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
Bone
Muscle
Fat

Small frame
YG 3, Choice, 650 lb HCW

Large frame
Increased Growth
YG 1, Select, 750 lb HCW

Energy intake / Days on Feed

Bone
Muscle
Fat

Small frame
YG 4, Choice, 750 lb HCW

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.
Sites: Low Choice, 28.6% EBF, Mid Choice, 29.9% EBF, Select, 26.2% EBF, Standard, 21.1% EBF.

~YG 2.7-3.0

Relationship between Marbling and Backfat with Carcass Weight

Bruns et al., 2000
• 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).
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>
</tr>
</thead>
<tbody>
<tr>
<td>Steer</td>
<td>1175</td>
<td>1250</td>
<td>1322</td>
<td>1395</td>
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<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

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

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

Implants and The Growth Curve

- 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)
Growth Curve Modification by Implants

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

Small0=5.0; Modest0=6.0
Effects of Implants on Holsteins

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

Effects of Implants on Holsteins

Cal Poly, 2000; 319 in wt. 291 dof
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!