Feedlot Cattle Nutrition – Receiving to Finish

Dan Schaefer
Professor
Animal Sciences Department

Outline

• Nutrient requirements
  • Mineral and vitamin nutrition
• Cattle type and market constraints
• Growing phase
  • Starting on feed and step-up
• Finishing phase
  • Energy feeds and diet energy density
  • Protein feeds
  • Complementarity among feeds
Nutrition of Growing & Finishing Cattle

• “Growing/finishing” – traditional reference to a two-phase feeding program;
  • phase 1 emphasizes growth of skeleton and muscle;
  • phase 2 emphasizes diet with higher energy concentration for fattening/finishing

As body weight increases ...
  • DMI/day increases
  • Crude protein reqt decreases
  • Calcium reqt decreases
  • Phosphorus reqt decreases

DMI and nutrient reqts based on animal that is 1300 lbs at 28% body fat, eating diet of 61 Mcal NEg/cwt, and gaining 3.99 lb/day
As “net energy” concentration in diet increases …

- ADG increases
- CP, Ca and P reqts increase

DMI and nutrient reqts based on animal that would attain 28% body fat at 1300 lbs

**Nutrients of Interest for Diet Formulation**

- Steers and heifers – energy (NE\textsubscript{gain}), protein, calcium, phosphorus, potassium, sulfur, sodium and vitamin A

**Nutrient Requirements**

<table>
<thead>
<tr>
<th></th>
<th>NE\textsubscript{gain}</th>
<th>CP</th>
<th>Ca</th>
<th>P</th>
<th>K</th>
<th>S</th>
<th>Na</th>
<th>Vit A, IU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grower</td>
<td>56</td>
<td>14</td>
<td>0.6</td>
<td>0.3</td>
<td>0.6</td>
<td>0.15</td>
<td>.08</td>
<td>1,000/lb</td>
</tr>
<tr>
<td>Finisher</td>
<td>62</td>
<td>11</td>
<td>0.4</td>
<td>0.2</td>
<td>0.6</td>
<td>0.15</td>
<td>.08</td>
<td>1,000/lb</td>
</tr>
<tr>
<td>Max</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.3-0.5</td>
</tr>
</tbody>
</table>
Nutrients of Interest – Sources

- Calcium
- Phosphorus
- Potassium
- Sulfur
- Sodium
- Vitamin A

- Legumes, Limestone
- Silage or hay, KCl
- Salt, 0.2% of diet DM
- Retinyl acetate

Cattle Type and Market Constraints

- A reasonable thumb rule is that the weight of finished steers is the same as the weight of their mature dams.
  - Steer finished weight > dam mature weight, if steers are implanted
  - Implanting causes feedlot cattle to achieve the desired carcass composition at 30-90 lb heavier live weight
- Carcass weight maximums, not minimums, are the concern
But in a pen of cattle, variation exists

For current native cattle and Holsteins, beware of too much growth before finishing phase begins!

The System’s Goal for a Holstein Steer

“Really ideal type of steer. Live weight 1415 lbs, dressed yield estimate 61.5%, Y3, High Choice, Muscle score 1-2. The ideal kind of steer that is desired by both the dairy steer harvesters and native cattle packers alike.”

Ron Mayer – JBS Packerland
Management Guidelines for Feedlot Cattle

• Needs of the animal
  • Water, feed, and comfort (shelter and space)
• Performance enhancing strategies
  • Consistent ingredient composition fed at consistent time(s) of day
  • Ensure that all animals seeking access to feed bunk have access
  • Feed that is not dusty
  • Stable pecking order
  • Minimum energy expenditure for activity
  • For finishing-phase cattle, avoidance of excess fatness; sorting on entry or sorting on exit into uniform outcome groups

Growing Phase - Starting Cattle on Feed
Teaching Cattle to Drink and Eat

• Make water easy to find and consume, i.e., splashing water, no obstructions to access, like self-locking headgates
• Comfortable place to lie down; avoid loud noises and people
• Aroma of silages is foreign initially to cattle; grass hay is recognizable; oats and molasses are attractants

