Choices, Chances and Consequences

The Risks and Rewards of Pasture Based Dairying

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Division of Animal Sciences
Remember this is a systems approach
Cows
Land/grass
People
Buildings/infrastructure
Each has its own set of parameters with a specific goal in mind:

**Cows**
- Big, Little, Brown, Black, Red, White?
- Seasonal, Milk, Dual?
- “Horses for Courses”
- “Ford, Dodge, Chevy”
Land/pasture forage (grasses, legumes, other)
Hilly, Flat, Wet, Dry, Trees
Monoculture, Diverse
“Graze what grows in the ditches”
Are you a People person?
“no one can do it the way I want it done”
System requires multiple staff
Infrastructure
  Lanes (races), fencing, feeding (grain and other supplements)
  Milking facility
  Bare bones, High Tech, Robotic
Evolution of Grazing
Where Do You Belong?

• Stacey’s Disclaimer!

• This is YOUR system, not mine, not the consultants and not the banks (Maybe!)

• There is no right or wrong but what makes YOU happy
Maximum Milk or Profit?

Profit versus milk sold per cow

- Top 25%
- Second 25%
- Third 25%
- Bottom 25%

Pounds of milk sold per cow:
0 5,000 10,000 15,000 20,000 25,000 30,000
Holistic Grazing Purist

**REWARD**
- “All natural” pasture!
- Lowest input (no grain)
- Simple system
- Cows not stressed
- Niche market
- Reproduction

**RISK**
- Lowest milk production/cow (~7,000) and per acre
- Flexibility can be slow
- Drought
- Pasture management
- Can you take advantage of...
Realistic Grazing Purist

**REWARD**
- High percentage pasture
- Low input (0-6# grain)
- Simple system
- Cows not stressed
- Reproduction

**RISK**
- Lower milk production/cow (~9,000) and per acre
- Some flexibility
- Drought
- Pasture management
- Can you take advantage of...
Low Supplement Hybrid

**REWARD**
- High percentage pasture
- Simple system
- Cows not stressed
- Milk production/cow (~12,500) and per acre
- Flexible
- Reproduction
- Takes advantage of...

**RISK**
- Drought
- Low input (3-8# grain)
- Pasture management
High Supplement Hybrid

REWARD
• Milk production/cow (~15,000) and per acre
• Flexible
• Cows not stressed
• Takes advantage of...

RISK
• Drought
• Pasture management
• Pasture percentage consumed declining
• Moderate input (8-18# grain)
• System getting complex
• Equipment
• Reproduction
## Almost There Confinement

<table>
<thead>
<tr>
<th>REWARD</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Milk production/cow (~20,000) and per acre</td>
<td>• Flexibility reduced</td>
</tr>
<tr>
<td></td>
<td>• Drought</td>
</tr>
<tr>
<td></td>
<td>• Pasture management</td>
</tr>
<tr>
<td></td>
<td>• Minimal pasture percentage consumed</td>
</tr>
<tr>
<td></td>
<td>• Moderate Input (15-22# grain)</td>
</tr>
<tr>
<td></td>
<td>• System getting complex</td>
</tr>
<tr>
<td></td>
<td>• Cows not stressed</td>
</tr>
<tr>
<td></td>
<td>• Equipment</td>
</tr>
<tr>
<td></td>
<td>• Reproduction</td>
</tr>
<tr>
<td></td>
<td>• Can you take advantage of...</td>
</tr>
</tbody>
</table>
Confinement

**REWARD**
- Milk production/cow (~22,000)

**RISK**
- Flexibility reduced
- Drought
- Pasture percentage consumed nil (unless cut’n’carry)
- Forage management
- High input (20-30# grain)
- Complex system
- Cows stressed
- Equipment
- Reproduction
- Can you take advantage of...
What were the Commonalities?

