INTENSIFIED COW/CALF PRODUCTION IN THE SOUTHERN GREAT PLAINS

Adam McGee, Jarrod Cole, Corbit Bayliff, Miles Redden, Courtney Spencer, Jason Warren, Damona Doye, Ryan Reuter, Gerald Horn, and David Lalman
Introduction

■ Increasing population
  – 8.5 billion people by 2030

■ Grazing land disappearing
  – Urban encroachment
  – Competition for other Ag use

■ Challenge
  – Feed increasing population
  – Fewer resources
Introduction

- 2014 5.3 Million acres of wheat planted
  - Oklahoma Ag Statistics 2015
- Estimated 61% of wheat used for Forage only or Dual purpose wheat
  - Hossain et al 2004

Photo Courtesy of Oklahoma State University
Introduction

- **Grazing Wheat**
  - *Common practice in Southern Plains*
  - *Typically used with stockers*

- **Cow/calf pairs**
  - *Not very common*
  - *Waste of nutrients*
Objectives

■ Develop a management system utilizing semi confinement and limit grazing of wheat and summer annuals to:
  - Match fall calving cow nutrient requirements during strategic times of the year
  - Reduce land area required for cow-calf production
  - Economically feasible
Hypothesis

- Cattle allowed to limit graze wheat during the winter and summer annuals during the summer will maintain a consistent BCS through the year and wean heavier calves while utilizing fewer hectares of land.
Fall Calving Cows Nutrient Requirements
Net Energy Mcal/d

Mcal/d

Weaning
Calving

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Required
Range
Range and Protein Supp

NRC, 1996
Fall Calving Cows Nutrient Requirements
Net Energy Mcal/d

NRC, 1996
Materials and Methods

Cattle Performance

- Multi Year Systems study
  - Cow/Calf
  - Stocker
  - Feedlot

Photo Courtesy of Oklahoma State University

Photo Courtesy of Dr. David Lalman
Materials and Methods

- Treatments
  - Intensive – INT
  - Extensive – EXT
- 3 replications/trt
- Cattle remain in treatment for duration
  - Age
  - Reproductive failure
Materials and Methods

Cattle Performance

- Angus/Hereford Mature Cows
- Fall Calving
  - *Calving Sept-Oct*
  - *Implant May*
  - *Wean Mid June-July*
Materials and Methods

Cattle Performance

- Fixed Timed AI
  - 7 day Co-Sync + CIDR
  - Charolais Cleanup Bulls
  - 45 days

- Commingled
  - Prior to burning
  - Weaning
  - Calving
Materials and Methods

Statistical Methods

■ One Way Design
  – Fixed Effect:
    ■ Treatment
  – Random Effect:
    ■ Year
    ■ Pasture within Treatment

■ SAS 9.3 (SAS Institute Inc, Cary, NC)
  – Glimmix procedure
  – Significance level if $P < 0.05$
Materials and Methods

EXT Treatment

- 14 hd/rep
- Native range
  - Continuously stocked – 13.41 ac/cow-calf pair
  - Little additional forage
- Protein supplement
  - October- March
  - 2.49 lb/hd/day 38% protein cube

Photo Courtesy of Oklahoma State University
Materials and Methods

INT Treatment

- 18 hd/rep
- Forages – 7.24 ac/cow-calf pair
  - Native
  - Wheat
  - Summer annual
- Supplements
  - Protein only from Oct.-Nov.
  - 1.5 lbs/hd/day
## Materials and Methods

### INT Treatment

<table>
<thead>
<tr>
<th>Grazing Period</th>
<th>Dates</th>
<th>Days</th>
<th>Feed/Forage</th>
<th>ha/Cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>Dec-March</td>
<td>103-120</td>
<td>Dry Lot Limit Graze Wheat</td>
<td>0.74</td>
</tr>
<tr>
<td>Spring Graze-out</td>
<td>March – May</td>
<td>23-41</td>
<td>Ad Lib Wheat</td>
<td>0.74</td>
</tr>
<tr>
<td>Early Summer</td>
<td>May – July</td>
<td>30-69</td>
<td>Native Rangeland</td>
<td>6.50</td>
</tr>
<tr>
<td>Late Summer</td>
<td>July- August</td>
<td>30-48</td>
<td>Summer Annual</td>
<td>0.50</td>
</tr>
<tr>
<td>Fall</td>
<td>Sept-Dec</td>
<td>102-112</td>
<td>Native Rangeland</td>
<td>6.50</td>
</tr>
</tbody>
</table>