• Coccidiosis
  • Controlled through feed additives
    • Deccox (decoquinate)
    • Bovatec (lasalocid)
    • Rumensin (monensin)
  • Water additive
    • Corid (amprolium)

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**Adaptation to the Grower Diet**

• Begin by using grass or grass-legume hay as forage source during days 1-5
• Introduce grower diet (silage or haylage, grain and supplement) with hay fed over the top during days 2-5
• As grower diet consumption increases, reduce hay fed; likely that hay feeding ends on day 5
• Grower diet continues to be fed to meet appetite of calves using good feed bunk management; more on this later
• Don’t rush to catch up to appetite of calves; pace of increase up to DMI of 2% of body weight can be quick, but then further increases should be a half the early pace
• Cattle are adapting to feeds, penmates, feeder, facility, and Rumensin
Net Energy gain (NEg) Concentrations in Feedlot Diets

<table>
<thead>
<tr>
<th>Corn silage</th>
<th>Corn, high-moisture</th>
<th>Net Energy gain (Mcal/lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion (%)</td>
<td>Proportion (%)</td>
<td>Mcal/lb</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
<td>0.65</td>
</tr>
<tr>
<td>15</td>
<td>55</td>
<td>0.64</td>
</tr>
<tr>
<td>20</td>
<td>50</td>
<td>0.63</td>
</tr>
<tr>
<td>25</td>
<td>45</td>
<td>0.61</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
<td>0.60</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>0.57</td>
</tr>
<tr>
<td>50</td>
<td>20</td>
<td>0.54</td>
</tr>
</tbody>
</table>

1 Based on diet DM formula as follows: corn silage proportion; high-moisture corn proportion; modified wet distillers grain with solubles, 25%; and supplement (5%).
2 NEg values for diet ingredients (NASEM, 2016) were corn silage, 0.44 Mcal/lb; high-moisture corn grain, 0.71 Mcal/lb; and modified wet corn distillers grain with solubles, 0.74 Mcal/lb. Supplement was considered to be only minerals, vitamins and additives with zero NEg value.

When to end the Growing Phase?

- Depends upon
  - frame size and body condition score of cattle
  - energy density (NEg concentration) of the finishing diet, and
  - weight when 28% body fat (BCS = 7) is achieved

- If aiming for 1450 lb slaughter weight at BCS = 7 with large-frame steers and NEg = 62 Mcal/cwt, end growing phase at
  - 800 lb if BCS = 5
  - 750 lb if BCS = 4

- Don’t wait too long!
Finishing Phase Goals

- Steers and heifers
  - Maintain health
  - Maximize growth rate
  - Minimize feed to weight gain ratio; “feed efficiency”
  - Attain carcass composition desired by market; 28% body fat, which is a body condition score of 7
  - Avoidance of excess fatness; sorting on entry or sorting on exit into uniform outcome groups

Adaptation to Grain Diet (Step-up)

- Begin by offering relatively high forage diet with low grain content
- Step-up grain component gradually over 14-28 d, allowing 3-5 d adaptation for each “step”; yearlings step-up faster than calves
- 30, then 60, 75, 80, 85 (and 90%?) concentrates on diet DM basis
- 2.5% of body wt is approx. max DM intake for 7-8
- Since Rumensin is not palatable, introduce Rumensin at half-dose
Alternative Diet Adaptation Strategy

• Instead of five diets for step-up, prepare only lowest and highest concentrate diets and then mix these two diets prior to delivery to achieve the targeted diet energy density.

Feed Bunk Management

OBJECTIVES
Keep animals eating a consistent amount of feed
Maximize animal performance
Minimize digestive disorders

The Most Important Daily Task in Finishing Cattle!
If cattle are fed in the morning, what should the feed bunk look like the next morning?