• Stress?
• Reproduction?
• Takes Advantage of....
• Flexibility?
• Complexity?
• Drought

We are all on the same team to make a living producing Milk! It is all Perception and Perspective!
Goal is to Grow Grass!
# Parameters of the System Types

<table>
<thead>
<tr>
<th>System Type</th>
<th>Cow Size</th>
<th>Lactation</th>
<th># Milk</th>
<th>Total DMI</th>
<th># Grain</th>
<th># Forage</th>
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</thead>
<tbody>
<tr>
<td>Purist</td>
<td>850</td>
<td>7,000</td>
<td>23</td>
<td>24</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Realist</td>
<td>900</td>
<td>9,000</td>
<td>30</td>
<td>27</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Low Suppl.</td>
<td>1,000</td>
<td>12,500</td>
<td>42</td>
<td>33</td>
<td>5.5</td>
<td>27.5</td>
</tr>
<tr>
<td>High Suppl.</td>
<td>1,100</td>
<td>15,000</td>
<td>50</td>
<td>37</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>Almost</td>
<td>1,250</td>
<td>20,000</td>
<td>67</td>
<td>45</td>
<td>18.5</td>
<td>26.5</td>
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<tr>
<td>Confine</td>
<td>1,350</td>
<td>22,000</td>
<td>73</td>
<td>50</td>
<td>25</td>
<td>25</td>
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</table>
Pasture-Based Dairies
What Will it Take to Meet Your Goals?

<table>
<thead>
<tr>
<th>Yield/acre</th>
<th>Stocking Rate 1 cow/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 T/ac</td>
</tr>
<tr>
<td><strong>Purist</strong></td>
<td>63%</td>
</tr>
<tr>
<td><strong>Realist</strong></td>
<td>62%</td>
</tr>
<tr>
<td><strong>Low Suppl.</strong></td>
<td>55%</td>
</tr>
<tr>
<td><strong>High Suppl.</strong></td>
<td>61%</td>
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</table>

85% utilization rate
### Pasture-Based Dairies
What Will it Take to Meet Your Goals?

<table>
<thead>
<tr>
<th>Yield/acre</th>
<th>Stocking Rate 1.25 cow/acre</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3 T/ac</td>
</tr>
<tr>
<td><strong>Purist</strong></td>
<td>51%</td>
</tr>
<tr>
<td><strong>Realist</strong></td>
<td>50%</td>
</tr>
<tr>
<td><strong>Low Suppl.</strong></td>
<td>44%</td>
</tr>
<tr>
<td><strong>High Suppl.</strong></td>
<td>49%</td>
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</table>

85% utilization rate
### Pasture-Based Dairies
What Will it Take to Meet Your Goals?

<table>
<thead>
<tr>
<th>Yield/acre</th>
<th>3 T/ac</th>
<th>4 T/ac</th>
<th>5 T/ac</th>
<th>6 T/ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purist</td>
<td>42%</td>
<td>56%</td>
<td>70%</td>
<td>85%</td>
</tr>
<tr>
<td>Realist</td>
<td>42%</td>
<td>55%</td>
<td>69%</td>
<td>83%</td>
</tr>
<tr>
<td>Low Suppl.</td>
<td>36%</td>
<td>48%</td>
<td>61%</td>
<td>73%</td>
</tr>
<tr>
<td>High Suppl.</td>
<td>41%</td>
<td>54%</td>
<td>68%</td>
<td>81%</td>
</tr>
</tbody>
</table>

85% utilization rate
So How is Your Farm Designed?

• 100% perennials?
• 70% perennials and 30% annuals?
  – Annuals doubled cropped with winter and summer forages
• 50% perennials and 50% annuals?
  – Annuals doubled cropped with winter and summer forages
• Analysis using parameters:
  – Perennial grasses – 4.2 tons/acre
  – Cool season annual – 3 tons/acre
  – Warm season annual – 3.6 tons/acre
  – Demand – 36# DM/day
    • Stocking rate 1-1.4 cows/acre depending on desired DMI
Dry Matter Yields by Farm System Type

# DM/acre/day

- **100% base farm**
- **Demand**
Dry Matter Yields by Farm System Type

- 100% base farm
- 70:30 farm
- Demand
Dry Matter Yields by Farm System Type

# DM/acre/day

- 100% base farm
- 50:50 farm
- 70:30 farm
- Demand
Summary of Farms

• 100% perennial farm
  – 4.2 tons/acre
  – 231 cow days
• 70:30 farm
  – 4.9 tons/acre
  – 272 cow days
• 50:50 farm
  – 5.4 tons/acre
  – 299 cow days
Risks and Rewards

100% Perennial Farm
- Consistent
- Reliable
- One time establishment in 5-10 years
- Cost/# DM forage less
- Less yield/acre
- Nutritive value less
- Drought

Perennial plus Annuals
- Higher nutritive value
- Higher yield/acre
- Planting twice per year
- Timing
- Time (labor)
- Equipment
- Stand establishment
- Drought
Goal is to Grow Grass!
No matter what type of farm!
• Intermission!

