

### Efficiency in the Range Beef Cow

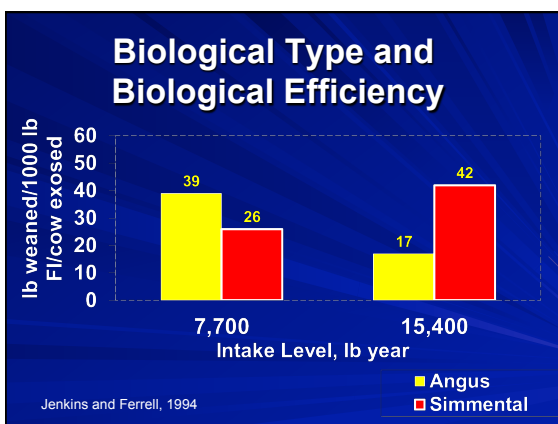


Dr. Trey Patterson, CEO, Padlock Ranch Company  
Range Beef Cow Symposium: November, 2015

### Biological Versus Economic Efficiency

- Profitable cattle are usually productive
- Productive cattle are not always profitable

Taylor, 1994



### Economic Efficiency of Beef Production

Milk Class	205 d Milk Avg lb/d	Weaning \$ Out/\$100 In
Low	13.8	90.3
Med	17.6	89.2
High	20.2	88.1

\*All cows same size  
Van Oijen et al., 1993

### Summary of 1984 Beef Cow Efficiency Forum

- Liberal Feed and/or Low Stress**
  - Heavier-milking, larger cattle are more efficient
- Restricted Feed or Higher Stress**
  - Moderate-milking, moderate size are more efficient

Adapted from Ritchie, 1995

### Cow Efficiency

- Stocking Rate and Grazing Management**
  - Run more moderate than large cows?
- Longevity in a production setting important**
- Cows produce second calf at 3 years?**  
(Zietsman, 2014)

## Key Metrics

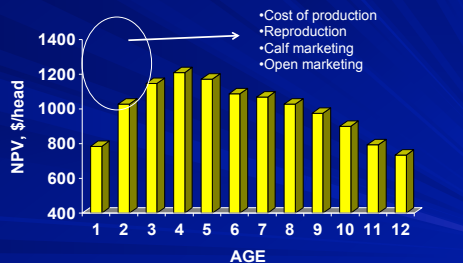
- **Pregnancy Rate**
  - Two-year pregnancy rate
  - Cows bred early vs late
- **Cost/weaned calf**
- **Carrying Capacity**
- **Customer Feedback**

## The Frustration?

- **Complex Systems**
  - Genetics
  - Management
  - Environment
  - Costs
  - Marketing



## Net Present Value of Cows

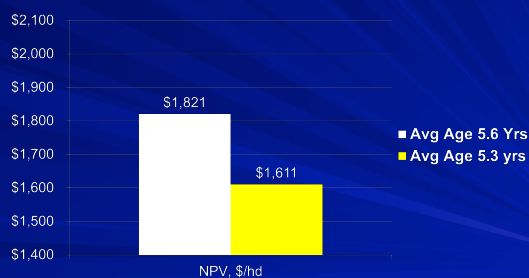


(Meek et al., 1999)

## Capital Budgeting: NPV

Age	Avg Age 5.6		Avg Age 5.3	
	# cows	Preg %	# cows	Preg %
2	100	88	100	75
3	86	88	73	75
4	71	93	51	93
5	62	93	44	93
....	....	....	....	....
12	19	85	14	85
13	7	80	5	80

## Effect of Longevity on NPV (5-yr avg prices; weigh-up cow marketing)



Difference: \$210

## Cost of Bred Heifers



## NPV vs Lifetime Profit

### ■ NPV of \$1821/hd

Cost to Put Heifer in Herd	Profit
\$1,000	\$821/hd
\$1,500	\$321/hd
\$2,000	-\$179/hd

## Can we build a better cow?



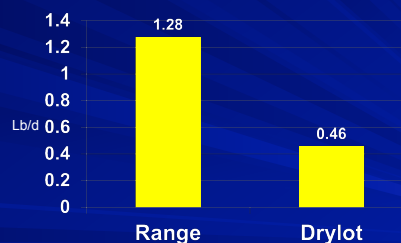
## Range Development

- Heifers developed on range or in a dry lot; All to grass May 18
  - Similar winter gains
- Gain from turnout to breeding (May 18 to June 14)
  - Range: 2.07 lb/day
  - Dry lot: 0.32 lb/day

( $P < 0.05$ )

Salverson et al., 2005

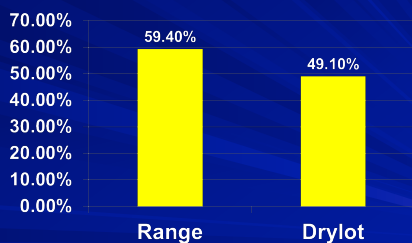
## ADG from AI to Pregnancy Detection for Heifers on Range or Dry Lot Prior to Breeding



$P < 0.01$

Perry et al., 2013

## Pregnancy to AI for Heifers on Range or Dry Lot Prior to Breeding



$P = 0.04$

Perry et al., 2013

## Range Development at Padlock

### ■ 2011

- 500 hd range developed
  - 3 lbs of cake
  - No hay
  - 771 lbs at breeding in July
  - 60.9% first service conception
- 1000 hd in feedlot
  - 39 NEg grower
  - 879 lbs at breeding in July
  - 61.6% first service conception

## Range Development at Padlock

- **2012**
  - 1000 hd range developed
    - 2 lbs of cake
    - No Hay
    - 865 lbs at breeding in July
    - **64.5% first service conception**
  - 1600 hd feedlot developed
    - 913 lbs at breeding in July
    - **60.7% first service conception**

## Range Development at Padlock: 2015

Item	Range Developed	Feedlot Developed
Number hd	1093	1026
May Wt (May 3-11), lbs	662	802
AI Wt (July 23), lbs	836	902
ADG (May-July), lbs	2.36	1.22
Total Cost (120 d)	\$84	\$144

## Fort Keogh Research

- Cows managed with marginal or adequate supplementation during the winter (8yrs)
- Progeny heavier at 5 yrs of age from dams on marginal vs adequate nutrition
  - BCS was better on marginal progeny

Roberts et al., 2011

## Effect of Protein Supplementation on Subsequent Heifer Performance

Item	No Winter Protein	Winter Protein
Adj. 205-d wt, lb	481 <sup>a</sup>	498 <sup>b</sup>
Age at Puberty	334	339
Pregnant %	80 <sup>a</sup>	93 <sup>b</sup>

P ≤ 0.05

Martin et al., 2007

## Cow Efficiency

- Reproduction is a driver in cow efficiency
- Improved reproduction in young cows improves longevity
- Young cow pregnancy may be influenced by management of the cow and the heifer calf

## Looking Ahead

- Learned Grazing Behavior
- Systems of Cow Management
- Fetal Programming

## Look Deeper

- Cause and Effect are distant in time and space
- The areas of highest leverage may not be the most obvious!

Senge, 1990

## Thank You!