Cattle Feeding Management

• Routine
  • Consistent time, amount, and ingredient composition
• If feeding once daily, bunk should have only crumbs remaining prior to next day’s feeding
• Makes changes to amount and ingredient composition gradually
  • Small, slow changes
  • But don’t limit intake; satisfy appetite, but don’t overfeed
  • Steady intakes lead to sustained growth
Note the gradual increase in DM intake over 2-3 weeks, and then DM intake was consistent. This is a good feed intake record.

**Ideal Daily Feed Consumption**

- **Ruminal pH**
- **Feed Intake**
Erratic Consumption Leads to Subacute Acidosis

Acidosis

• Acidosis is due to the metabolism of the animal being overloaded with acid (e.g., lactic acid, acetic acid, propionic acid, butyric acid)
• Acidosis is caused by an abrupt upshift in intake of fermentable energy
  • Switching from whole corn to ground corn
  • Switching from pasture to corn silage
  • Many more .....
Grains ranked by starch digestion rate

FAST
- Wheat
- Barley
- Processed high moisture corn
- Steam-flaked corn, HMC (stored whole)
- Dry rolled corn
- Dry whole corn

SLOW

Acidosis

- **Acute**
  - Laminitis, founder (sore feet)
  - Will not return to expected feed intake amt (anorexic)
  - Listlessness, diarrhea

- **Chronic or subacute**
  - Sporadic feed intake, poor doers
  - Excessive hoof growth; loss of agility

- **Long term effect (?)**
  - Rumenitis: more problems with longer-fed cattle (but not if there is consistently good bunk management!)
Self-Feeders

• Advantages?
  • Low labor
  • No feed bunks or feeding equipment

• Disadvantages?
  • Only dry feeds
  • Creep feeders don’t necessarily make efficient self-feeders
  • No way of knowing if all cattle are eating
Nutrient of Interest - Energy

- Goal – Maximize ADG and feed conversion efficiency
  - feed energy-dense diets
  - maximize dry matter intake, therefore palatability is important
- “Energy” accounts for largest component of required nutrients
- “Energy” feeds of lowest cost are desired
### Energy Concentrations in Grains and Forages

<table>
<thead>
<tr>
<th>Feed</th>
<th>NEg (Mcal/cwt DM)</th>
<th>Ratio to Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn, whole, dry-rolled</td>
<td>68</td>
<td>100</td>
</tr>
<tr>
<td>Corn, ~28% moisture</td>
<td>71</td>
<td>105</td>
</tr>
<tr>
<td>Corn, wet distiller's grains</td>
<td>74</td>
<td>109</td>
</tr>
<tr>
<td>Oats</td>
<td>62</td>
<td>92</td>
</tr>
<tr>
<td>Barley</td>
<td>64</td>
<td>94</td>
</tr>
<tr>
<td>Corn gluten feed</td>
<td>59</td>
<td>87</td>
</tr>
<tr>
<td>Corn silage</td>
<td>44</td>
<td>64</td>
</tr>
<tr>
<td>Alfalfa hay, mid-bloom</td>
<td>38</td>
<td>56</td>
</tr>
</tbody>
</table>

*Beef Cattle Nutrient Requirement Model, 2016*

### Starch Digestibility of Corn in Feedlot Cattle

**Owens & Zinn, SWNC, 2005**

<table>
<thead>
<tr>
<th></th>
<th>Dry Rolled</th>
<th>High Moisture</th>
<th>Steam Flaked</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Diet Observations</td>
<td>26</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>% of Starch Intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruminal</td>
<td>61</td>
<td>91</td>
<td>84</td>
</tr>
<tr>
<td>Post-Ruminal</td>
<td>28 (0.90)</td>
<td>8 (0.90)</td>
<td>15 (0.94)</td>
</tr>
<tr>
<td>Total Tract</td>
<td>89 (69:31)</td>
<td>99 (92:8)</td>
<td>99 (85:15)</td>
</tr>
</tbody>
</table>
Primary Factors Influencing Starch Digestibility in Corn Grain

- Processing: i.e. Particle size; Steam Treatment
- Harvest/Storage: i.e. Dry vs. HMC DM of HM/Maturity; Fermentation Time
- Endosperm Type: i.e. Prolamin; Prolamin-starch matrix; Hardness

Adapted from Pat Hoffman, UW Madison Dairy Sci. Dept.