• Questions
  • Where does your farm stack up?
What Impacts Pasture Growth?

- Rainfall
- Soil type
- Soil water availability
- Fertilization
- Solar radiation
- Growing days (heat units)
- Time of year
- Species
- Management
What Can You Impact to Increase Pasture Growth?

- Time (week)
- Soil available water
- Solar radiation
- Growing days heat units
- Soil type
- Pasture species selection
How Does Soil Available Water Impact Yield?

• **Available water** is the difference between field **capacity** which is the maximum amount of **water** the **soil** can hold and wilting point where the plant can no longer extract **water** from the **soil**.
4.1” (104 mm) Soil Available Water

SAW
Soil Available Water w Growing Days

4.1” (104 mm) Soil Available Water
Year 2011

4.1” (104 mm) Soil Available Water

[Graph showing soil available water levels for GR, SAW, and GD throughout the year 2011.]
Year 2012

4.1” (104 mm) Soil Available Water
Year 2013

4.1” (104 mm) Soil Available Water
Comparing Soil Types

• Newtonia
  – 7.9 inches soil water availability capacity

• MU Southwest Center (Wilderness, Creldon, Goss, Hoberg, Cedargap, Viraton, Gerald)
  – 4.1 inches soil water availability capacity
Comparison of Soil Available Water

2011

2012

2013

Available Soil Water (mm at 40")

Available Soil Water (mm at 40")

Available Soil Water (mm at 40")

Newtonia

SWC

Newtonia

SWC

Newtonia

SWC

21 days

14 days

? days
Which Farm would you Buy?
Evapotranspiration

• **Transpiration** consists of the vaporization of liquid water contained in plant tissues and the vapor removal to the atmosphere.

• **Evaporation** is the process whereby liquid water is converted to water vapor (vaporization) and removed from the evaporating surface (vapor removal).

