Selecting and Sourcing Replacement Heifers

- 10 to 20% of a cowherd is replaced annually.
- Approximately 30% of weaned heifers are needed for replacement.
- Additional heifers are needed for expansion.
Heifers Needed As a Percent of Cows to Calve

<table>
<thead>
<tr>
<th>Death Loss</th>
<th>86%</th>
<th>88%</th>
<th>90%</th>
<th>92%</th>
<th>94%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0%</td>
<td>23.5</td>
<td>21.2</td>
<td>19.1</td>
<td>17.2</td>
<td>15.5</td>
</tr>
<tr>
<td>2.0%</td>
<td>24.5</td>
<td>22.2</td>
<td>20.0</td>
<td>18.1</td>
<td>16.3</td>
</tr>
<tr>
<td>3.0%</td>
<td>25.7</td>
<td>23.2</td>
<td>21.0</td>
<td>19.0</td>
<td>17.1</td>
</tr>
</tbody>
</table>
## Annual Cow Depreciation

(100 head cow herd example)

<table>
<thead>
<tr>
<th></th>
<th>Replacement Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12%</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td></td>
</tr>
<tr>
<td>Bred Heifer</td>
<td>1100</td>
</tr>
<tr>
<td>Cull Cow</td>
<td>625</td>
</tr>
<tr>
<td>Difference</td>
<td>475</td>
</tr>
<tr>
<td><strong>Depreciation/cow</strong></td>
<td><strong>57.00</strong></td>
</tr>
</tbody>
</table>
Herd Replacement and Expansion vs Price Cycles

• Harlan Hughes –
  – Heifers retained at the high price times of the cattle cycle often are at maximum productivity through periods of low prices
  – Minimize herd replacement and culling at times of high calf prices and sell lots of calves
  – Rebuild and expand with cheap heifers to minimize herd debt and investment
• There can be good market opportunities for developing and breeding heifers in periods of herd expansion
“Cowing up … Cowing down”

- Heifer replacement strategies impact herd profitability
- Retaining the same dollar value of heifers instead of enough heifers to maintain a constant herd inventory projected to increase net worth 20% (ISU 1970-1999 simulation)
- 120 head herd fluctuated from 86 to 138 cows, purchased yearlings use excess forage
Sources

• Retained Within Herd
  – Home Raised
  – Custom Development

• Purchased Bought In
  – Direct
  – Auction
  – Professional Services
  – Know background
  – generic
• Conventional Wisdom
  
  – “You can’t buy them as good as you can raise them … you are most likely getting somebody’s second cut … it’s cheaper to raise your own, you know what you’ve got”

• Industry Innovation
  
  – “customers specify breed(s), numbers, mature wt, service sire, and calving date… we market genetically superior, professionally developed replacement heifers”
Reasons to Buy

- Manage breed makeup in crossbreeding
- Eliminate calving ease bulls
- Maximize use of resources for production
- Acquire greater genetic value
- Simplify herd management
## Heifer Value Example

<table>
<thead>
<tr>
<th></th>
<th>1200</th>
<th>1300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow Weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in Herd</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Salvage value</td>
<td>540</td>
<td>585</td>
</tr>
<tr>
<td>Weaning Rate</td>
<td>94</td>
<td>92</td>
</tr>
<tr>
<td>Weaning Weight</td>
<td>550</td>
<td>530</td>
</tr>
<tr>
<td>Annual Feed Cost</td>
<td>220</td>
<td>230</td>
</tr>
<tr>
<td>Annual Vet Cost</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Annual Labor Cost</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Annual Overhead Cost</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>Profit</strong></td>
<td>$120</td>
<td>$70</td>
</tr>
<tr>
<td><strong>Total Returns</strong></td>
<td>$1500</td>
<td>$1075</td>
</tr>
<tr>
<td><strong>Net Present Value</strong></td>
<td>$1097</td>
<td>$803</td>
</tr>
</tbody>
</table>
Reasons to Raise