Figure 17. Kernels on a light table (left) and modification classes in F2 seed from normal x QPM donors.
Source: Adapted from Krivanek and Vivek (2006).
Whole-Plant Corn Silage

- Grain ~40-45% of WPDM
  - Avg. 32% starch in WPDM
  - Variable grain:stover

- Stover ~55-60% of WPDM
  - Avg. 41% NDF in WPDM
  - Variable stover:grain

- 80 to 98% StarchD
  - Kernel particle size
  - Duration of silage fermentation
  - Kernel maturity
  - Endosperm properties
  - Additives (exp.)

- 40 to 70% IVNDFD
  - Lignin/NDF
  - Hybrid Type
  - Environment: G x E
  - Maturity
  - Cutting height
  - Additives (exp.)

Variable peNDF as per chop length

Adapted from Joe Lauer, UW Madison Agronomy Dept.

Any risks associated with this diet ingredient?

Manitowoc Co. feedlot

NEg = 72 Mcal/cwt
Corn Co-Products

- Ruminants can utilize many by-products better than non-ruminants, and they fit growing/finishing better than dairy
- Corn co-products (corn starch component has been removed)
  - High-fructose corn syrup
  - Corn gluten feed
  - Ethanol production
    - Dried distillers grain with solubles (DDGS)
    - Corn syrup
- Corn screenings from terminal corn markets

Corn distillers grain is still good, but changing

- In terms of feeding value of distillers grain, “wetter is better”
- Values shown below are for normal oil content

<table>
<thead>
<tr>
<th></th>
<th>Dried</th>
<th>Modified Wet</th>
<th>Wet</th>
<th>Syrup</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM, %</td>
<td>92</td>
<td>49</td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>Starch, %</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Crude protein, %</td>
<td>30</td>
<td>31</td>
<td>31</td>
<td>17</td>
</tr>
<tr>
<td>Oil, %</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>NEg, Mcal/cwt DM</td>
<td>77</td>
<td>80</td>
<td>93</td>
<td>87</td>
</tr>
</tbody>
</table>

Iowa Beef Center, IBCR 200A, 2014
Corn distillers grain is still good, but changing

- Now, ethanol plants have retained more corn oil; DDGS now is 5-8% corn oil

<table>
<thead>
<tr>
<th></th>
<th>Dried</th>
<th>Modified Wet</th>
<th>Wet</th>
<th>Syrup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal, oil %</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Normal NEg</td>
<td>77</td>
<td>80</td>
<td>93</td>
<td>87</td>
</tr>
<tr>
<td>Low fat, oil %</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>Low fat, NEg</td>
<td>74</td>
<td>77</td>
<td>77</td>
<td>-</td>
</tr>
<tr>
<td>De-oiled, oil %</td>
<td>4</td>
<td>-</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>De-oiled, NEg</td>
<td>72</td>
<td>-</td>
<td>77</td>
<td>78</td>
</tr>
</tbody>
</table>

Iowa Beef Center, IBCR 200A, 2014

Cost per Mcal of Dry Corn NEg

- Bushel of dry corn = 56 lbs @15% H₂O
- 56 lbs * 0.85 lb DM/lb as-fed = 47.6 lb DM
- Dry corn: 0.68 Mcal NEg/lb DM
- 47.6 lb DM * 0.68 Mcal NEg/lb DM = 32.37 Mcal NEg
- Corn price = $3.20/ bushel
- $3.20/ 32.37 Mcal = $0.099/Mcal NEg
Cost per Unit of Net Energy for Gain