• The combination of two separate processes whereby water is lost on the one hand from the soil surface by evaporation and on the other hand from the crop by transpiration is referred to as **evapotranspiration (ET)**.
<table>
<thead>
<tr>
<th>Date</th>
<th>2011 Inches</th>
<th>2012 Inches</th>
<th>2013 Inches</th>
<th>Average 3 year</th>
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<tr>
<td>1-Apr</td>
<td>0.06</td>
<td>0.11</td>
<td>0.12</td>
<td>0.10</td>
</tr>
<tr>
<td>8-Apr</td>
<td>0.14</td>
<td>0.13</td>
<td>0.09</td>
<td>0.12</td>
</tr>
<tr>
<td>15-Apr</td>
<td>0.14</td>
<td>0.14</td>
<td>0.11</td>
<td>0.13</td>
</tr>
<tr>
<td>22-Apr</td>
<td>0.11</td>
<td>0.16</td>
<td>0.09</td>
<td>0.12</td>
</tr>
<tr>
<td>29-Apr</td>
<td>0.10</td>
<td>0.16</td>
<td>0.13</td>
<td>0.13</td>
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<tr>
<td>6-May</td>
<td>0.13</td>
<td>0.15</td>
<td>0.11</td>
<td>0.13</td>
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<tr>
<td>13-May</td>
<td>0.15</td>
<td>0.20</td>
<td>0.17</td>
<td>0.18</td>
</tr>
<tr>
<td>20-May</td>
<td>0.14</td>
<td>0.22</td>
<td>0.15</td>
<td>0.17</td>
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<tr>
<td>27-May</td>
<td>0.12</td>
<td>0.21</td>
<td>0.16</td>
<td>0.16</td>
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<tr>
<td>3-Jun</td>
<td>0.21</td>
<td>0.21</td>
<td>0.13</td>
<td>0.19</td>
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<tr>
<td>10-Jun</td>
<td>0.22</td>
<td>0.23</td>
<td>0.21</td>
<td>0.22</td>
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<tr>
<td>17-Jun</td>
<td>0.19</td>
<td>0.23</td>
<td>0.20</td>
<td>0.21</td>
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<tr>
<td>24-Jun</td>
<td>0.22</td>
<td>0.28</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>1-Jul</td>
<td>0.22</td>
<td>0.25</td>
<td>0.21</td>
<td>0.23</td>
</tr>
<tr>
<td>8-Jul</td>
<td>0.21</td>
<td>0.22</td>
<td>0.25</td>
<td>0.23</td>
</tr>
<tr>
<td>15-Jul</td>
<td>0.23</td>
<td>0.26</td>
<td>0.23</td>
<td>0.24</td>
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<tr>
<td>22-Jul</td>
<td>0.24</td>
<td>0.25</td>
<td>0.16</td>
<td>0.22</td>
</tr>
<tr>
<td>29-Jul</td>
<td>0.21</td>
<td>0.23</td>
<td>0.13</td>
<td>0.19</td>
</tr>
<tr>
<td>5-Aug</td>
<td>0.21</td>
<td>0.22</td>
<td>0.11</td>
<td>0.18</td>
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<tr>
<td>12-Aug</td>
<td>0.14</td>
<td>0.16</td>
<td>0.15</td>
<td>0.15</td>
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<tr>
<td>19-Aug</td>
<td>0.18</td>
<td>0.21</td>
<td>0.18</td>
<td>0.19</td>
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<tr>
<td>26-Aug</td>
<td>0.20</td>
<td>0.14</td>
<td>0.19</td>
<td>0.18</td>
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<tr>
<td>2-Sep</td>
<td>0.24</td>
<td>0.16</td>
<td>0.16</td>
<td>0.19</td>
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<tr>
<td>9-Sep</td>
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<td>0.13</td>
<td>0.17</td>
<td>0.15</td>
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<tr>
<td>16-Sep</td>
<td>0.12</td>
<td>0.13</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>23-Sep</td>
<td>0.10</td>
<td>0.11</td>
<td>0.13</td>
<td>0.11</td>
</tr>
<tr>
<td>30-Sep</td>
<td>0.15</td>
<td>0.09</td>
<td>0.12</td>
<td>0.12</td>
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<tr>
<td>7-Oct</td>
<td>0.17</td>
<td>0.08</td>
<td>0.11</td>
<td>0.12</td>
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<tr>
<td>14-Oct</td>
<td>0.13</td>
<td>0.12</td>
<td>0.07</td>
<td>0.11</td>
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<tr>
<td>21-Oct</td>
<td>0.11</td>
<td>0.08</td>
<td>0.08</td>
<td>0.09</td>
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<tr>
<td>28-Oct</td>
<td>0.11</td>
<td>0.07</td>
<td>0.05</td>
<td>0.08</td>
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<td>4-Nov</td>
<td>0.11</td>
<td>0.09</td>
<td>0.07</td>
<td>0.09</td>
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<tr>
<td>11-Nov</td>
<td>0.07</td>
<td>0.06</td>
<td>0.06</td>
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<tr>
<td>18-Nov</td>
<td>0.09</td>
<td>0.07</td>
<td>0.07</td>
<td>0.08</td>
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<tr>
<td>25-Nov</td>
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<td>0.06</td>
<td>0.04</td>
<td>0.05</td>
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<tr>
<td>2-Dec</td>
<td>0.04</td>
<td>0.05</td>
<td>0.02</td>
<td>0.04</td>
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<tr>
<td>9-Dec</td>
<td>0.03</td>
<td>0.06</td>
<td>0.02</td>
<td>0.03</td>
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<tr>
<td>16-Dec</td>
<td>0.03</td>
<td>0.05</td>
<td>0.04</td>
<td>0.04</td>
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<tr>
<td>23-Dec</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Evapotranspiration rate 0.20 inches/day
Folks in the Ozarks like to say…

– “2 weeks from a drought”

It’s TRUE!
Is Irrigation an Opportunity or Risk?
## Multiple Regression Analysis

### Regression Statistics

- **Multiple R**: 0.875813
- **R Square**: 0.767049
- **Adjusted R Square**: 0.751166
- **Standard Error**: 11.04325
- **Observations**: 48

### ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
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<td>Regression</td>
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<td>17668.74</td>
<td>5889.582</td>
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<td>Residual</td>
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<td>5365.952</td>
<td>121.9534</td>
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<tr>
<td>Total</td>
<td>47</td>
<td>23034.7</td>
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### Coefficients

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>Lower 95.0%</th>
<th>Upper 95.0%</th>
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<td>Intercept</td>
<td>52.7017</td>
<td>22.33453</td>
<td>2.359651</td>
<td>0.022794</td>
<td>7.689412</td>
<td>97.71399</td>
<td>7.689412</td>
<td>97.71399</td>
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<td>Week</td>
<td>-0.388</td>
<td>0.396727</td>
<td>-0.978</td>
<td>0.33342</td>
<td>-1.18755</td>
<td>0.411551</td>
<td>-1.18755</td>
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<tr>
<td>Average of Available Soil Water (mm)</td>
<td>0.516395</td>
<td>0.053104</td>
<td>9.724145</td>
<td>1.57E-12</td>
<td>0.40937</td>
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<tr>
<td>Average of GD adjusted</td>
<td>-1.09443</td>
<td>0.452329</td>
<td>-2.41954</td>
<td>0.01974</td>
<td>-2.00604</td>
<td>-0.18282</td>
<td>-2.00604</td>
<td>-0.18282</td>
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</table>

Just to show I did it and didn’t make this stuff up!
Multiple Regression Equation for Irrigation

- Growth Rate = (Week x -0.39) + (SAW x 0.52) + (GD units x -1.09) + 52.7
  - Week = week of the year
  - SAW = soil available water
  - GD unit = growing day heat units
  - June 1- Sept 15
  - $R^2 = 0.75$
Dry Matter Yield Response to 5 Irrigation Levels

Fig. 1. Yearly mean (1996–1998) dry matter yield (DMY) response of eight cool-season grass species to five irrigation levels. Two plots are shown (a) standard pasture species and (b) less typical and/or more drought tolerant pasture species. The eight species average DMY is plotted in both graphs to aid in comparison. Only perennial ryegrass and meadow brome did not have a significant curvilinear response.
2.99 ton/ac

29% increase

0.75 inches Water/week

Irrigation
June 3-Sept 15

3.85 ton/ac
Year 2011

**190 mm Irrigation**

- **Growth Rate (irrigation)**: 3.85 ton/ac
- **Available Soil Water (mm)**: 0.75 inches Water/week

**380 mm Irrigation**

- **Growth Rate (irrigation)**: 5.37 ton/ac
- **Available Soil Water (mm)**: 1.5 inches Water/week

**predicted Growth Rate (irrigation)**

- **Irrigation Available Soil Water (mm)**
- **Growth Rate (kg/ha/day)**
**Year 2012**

- **Available Soil Water (mm)**: Illustrated in blue.
- **Growing Day Units**: Illustrated in orange.
- **Growth Rate**: Illustrated in black.

**Growth Rate (#/ac)**

**Soil Water (mm)**

**Available Soil Water (mm)**

**Predicted Growth Rate (irrigation)**

**Irrigation Available Soil Water (mm)**

**Growth Rate**

*27% increase*

*0.75 inches Water/week*

*Irrigation June 3-Sept 15*

*2.45 T/ac*

*3.2 T/ac*
Year 2012

- **Available Soil Water (mm)**
- **Irrigation Available Soil Water (mm)**
- **Growth Rate (#/ac)**
- **Predicted Growth Rate (irrigation)**

- **0.75 inches Water/week**
  - June 3 - Sept 15
  - 3.2 T/ac

- **91% increase**
  - 1.5 inches Water/week
  - 4.7 T/ac
Is Irrigation Cost Effective?

