Cattle Growth Dynamics and Its Implications

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Maximize Weight Gain
Minimize Feed/Gain
Reach desirable level of finish
Minimize Discounts
Capture Premiums

To manage these I must understand growth
- Body composition = protein + fat in the animal.
- Depends upon where the animal falls on its growth curve.
- Changing the growth curve: changes the weight at which an animal reaches a specific body composition.

Source: Robbi Pritchard
Energy intake / Days on Feed

Bone

Muscle

Fat

Small frame

YG 3, Choice, 650 lb HCW

Energy intake / Days on Feed

Bone

Muscle

Fat

Large frame
Increased Growth

YG 1, Select, 750 lb HCW

Source: Robbi Pritchard

Energy intake / Days on Feed

Bone

Muscle

Fat

Small frame

YG 4, Choice, 750 lb HCW

Energy intake / Days on Feed

Bone

Muscle

Fat

Large frame
Increased Growth

YG 3, Choice, 850 lb HCW

Source: Robbi Pritchard
Can they have equal fatness? Yes
Will they weigh the same at equal fatness? No

Will they have similar grade at equal fatness? ???

- Weight at a target fat endpoint
  - Not a common time endpoint
- Animals need to reach a certain level of fatness to marble.
**Relationship of body fat to marbling**

(Guiroy, 2001, total of 1,355 animals)

![Graph showing the relationship between empty body fat and quality grade.](image)

**Select, 26.2% EBF**

**Low Choice, 28.6% EBF**

**Mid Choice, 29.9% EBF**

**Standard, 21.1% EBF**

**Relationship between Marbling and Backfat with Carcass Weight**

(Bruns et al., 2000)

![Graph showing the relationship between marbling score and backfat thickness with carcass weight.](image)

Marbling linear p<.01

Small 0

YG 2.7
Marbling Score vs Empty Body Fat % in Holsteins
(9 Studies; 39 treatment means)

- Allowing cattle to reach a particular fatness will allow the animal to express its genetic potential to marble.
- Marbling is linear and increases with increasing hot carcass weight.
- Changes in the growth curve will change the weight at which an animal reaches a target level of marbling (fat).
Genetics

Plane of Nutrition (Energy intake)

Increased Finished Weight

Sex

Implant Program

B-agonist

Frame Size x Weight (lb) at equal fatness (29% fat)

<table>
<thead>
<tr>
<th>Frame Score</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>Steer</td>
<td>1175</td>
<td>1250</td>
<td>1322</td>
<td>1395</td>
</tr>
<tr>
<td>Heifer</td>
<td>939</td>
<td>1001</td>
<td>1058</td>
<td>1115</td>
</tr>
</tbody>
</table>
Effect of Rates of gain vs. Fat in gain

- 1.3 lb/d
- 2.2 lb/d
- 2.9 lb/d

Shrunken Body Weight, lb

Fat in gain, %

Effects of Body Weight on Holsteins
Proceedings: Cornell Holstein Beef Symposium 1986
U. Of MN, 612 lb in wt; Ralgro

EBF
Marbling

Percent

Body Weight, lbs

Small0=25.0; Modest0=30.0
Effects of Body Weight on Holsteins
Penn. State, 2001; 404 in wt. 247-332 dof

Body Weight, lbs

Percent

Do implants change weight at equal fatness?
Do implants change the amount of fat required to reach Choice?
Cornell Database Evaluation

• 13 implant trials,
• 13,640 total animals
  – 9,052 steers; 4,588 heifers
• 15 different implant strategies
• Reimplanting 64-90 days on feed.
• Individual carcass data measurements
  – used to calculate finished weight at 29% empty body fat.

Implant Strategies and Weight at Equal Fatness
Implants and Fatness

Implants **DO** change wt at 29% body fat,

But do implants change  
Percent Choice at 29% Body fat?

Fat Content of Steers Grading  
**Low Choice** (Guiroy, 2001)

![Chart showing fat content for different treatments and body fat percentages.](chart.png)
Growth Curve Modification by Implants

Effects of Implants on Holsteins
KSU 1993; 378 in wt. 252 dof
Effects of Implants on Holsteins

KSU, 1998; 308 lbs.; 326-350 dof

Scale

\[ \text{EBF} \quad \text{Marbling} \quad \text{Wt} \]

Effects of Implants on Holsteins

Cal Poly, 2000; 319 in wt. 291 dof

Scale

\[ \text{EBF} \quad \text{Marbling} \quad \text{Wt} \]

Small0=5.0; Modest0=6.0

Small0=25.0; Modest0=30.0
Implants and Finished Weight

- Implants increase the growth curve
- Increasing dose increases weight at a common body fatness.
- Different implant programs in time constant trials can be misleading.
- Compare cattle of = fatness if evaluating grade differences.
- Implants do not change the amount of fat required to reach Choice.

Questions?
Conclusion

• Use technology to your advantage.
• Animals need to reach a certain fatness to marble.
• Relationship between Quality grade vs. Yield grade:
  – Exploit it to your advantage.

Thank You!