<table>
<thead>
<tr>
<th>Feed</th>
<th>Unit</th>
<th>DM, %</th>
<th>$/unit</th>
<th>$/Mcal NEg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn, dry</td>
<td>Bu</td>
<td>85</td>
<td>3.20</td>
<td>0.099</td>
</tr>
<tr>
<td>Corn, HM</td>
<td>Bu</td>
<td></td>
<td>3.20</td>
<td>0.095</td>
</tr>
<tr>
<td>Corn silage</td>
<td>Ton</td>
<td>35</td>
<td>32.00</td>
<td>0.104</td>
</tr>
<tr>
<td>Alf. hay</td>
<td>Ton</td>
<td>88</td>
<td>120.00</td>
<td>0.179</td>
</tr>
</tbody>
</table>

• Because the NEg value of high-moisture corn is greater than that of dry-rolled corn, the cost/Mcal NEg is less.
• Corn silage calories have similar cost as dry corn and are definitely less expensive than alfalfa hay calories.

Alfalfa can have a role in finishing cattle

• Corn and alfalfa complementary in terms of CP, Ca and K
• Complementarity works best only for a growing diet in middle wts (400-700 lbs)

<table>
<thead>
<tr>
<th>Feedstuff or Diet</th>
<th>CP, %</th>
<th>Ca, %</th>
<th>K, %</th>
<th>NE, Mcal/cwt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>9</td>
<td>0.02</td>
<td>0.4</td>
<td>68</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>20</td>
<td>1.5</td>
<td>2.7</td>
<td>38</td>
</tr>
<tr>
<td>10 alf: 72 corn: 14 DDG: 4 suppl</td>
<td>13</td>
<td>0.5</td>
<td>0.77</td>
<td>62</td>
</tr>
<tr>
<td>40 alf: 59 corn: 1 suppl</td>
<td>13</td>
<td>0.6</td>
<td>1.3</td>
<td>53.5</td>
</tr>
</tbody>
</table>

• When 40% alfalfa included, there is no need for supplemental CP or Ca
Holstein Steer Budget Comparisons

• Prices in Examples
  • Corn silage - $32/ ton
  • Alfalfa haylage - $60/ ton grower; $90/ ton finisher
  • Rolled Corn - $3.20/ bu
  • DDGS - $116/ ton
  • Mineral Supplement - $800/ ton
  • Feeders - 4 & 5 wts @ $90/ cwt; 8 wts @ $75/cwt
  • Choice Feds - $90/ cwt
  • Bedding - 5 lb/ head per day at $35/ ton
  • Yardage - $0.49/ head per day

Bill Halfman, UW Extension, Monroe County, 2017

Backgrounding Program Comparisons

<table>
<thead>
<tr>
<th>Program</th>
<th>Corn Silage</th>
<th>Alfalfa Haylage</th>
<th>Corn Silage Finished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start weight</td>
<td>400</td>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>End weight</td>
<td>800</td>
<td>800</td>
<td>1500</td>
</tr>
<tr>
<td>Rate of gain</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Feed to gain</td>
<td>6.7</td>
<td>6.7</td>
<td>10.0</td>
</tr>
<tr>
<td>Days on feed</td>
<td>182</td>
<td>182</td>
<td>455</td>
</tr>
<tr>
<td>Feed cost/ pound of gain</td>
<td>$0.27</td>
<td>$0.37</td>
<td>$0.37</td>
</tr>
</tbody>
</table>

* Assume corn silage is 50% roughage
## Backgrounding Program Comparisons

<table>
<thead>
<tr>
<th>Program</th>
<th>Corn Silage</th>
<th>Alfalfa Haylage</th>
<th>Corn Silage Finished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>$600</td>
<td>$600</td>
<td>$1125</td>
</tr>
<tr>
<td>Feeder value</td>
<td>$360</td>
<td>$360</td>
<td>$450</td>
</tr>
<tr>
<td>Total feed</td>
<td>$107.94</td>
<td>$148</td>
<td>$373</td>
</tr>
<tr>
<td>Other costs*</td>
<td>$104</td>
<td>$104</td>
<td>$185</td>
</tr>
<tr>
<td>Yardage</td>
<td>$89</td>
<td>$89</td>
<td>$223</td>
</tr>
<tr>
<td>Return to labor &amp; mgt</td>
<td>-$63</td>
<td>-$90</td>
<td>-$100</td>
</tr>
<tr>
<td>Turns/year</td>
<td>2.0</td>
<td>2.0</td>
<td>0.7</td>
</tr>
</tbody>
</table>