• What are the “replacement” costs for feed if you don’t grow the “extra” pasture?
## Annualized Cost per Ton of Dry Matter Forage for Different Irrigation Systems

**Response Rate (Pounds DM Forage per acre inch water applied)**

<table>
<thead>
<tr>
<th></th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pod-line</strong></td>
<td>$145</td>
<td>$97</td>
<td>$73</td>
<td>$58</td>
<td>$48</td>
<td>$41</td>
<td>$36</td>
<td>$32</td>
</tr>
<tr>
<td><strong>Spider</strong></td>
<td>$72</td>
<td>$48</td>
<td>$36</td>
<td>$29</td>
<td>$24</td>
<td>$21</td>
<td>$18</td>
<td>$16</td>
</tr>
<tr>
<td><strong>Traveling gun</strong></td>
<td>$122</td>
<td>$81</td>
<td>$61</td>
<td>$49</td>
<td>$41</td>
<td>$35</td>
<td>$30</td>
<td>$27</td>
</tr>
<tr>
<td><strong>Pivot and well(electric)</strong></td>
<td>$142</td>
<td>$94</td>
<td>$71</td>
<td>$57</td>
<td>$47</td>
<td>$40</td>
<td>$35</td>
<td>$31</td>
</tr>
</tbody>
</table>

### Cool Season Forages

### Warm Season Forages

**Which should we grow?**

**What are the Risks and Rewards?**
Irrigation
Risks and Rewards

• Upfront Costs
  – Could be over $1000/acre depending on scale and source
• Labor
  – Needs vary by system
• Maintenance
• Cost-effective
  – What is your return per acre inch?
  – Response rates per acre inch?
• Insurance program
• Nutritive value can be slightly reduced
• PICK YOUR FORAGE WISELY!
Intangibles?
• Intermission!

• Questions
  • Is Irrigation a Viable Option for you?
Reproduction
Risks and Rewards
This is What We Want, Right?
Calving Pattern of Synchronization vs. Non-Synchronization
Cows Second Lactation and Older

Mean Calving Dates
Non-synch – 2/29
SWC synch – 2/10
CIDR synch – 2/11
Lactation Curves of Cows Freshening in February through March
# Modeling Synch vs. Non-Synch – 100 Cows

## Feed Cost Summary

<table>
<thead>
<tr>
<th>NON SYNCH</th>
<th>Annual Per Herd (lbs.)</th>
<th>SYNCH</th>
<th>Annual Per Herd (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain</td>
<td>329,649</td>
<td>Grain</td>
<td>335,648</td>
</tr>
<tr>
<td>Dry cow hay</td>
<td>143,223</td>
<td>Dry cow hay</td>
<td>119,585</td>
</tr>
<tr>
<td>Lactating cow hay</td>
<td>41,736</td>
<td>Lactating cow hay</td>
<td>53,603</td>
</tr>
<tr>
<td>Silage</td>
<td>257,817</td>
<td>Silage</td>
<td>278,105</td>
</tr>
<tr>
<td>Baleage</td>
<td>17,000</td>
<td>Baleage</td>
<td>17,000</td>
</tr>
<tr>
<td>Pasture</td>
<td>452,077</td>
<td>Pasture</td>
<td>451,275</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,241,501</strong></td>
<td><strong>Total</strong></td>
<td><strong>1,255,216</strong></td>
</tr>
</tbody>
</table>

## Economic Summary

<table>
<thead>
<tr>
<th></th>
<th><strong>Annual</strong></th>
<th>Economic Summary</th>
<th><strong>Annual</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross milk sales</td>
<td>$247,462</td>
<td>Gross milk sales</td>
<td>$253,511</td>
</tr>
<tr>
<td>Income over purchased feed &amp; forage</td>
<td>$163,432</td>
<td>Income over purchased feed &amp; forage</td>
<td>$167,196</td>
</tr>
<tr>
<td>Annual milk produced</td>
<td>1,302,429</td>
<td>Annual milk produced</td>
<td>1,334,269</td>
</tr>
</tbody>
</table>

**Difference**: $3,765  
**With cost of synch products**: $2,365 advantage
Non Synch
- Less cost
- Labor for heat check/breeding
- More dry cow feed
- Spread risks over time
- Milk throughout season?
- More time with calves

Synch
- Costlier
- Labor efficient
- Chance of a major screw up
- Tighten calving window
- More lactating feed
- More milk
- Weather event could be fun
- Propagating infertility?

Tell us what you've done with all the grass!
Pasture Management

• Inexpensive feed source
  – If done right!
  – Very expensive if done WRONG!

• Constant vigilance
  – Monitor!

