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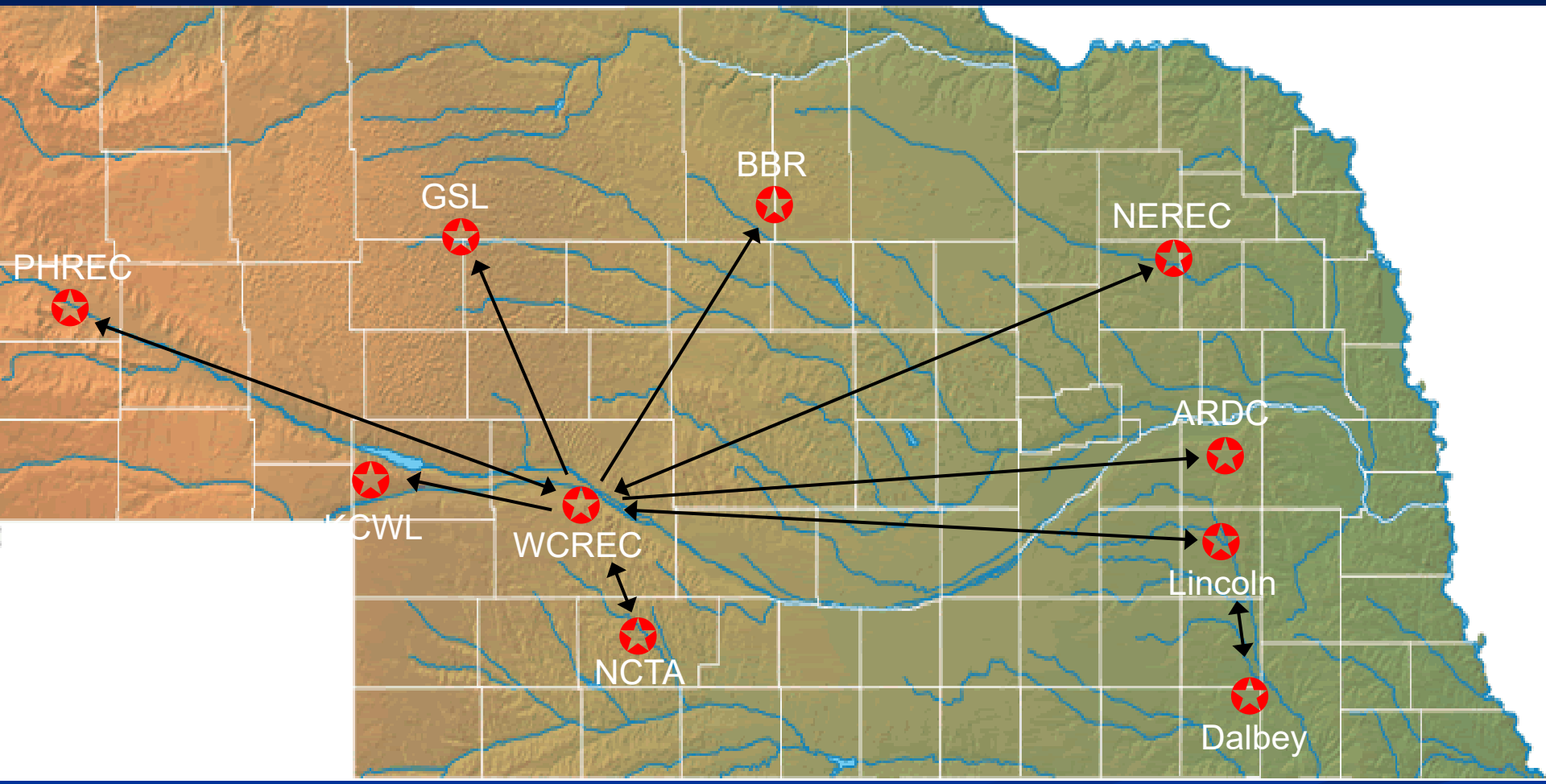
Selection of a calving season
Rick Funston
Reproductive Physiologist
IANR


West Central
Research & Extension
Center
Est. 1903
IANR

UNL – Beef Research and Extension



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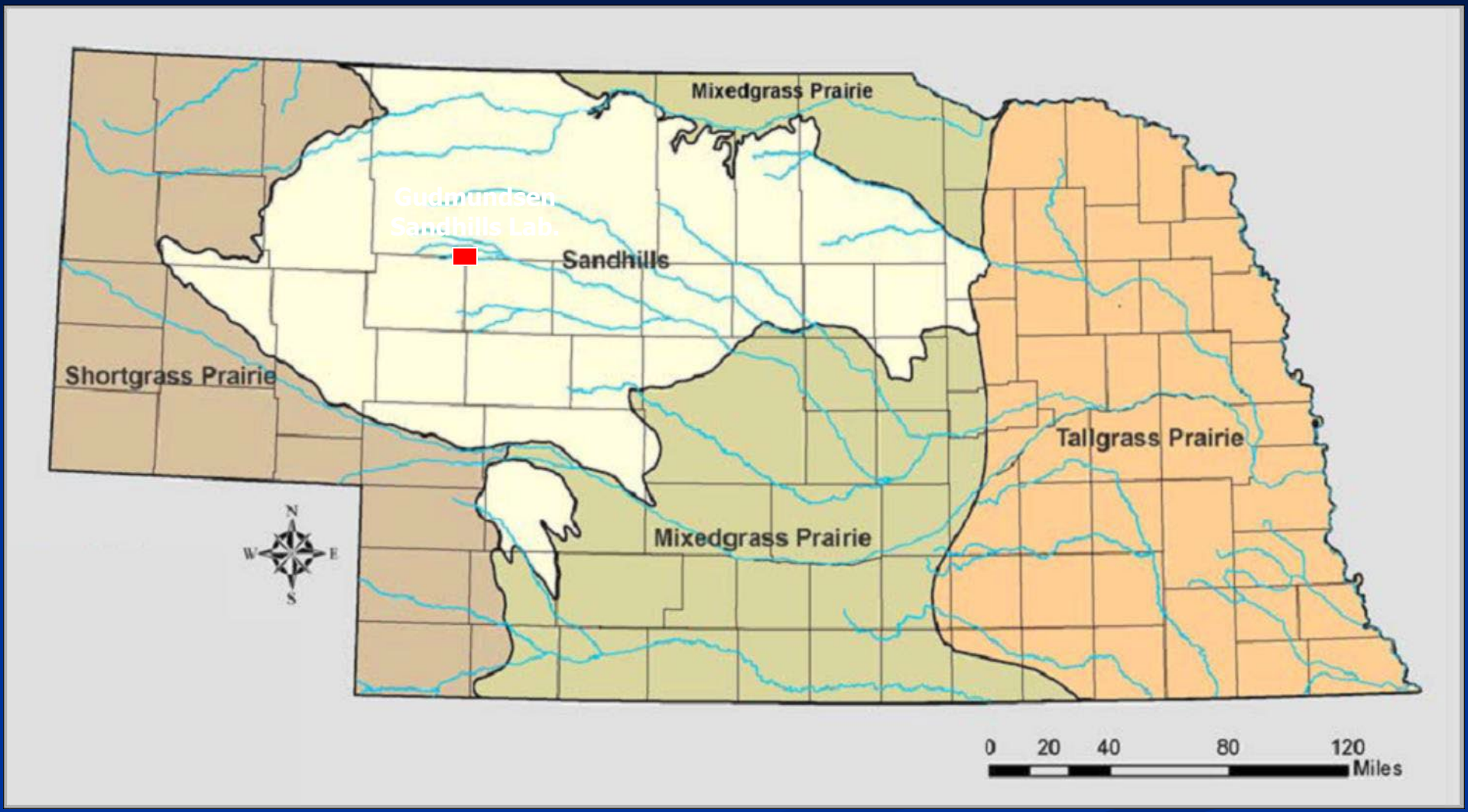