• Greater opportunity for information
• More accurate selections
• Greater Adaptation
• Bio-security
• Lower cost
Cost of Raising Heifers

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Opportunity cost of the Heifer</td>
<td>600</td>
</tr>
<tr>
<td>Winter Feeding (N-A)</td>
<td>150</td>
</tr>
<tr>
<td>Summer Grazing (M-O)</td>
<td>50</td>
</tr>
<tr>
<td>Fall Feeding (N)</td>
<td>25</td>
</tr>
<tr>
<td>Variable Expense</td>
<td>50</td>
</tr>
<tr>
<td>Fixed Expense</td>
<td>10</td>
</tr>
<tr>
<td>Death Loss</td>
<td>5</td>
</tr>
<tr>
<td>Interest</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$940</strong></td>
</tr>
<tr>
<td>Adjustment for Calls</td>
<td>10</td>
</tr>
<tr>
<td>Lost Opportunity Adjustment</td>
<td>90</td>
</tr>
<tr>
<td><strong>Adjusted Total</strong></td>
<td><strong>$1040</strong></td>
</tr>
</tbody>
</table>
• Adjustment For Culls
  - 25 heifers @ $940 = $23,500
  - 2 culls @ $817 = $1,675
  - $21,865 / 23 = $950

• Lost Opportunity Adjustment
  - 100 cows x $150 = $15,000
  - 115 cows x $150 = $17,250
  - $2,250 / 25 = $90
Selection/Cowherd Goals

• Easy to run, trouble free, cheap to feed, that breed in season, calve with few losses, and stay in the herd a long time

• Produce healthy heavy, calves with high market acceptance capable of making efficient feedlot gains and hanging a high grading value carcass
### Selection Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Score</td>
<td>4-6 (47”)</td>
</tr>
<tr>
<td>Mature weight</td>
<td>1100-1300</td>
</tr>
<tr>
<td>BCS at breeding</td>
<td>5.7-6.0</td>
</tr>
<tr>
<td>Weight at breeding</td>
<td>720-850</td>
</tr>
<tr>
<td>BCS at calving</td>
<td>6</td>
</tr>
<tr>
<td>Weight at calving</td>
<td>1000-1150</td>
</tr>
<tr>
<td>1\textsuperscript{st} cycle conception</td>
<td>70%</td>
</tr>
<tr>
<td>Carcass weight</td>
<td>700-850</td>
</tr>
<tr>
<td>Carcass grade</td>
<td>70% CH YG2</td>
</tr>
<tr>
<td>Feedlot gain</td>
<td>3.5</td>
</tr>
<tr>
<td>Feedlot Conversion</td>
<td>&lt;6.5</td>
</tr>
</tbody>
</table>
Heifer Development

• Heifer that has adequate size, is bred early, and doesn’t have major calving problems is likely to breed back earlier and consistently wean a heavier calf

• Recommended heifers weigh at least 65% of mature cow weight prior to breeding requiring target winter gains 1.25-1.75 lbs/day

• Heifers should be calf hood and prebreeding vaccinated, never implanted. Wormers and ionophores can reduce age and weight at puberty and feed cost

• Heifers should be mated to proven or high accuracy calving ease sires for a limited breeding season and fed to reach 85% of mature weight and BCS 6 at calving
Timing the Breeding of Yearling Heifers

- Breed 1 month prior to mature cows
  - Wintering ADG 1.5
  - Winter feed costs $66
  - Same pregnancy rate
  - Greater calving difficulty
  - Weaning weight 22 lbs heavier as 1st calvers

- Breed same date as mature cows
  - Wintering ADG 1.18
  - Winter feed costs $55
  - Breeding weight 60% of mature weight
  - Lower mature weight 1003 vs 974
  - As 3 & 4 yr olds same reproduction and calf weight
Target Breeding Weight

- Mature cow size: 1300
- Target weight (65%): 845
- Current Weight: 650
- Current Date: 12/15
- Breeding Date: 6/1
- Feeding period: 160 d
- Gain needed: 195
- Target ADG: 1.3
Lowering Target Weights ??