• Can be species specific
  – Bunch grasses vs. jointed
  – Cool season vs. warm season
  – Root/stubble reserves vs. all photosynthetic

• If you mess it up you better fix it!
  – DMI, yield and nutritive value effected

• Evaluate the next 7 slides!
Pasture Management
Pasture Management
Pasture Management
Pasture Management
Fig. 1. Total annual dry matter (DM) yield in 2002 and 2003 of tall fescue and perennial ryegrass when repeatedly mowed to different stubble heights. Contributions of seasonal yields are differentiated by background fill of histogram bars. Mean separation was conducted on total DM yield. Within years, bars with common letters do not differ at $\alpha = 0.05$ probability level. Error bars represent two times the standard error of the mean.
Impact of Cutting Height on Stand Counts

Table 4. Final stand counts of perennial ryegrass and tall fescue stands after 2 yr of repeatedly mowing to various stubble heights.

<table>
<thead>
<tr>
<th>Species</th>
<th>Stubble height</th>
<th>Stand density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>tillers m⁻²</td>
</tr>
<tr>
<td>Perennial ryegrass</td>
<td>2.5</td>
<td>1100d†</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>821d</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>1437cd</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2822ab</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>3280a</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>2488abc</td>
</tr>
<tr>
<td>Tall fescue</td>
<td>2.5</td>
<td>1389d</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1326d</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>1279d</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1453cd</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>1831bcd</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>1768bcd</td>
</tr>
<tr>
<td>SEM†</td>
<td></td>
<td>378</td>
</tr>
</tbody>
</table>

† Means with common letters within a column are not significantly different using Fisher's protected LSD (α = 0.05).
†† Standard error of the mean.
Why the Hang-up on Residual?

• Risks and rewards
• Dry matter intake may be limited
• Nutritive value impacted
• Stand longevity?
Forage Selection
### Production per Acre

<table>
<thead>
<tr>
<th></th>
<th>Fescue 2010</th>
<th>Ryegrass 2010</th>
<th>Fescue 2009</th>
<th>Ryegrass 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grazing to July 1</td>
<td>3,773</td>
<td>4,228</td>
<td>4,600</td>
<td>4,510</td>
</tr>
<tr>
<td>July 1-Sept 1</td>
<td>476</td>
<td>0</td>
<td>1,211</td>
<td>882</td>
</tr>
<tr>
<td>Sept 1-Dry Off</td>
<td>2,646</td>
<td>1,148</td>
<td>1,575</td>
<td>1,757</td>
</tr>
<tr>
<td><strong>TOTAL (pounds)</strong></td>
<td><strong>6,895</strong></td>
<td><strong>5,376</strong></td>
<td><strong>7,386</strong></td>
<td><strong>7,149</strong></td>
</tr>
</tbody>
</table>

**2009**
- Spring very cool, wet
- Summer cool, above normal rainfall
- Fall cool and very dry

**2010**
- Spring cool, normal rainfall
- Summer very hot, extreme drought
- Fall normal temperature, drought extends
Total Milk Production by Species

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fescue</td>
<td>Ryegrass</td>
</tr>
<tr>
<td>Milk/Cow</td>
<td>9,513</td>
<td>10,277</td>
</tr>
<tr>
<td>Milk/Acre</td>
<td>11,576</td>
<td>12,294</td>
</tr>
</tbody>
</table>

Milk production from beginning of study to dry off
2009 grazing began March 25
2010 grazing began April 8
## Milk Production by Species

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fescue</td>
<td>Ryegrass</td>
</tr>
<tr>
<td>% Feed</td>
<td>41%</td>
<td>28%</td>
</tr>
<tr>
<td># Milk (Energy based)</td>
<td>3580</td>
<td>2607</td>
</tr>
</tbody>
</table>

Milk production from beginning of study to dry off
2009 grazing began March 25
2010 grazing began April 8
Stay The Course!

Know Your Goals!

Be Flexible

Focus on What’s Important
Let the Grazing Begin!
Grain Feeding?

Milk Production per Cow/Day while Grazing Tall Fescues and Receiving Grain or No-Grain as Supplement

Pounds Milk/Cow/Day


BO Grain • BO No Grain • GT Grain • Gt No Grain
Grain Feeding?

- Response rate
- Bang for your buck
- Increased milk vs. weight gain vs. fertility
- Substitution rate
  - The Good, the bad and the ugly
- Does it fit YOUR SYSTEM?