*Other costs include death loss, interest on feed and cattle, veterinary, bedding, health products, implants, transportation, and marketing

## Finishing Program Comparisons

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Start weight</td>
<td>500</td>
<td>850</td>
<td>500</td>
<td>850</td>
</tr>
<tr>
<td>End weight</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Rate of gain</td>
<td>2.8</td>
<td>3.2</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Feed to gain</td>
<td>7.4</td>
<td>7.3</td>
<td>7.4</td>
<td>7.3</td>
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<tr>
<td>Days on feed</td>
<td>357</td>
<td>203</td>
<td>357</td>
<td>203</td>
</tr>
<tr>
<td>Feed cost/ pound of gain</td>
<td>$0.49</td>
<td>$0.49</td>
<td>$0.49</td>
<td>$0.49</td>
</tr>
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</table>
Finishing Program Comparisons

<table>
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<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>$1350</td>
<td>$1350</td>
<td>$1350</td>
<td>$1350</td>
</tr>
<tr>
<td>Feeder value</td>
<td>$450</td>
<td>$637</td>
<td>$450</td>
<td>$637</td>
</tr>
<tr>
<td>Total feed</td>
<td>$492</td>
<td>$316</td>
<td>$492</td>
<td>$316</td>
</tr>
<tr>
<td>Other costs*</td>
<td>$159</td>
<td>$134</td>
<td>$159</td>
<td>$134</td>
</tr>
<tr>
<td>Yardage</td>
<td>$175</td>
<td>$99</td>
<td>$175</td>
<td>$99</td>
</tr>
<tr>
<td>Return to labor &amp; mgt</td>
<td>$67</td>
<td>$160</td>
<td>$67</td>
<td>$160</td>
</tr>
<tr>
<td>Turns/year</td>
<td>1.0</td>
<td>1.8</td>
<td>1.8</td>
<td>1.8</td>
</tr>
</tbody>
</table>

*Other costs include death loss, interest on feed and cattle, veterinary, bedding, health products, implants, transportation, and marketing.

Beta-agonist Feed Additives

<table>
<thead>
<tr>
<th>Trait</th>
<th>Optaflexx</th>
<th>Zilmax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active ingredient</td>
<td>ractopamine</td>
<td>zilpaterol</td>
</tr>
<tr>
<td>Dose (mg/hd daily)</td>
<td>70-430</td>
<td>60-90</td>
</tr>
<tr>
<td>Feeding duration (days)</td>
<td>28-42</td>
<td>20-40</td>
</tr>
<tr>
<td>Withdrawal (days)</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Projected live wt gain (lbs)</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Projected carcass wt gain (lbs)</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Increase in ribeye area (sq. in.)</td>
<td>0.47</td>
<td>1.3</td>
</tr>
<tr>
<td>Reduction in marbling score</td>
<td>9 (very little)</td>
<td>43 (almost half a marbling score)</td>
</tr>
</tbody>
</table>

There are currently no markets accepting cattle fed Zilmax.
Deliver Carcass Composition Desired by Market

- Avoid over-fat, under-finished, too heavy and too light-weight cattle
  - Each animal has a window of time in which its market value is optimal
  - Sort cattle from finish pen for slaughter to achieve uniformly finished cattle
- Avoid stags, pregnant heifers, grubs, manure-caked hides
- Respect drug withdrawals

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Clean coat – sufficiently dry pen, “space”, no riding activity

No horns

Healthful appearance

Shelter

Bedding

Good footing; no evidence of joint swelling; no deep manure
UW Extension WI Beef Information Center
http://fyi.uwex.edu/wbic/feedlot/