- 60% of Projected Mature Weight
  - 1.4 ADG
  - $107 feed cost
  - 690 prebreeding wt
  - 939 2 yr weight
  - By age 4 all comparisons including cow weight were similar

- 55% of Projected Mature Weight
  - 1.1 ADG
  - $85 feed cost
  - 637 prebreeding wt
  - 915 2 yr old weight
  - Calf birth date, weight, calving difficulty, weaning weight, preg rate were same
Don’t overlook maternal heterosis

- Crossbred Cow Heterosis
  - Calving Rate  +6.6%
  - Calf survival  +2.0%
  - Birth Weight  +1.6%
  - Weaning Wt  +4.2%
  - Longevity  +38%

- Improvement in weight weaned / cow exposed
  - Sire breed rotation  +16%
  - 4-breed composite  +15%
  - 2-breed rotation  +16%
  - Terminal x F1  +28%
  - Terminal x comp  +22%
## Biological Type

<table>
<thead>
<tr>
<th>Breed</th>
<th>Size</th>
<th>Muscle</th>
<th>Marbling</th>
<th>Milk</th>
<th>Puberty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hereford</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Angus</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Simmental</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Limousin</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Charolias</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Gelbvieh</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
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</tbody>
</table>
Keys to Effective Genetic Selection

• A population of heifers sired by bulls which transmit desired maternal characteristics

• Information upon which to make individual heifer selection and culling decisions
Traits of Economic Importance

• Low Cost Cows
  – Feed requirement
  – Longevity
  – Fertility
  – Calving ease
  – Health status

• High Value Calves
  – Weaning weight
  – Feedlot gain/conversion
  – Carcass marbling
  – Carcass yield
  – Uniformity
Genetic Trade Offs

• Female Trait
  – Age at puberty
  – Cow maintenance
  – Conception rate

• Match Cow to Forage Resources

• Steer Trait
  – Retail product yield
  – Post weaning growth
  – Fat thickness

• Match Sire to Market Targets
<table>
<thead>
<tr>
<th></th>
<th>1000</th>
<th>1200</th>
<th>1200</th>
<th>1400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak milk</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Annual TDN</td>
<td>4219</td>
<td>5146</td>
<td>5339</td>
<td>5879</td>
</tr>
<tr>
<td>Feed Cost</td>
<td>$169</td>
<td>$206</td>
<td>$214</td>
<td>$235</td>
</tr>
<tr>
<td>Stocking Rate</td>
<td>121</td>
<td>100</td>
<td>96</td>
<td>88</td>
</tr>
<tr>
<td>Weaning Wt</td>
<td>455</td>
<td>550</td>
<td>575</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>1.05</td>
<td>1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calf price</td>
<td>832</td>
<td>832</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of calves (.93%)</td>
<td>82</td>
<td>93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed Cost</td>
<td>20,600</td>
<td>20,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td>40,769</td>
<td>43,205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Revenue</td>
<td>53,708</td>
<td>56,265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>12,939 ($147/cow)</td>
<td>13,060 ($130/cow)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakeven Price</td>
<td>$.80</td>
<td>$.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finish weight</td>
<td>1350</td>
<td>1175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of Gain (ADG 3.5, FE 8)</td>
<td>.534</td>
<td>.534</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days on Feed</td>
<td>207</td>
<td>176</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling Price (70% CH YG3)</td>
<td>83.2</td>
<td>83.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>6,542 ($79/calf)</td>
<td>3,633 ($39/calf)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Profit</td>
<td>19,481</td>
<td>16,693</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative Gain and Price</td>
<td>80</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit</td>
<td>2,999 ($36/calf)</td>
<td>2,624 ($28/calf)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Profit</td>
<td>15,938</td>
<td>15,684</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
start with the right ones, daughters of:

Sires Strong In Maternal Traits

• Fertility
  – High scoring Breeding Soundness Exam
  – Uniform shaped testicles of average or better size
  – Early sexual development and masculinity
  – Dam has regular calving interval
  – Favorable EPDs
    • Yearling scrotal circumference
      (genetic correlation .2)
    • Heifer Pregnancy Percent
      (heritability .57)
start with the right ones, daughters of:
Sires Strong In Maternal Traits

• Feed Requirements and Efficiency
  – Moderate Frame and Mature Weight
  – Displays natural thickness and fleshing ability
  – Favorable EPDs
    • Daughter Mature Weight
    • Daughter ME Feed
    • Milk EPD
    • Yearling height
start with the right ones, daughters of:
Sires Strong In Maternal Traits

• Calving Ease
  – Moderate birth weight
  – Born unassisted
  – Large yearling pelvic area
  – Favorable EPDs
    • Birth Weight
    • Maternal Birth Weight
    • Maternal Calving Ease
start with the right ones, daughters of:

**Sires Strong In Maternal Traits**

- **Weaning Weight**
  - Display good early growth and weaning weight
  - Favorable EPDs
    - Maternal weaning weight
    - Maternal Milk
    - Weaning weight
start with the right ones, daughters of:

**Sires Strong In Maternal Traits**

- **Longevity**
  - Good feet and leg structure and walks freely
  - Dam and daughters have good udders
  - Pleasant disposition, not up headed or mean
  - Favorable EPDs
    - Stayability
    - Disposition
complete the package with daughters of:

**Sires That Add Value**

- **Efficient Feedlot Gain**
  - Good yearling weight and post weaning ADG
  - Favorable EPDs
    - Yearling Weight
    - $Feedlot Index
    - $Terminal Index
complete the package with daughters of:

Sires That Add Value

- High Value Carcass
  - Display Natural thickness and muscle
  - Favorable EPDs
    - Ribeye Area
    - Fat Thickness
    - Carcass Weight
    - Percent Retail Product
    - Marbling (Intramuscular Fat)
    - $Grid Value
  - DNA Genetic Markers
Genetic Strategies

- Best Compromise
- “Curve Benders”
- Terminal x Maternal
Select & cull Heifers for Maternal Traits

• Fertility
  – Early born
  – Yearling weight, BCS, and Repro Tract Score
  – Early breeding date
  – Herd health, culling management, implant history

• Feed Requirement and Efficiency
  – Moderate frame
  – Spring and Fall Body Condition Score
  – Yearling Ultrasound Fat Thickness
Select & cull Heifers for Maternal Traits

• Longevity
  – Feet and leg structure
  – Disposition
  – Age of dam
  – Breeding date and BCS

• Calving Ease
  – Moderate birth weight and Calving Ease Score
  – Pelvic area
  – Service Sire BW & CE EPDs
Select & cull Heifers for Maternal Traits

• Weaning Weight
  – Weaning Weight
  – Breeding Date
  – Creep/nutrition management

• Uniformity
  – Breed makeup
  – Visual type
  – Calving date
Select Heifers that add Value

- **Feedlot Growth**
  - Yearling weight
  - Post wean ADG
  - Frame score

- **Carcass Value**
  - Yearling ultrasound
    - Intrarmuscular fat
    - Ribeye area
    - Fat thickness
  - Sib data
  - Muscle score
Source – Biosecurity

• Individual Health History
  – Treatments
    • Scours, BRD
  – Vaccinations
    • IBR, BVD, Lepto, Vibrio, Brucelosis, etc…
  – Testing
    • BVD PI ear test (5-20/hd)

• Herd (of origin) Health Status
  – Testing
  – Diagnosis
    • Johnnes

• Isolation
Selection and management of herd replacements is extremely important.

Decisions on heifers retained or purchased will impact herd profitability for the next decade.