**Total Land Area**: 7.24 ha/Cow
Materials and Methods

INT Treatment

- **During Winter Grazing Period**
  - *Ad Lib Hay*
    - Native Prairie hay
    - Wheat, sorghum sudan, or crabgrass hay from previous year
  - *Grazed 3hr/day, 3 days/wk*
  - *Calves allowed ad lib access*
Materials and Methods

Wheat DMI

- 2 cows/pen
- Weighed
- Grazed
  - Fecal collected
  - Calf prevented from nursing
- Weighed
- (Final-Initial) + Fecal*Wheat DM
# Materials and Methods

## Summer Annuals

<table>
<thead>
<tr>
<th>Year</th>
<th>Cows</th>
<th>Stockers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BMR Sorghum sudan, sunhemp, and cowpeas</td>
<td>BMR Sorghum sudan, sunhemp, and cowpeas</td>
</tr>
<tr>
<td>2</td>
<td>Bermuda Grass</td>
<td>Red River Crab Grass</td>
</tr>
<tr>
<td>3</td>
<td>Red River Crabgrass- Limit grazed 3 hr/day</td>
<td>Native Range</td>
</tr>
</tbody>
</table>
Materials and Methods

Hay Production

- Hay baled only on INT
  - *Wheat*
  - *Crabgrass*
  - *Sorghum sudan/sunhemp/cowpeas*
- Remainder of hay purchased
Materials and Methods

Stocker phase

- Weaning to feedlot entry
  - Mid June – Mid August
  - ~60 days
  - Additional animals added in Year 2

<table>
<thead>
<tr>
<th>Year</th>
<th>EXT</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Native Range</td>
<td>BMR Sudangrass Mix</td>
</tr>
<tr>
<td>2</td>
<td>Native Range</td>
<td>Red River crabgrass</td>
</tr>
<tr>
<td>3</td>
<td>Native Range</td>
<td>Native Range</td>
</tr>
</tbody>
</table>
Cow Body Weight

- Initial
- Winter
- Spring Graze-out
- Early Summer
- Late Summer

Body Wt, lb

- $P = 0.13$
- $P < 0.01$
- $P < 0.01$
- $P = 0.36$

EXT
INT
Cow BCS

Body Condition Score

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th>Winter</th>
<th>Spring Grazeout</th>
<th>Early Summer</th>
<th>Late Summer</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P &lt; 0.03</td>
</tr>
<tr>
<td>INT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P &lt; 0.91</td>
</tr>
</tbody>
</table>

P = 0.84

P < 0.01

P < 0.03

P < 0.91
Reproductive Performance

Pregnancy Rate

- 88% (EXT)
- 91% (INT)

% AI Sired Calves

- 65% (EXT)
- 49% (INT)

$P = 0.54$

$P = 0.11$
Calf ADG

Winter  
Spring Grazeout  
Early Summer

ADG, lb

P < 0.01  
P = 0.02  
P = 0.01

P = 0.02  
P = 0.01
Wheat DMI

% Body weight

January  | February  | March  
---   | ---       | ---   
1.25  | 0.94      | 1.49  
11.60 lb | 18.39 lb  |
Stocker ADG

<table>
<thead>
<tr>
<th>Year</th>
<th>EXT</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Native Range</td>
<td>BMR Sudangrass Mix</td>
</tr>
<tr>
<td>2</td>
<td>Native Range</td>
<td>Red River Crabgrass</td>
</tr>
<tr>
<td>3</td>
<td>Native Range</td>
<td>Native Range</td>
</tr>
</tbody>
</table>
## Hay Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Forage</th>
<th>East Pen</th>
<th>Center Pen</th>
<th>West Pen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BMR Sudan Grass Early</td>
<td>4.49</td>
<td>3.90</td>
<td>4.69</td>
</tr>
<tr>
<td>1</td>
<td>BMR Sudan Grass Late</td>
<td>7.84</td>
<td>8.16</td>
<td>6.85</td>
</tr>
<tr>
<td>2</td>
<td>None baled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Wheat</td>
<td>5.51</td>
<td>4.34</td>
<td>2.80</td>
</tr>
<tr>
<td>3</td>
<td>Crabgrass</td>
<td>2.94</td>
<td>3.21</td>
<td>2.83</td>
</tr>
</tbody>
</table>
Summary

■ Cows

- INT heavier and greater BCS at all time points except initial and late summer
- No difference in pregnancy rate
- Trend towards more AI sired calves in EXT treatment
Summary

- Calves
  - *INT were heavier throughout the year*
  - *ADG was statistically significant at all time points*
    - INT greater during Winter and Grazeout
    - EXT greater during early summer

- Reduced land mass
  - 13.41 ac *EXT*
  - 7.24 ac *INT*
  - 54% *Reduction in land use*