsworth and Tucker, 2003

WHAT ARE THE CREWS SEEING WHEN PULLING BVD PI CATTLE?

• Many of the PI cattle are pulled for coccidiosis

• The doctors have treated many of the cattle as Coccidiosis and Salmonella cases

• Necropsy diagnosis has been mainly abomasal ulcers, coccidiosis and pen dead enteritis

PROCESSING IS NOT A TIMED EVENT!

WHEN TO PROCESS?
VACCINE RECOMMENDATIONS BY 23 CONSULTING FEEDYARD VETERINARIANS

<table>
<thead>
<tr>
<th></th>
<th>High risk calves</th>
<th>Low risk calves</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBR</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>BVD Type 1</td>
<td>90.9%</td>
<td>90.3%</td>
</tr>
<tr>
<td>BVD Type 2</td>
<td>90.9%</td>
<td>95.6%</td>
</tr>
<tr>
<td>BRSV</td>
<td>68.2%</td>
<td>50%</td>
</tr>
<tr>
<td>PI3</td>
<td>68.2%</td>
<td>54.5%</td>
</tr>
<tr>
<td>Histophilus</td>
<td>11.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Moraxella bovis</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Mycoplasma bovis</td>
<td>9.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Leptospira</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Clostridials</td>
<td>45.5%</td>
<td>31.8%</td>
</tr>
<tr>
<td>Mannheimia</td>
<td>73.9%</td>
<td>0%</td>
</tr>
<tr>
<td>Autogenous</td>
<td>22.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Pasteurella</td>
<td>36.4%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Lee, Thomson et al. 2014

EFFECTS OF MASS TREATMENT ON BEEF CATTLE HEALTH AND MORTALITY

<table>
<thead>
<tr>
<th></th>
<th>Risk of treatment-related death and liver abscesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Meta- mort</td>
<td>70%</td>
</tr>
<tr>
<td>Meta mort</td>
<td>60%</td>
</tr>
<tr>
<td>No Meta- mort</td>
<td>50%</td>
</tr>
<tr>
<td>Meta mort</td>
<td>40%</td>
</tr>
<tr>
<td>No Meta- mort</td>
<td>30%</td>
</tr>
<tr>
<td>Meta mort</td>
<td>20%</td>
</tr>
<tr>
<td>No Meta- mort</td>
<td>10%</td>
</tr>
<tr>
<td>Meta mort</td>
<td>0%</td>
</tr>
</tbody>
</table>

IMMUNE MODULATION

<table>
<thead>
<tr>
<th>Case</th>
<th>Basic Description</th>
<th>Location</th>
<th>Total Number</th>
<th>Treatment group</th>
<th>%</th>
<th>Mortality</th>
<th>Relative Risk</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bovine leukemia</td>
<td>Maine</td>
<td>1200</td>
<td>Meta mort</td>
<td>50%</td>
<td>1.8%</td>
<td>1.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>2</td>
<td>Autogenous</td>
<td>Kansas</td>
<td>1500</td>
<td>Meta mort</td>
<td>75%</td>
<td>0.1%</td>
<td>0.17%</td>
<td>0.17%</td>
</tr>
<tr>
<td>3</td>
<td>Autogenous</td>
<td>Nebraska</td>
<td>1000</td>
<td>Meta mort</td>
<td>25%</td>
<td>0.1%</td>
<td>0.12%</td>
<td>0.12%</td>
</tr>
<tr>
<td>4</td>
<td>Autogenous</td>
<td>Oregon</td>
<td>2000</td>
<td>Meta mort</td>
<td>75%</td>
<td>0.1%</td>
<td>0.21%</td>
<td>0.21%</td>
</tr>
<tr>
<td>5</td>
<td>Autogenous</td>
<td>Washington</td>
<td>1500</td>
<td>Meta mort</td>
<td>50%</td>
<td>0.1%</td>
<td>0.13%</td>
<td>0.13%</td>
</tr>
<tr>
<td>6</td>
<td>Autogenous</td>
<td>Idaho</td>
<td>1000</td>
<td>Meta mort</td>
<td>25%</td>
<td>0.1%</td>
<td>0.21%</td>
<td>0.21%</td>
</tr>
<tr>
<td>Overall</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
WHEN AND WHY DID THE ANIMAL DIE?

CASE FATALITY RATE

PROBLEM

___________________________________

___________________________________

___________________________________

___________________________________

_____________________________

WHEN AND WHY DID THE ANIMAL DIE?

CASE FATALITY RATE

PROBLEM

___________________________________

___________________________________

___________________________________

___________________________________

_____________________________

CAN WE FIND SICK CATTLE?

• Witrum - 1996
  - Treated 78% LL, Untreated – 68% LL
• Bryant - 1999
  - Treated – 44% LL, Untreated – 42% LL
• Gardner - 1999
  - Treated – 37% LL, Untreated – 29% LL
• Thomson - 2004
  - Treated – 62% LL, Untreated – 45% LL
• Friton et al., 2006
  - Treated – 35% LL, Untreated – 25% LL

ACCLIMATION, HAY AND PEN RIDING
NEWLY RECEIVED CALVES...

- Stressed
- Sick

- We want them eating 1.5% of body weight by 1.5 weeks on feed.

DESCRIPTION OF PERFECT FEEDING PEN FOR STARTING CALVES

- Max – 200 head, Min – 50, Mean – 103 head

- Bunk space, Max 21 in., Min 10 in, Mean – 13 in

- One load pens with 116 ft of bunk space

HOW MANY PEOPLE DO YOU NEED?

![Graph showing number of people needed for different risk levels.]

- Doctor
- Pen Rider

High risk
Low risk
HOW MANY TIMES DO YOU RECOMMEND THAT THAT THEY RIDE PENS ON HIGH RISK CALVES?

<table>
<thead>
<tr>
<th></th>
<th>Once</th>
<th>Twice</th>
<th>Three</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

% of consultants

IN THE CHUTE EXAMINATION

- Begin with a rectal temperature
- Sunken flank – diarrhea?
- Eyes and skin for dehydration
- Nose – dry or moist
- Ears – cold?

NORMALS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal temperature</td>
<td>101.5 to 103.5</td>
</tr>
<tr>
<td>Respiration rates</td>
<td>10 to 40 breaths per minute</td>
</tr>
<tr>
<td>Heart rates</td>
<td>60 to 80 beats per minute</td>
</tr>
<tr>
<td>Rumen contractions</td>
<td>1 to 2 contractions per minute</td>
</tr>
</tbody>
</table>
COMMON QUESTIONS

• Single or combination antimicrobials?
• How long to I wait to treat again?
• When should you switch to the next drug?
• Route of delivery and speed to infection?
• Low dose multiple days or larger dose on one day?
• What is considered normal antibiotic success?
• What about ancillary therapy?

HOSPITAL PENS

• Hospital pens are the most abused pens in the feedyard.

• Comfort – pen floors and shade
  • Need at least as much room or more than a feeding pen (150 to 200 sq. ft.)
  • Water tanks must be clean
  • Fresh feed and hay available
  • Shades
THANK YOU DALE AND CREW!