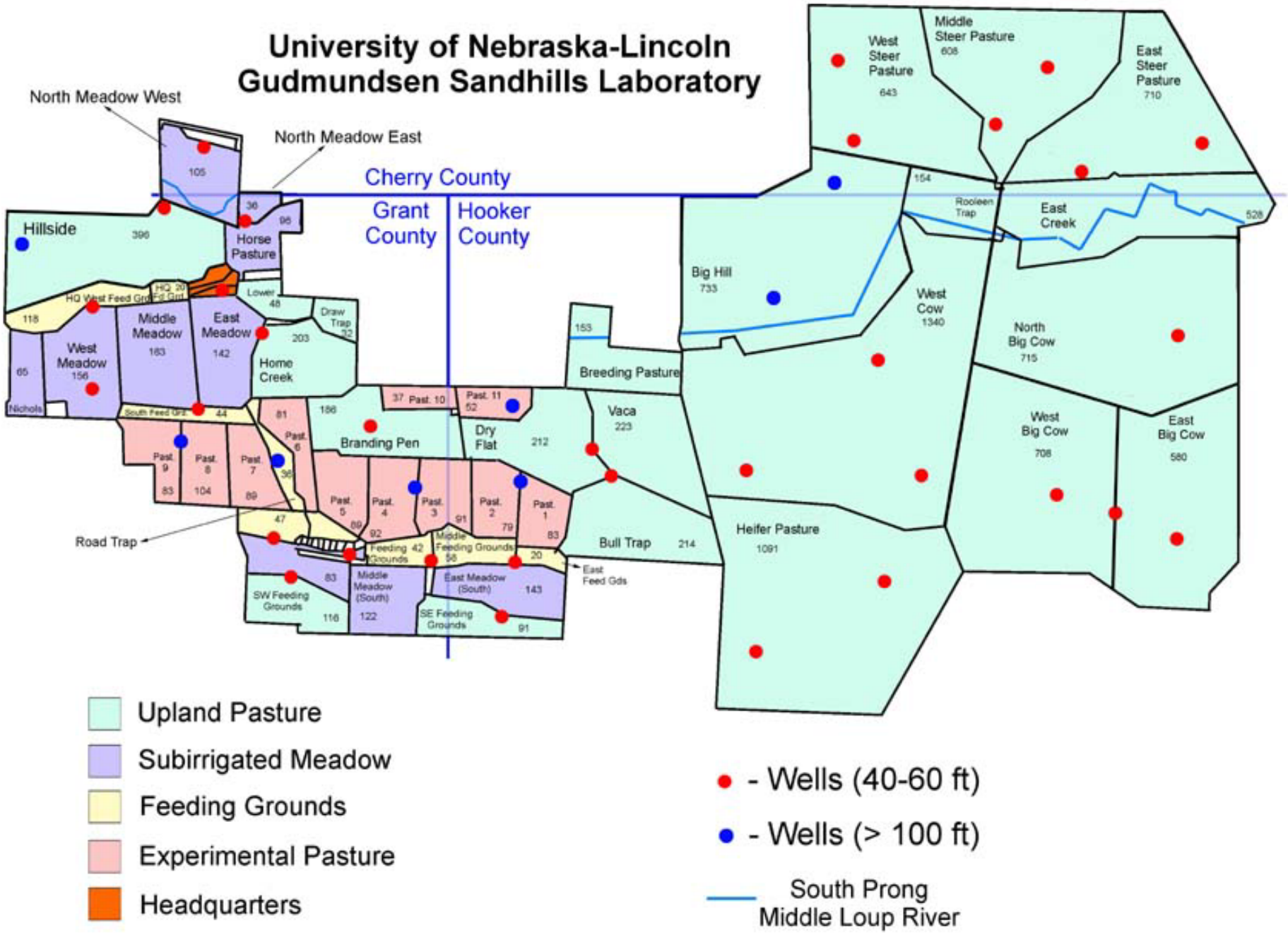

Mixedgrass Prairie
Gudmundsen
Sandhills Lab.
Sandhills
Shortgrass Prairie
Tallgrass Prairie
Mixedgrass Prairie
N
W
E
S
0
20
40
80
120
Miles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Gudmundsen Sandhills Laboratory
North Meadow West
North Meadow East
Cherry County
Grant County
Hooker County
Hillside
396
Horse Pasture
Lower 48
HQ West Feed Grd
HQ Pot Plot
Middle Meadow
183
East Meadow
142
West Meadow
156
Home Creek
203
Draw Trap
Nichols
South Feed Grd
44
Branding Pen
186
Past. 10
37
Past. 11
52
Dry Flat
212
Vaca
223
Breeding Pasture
153
Past. 6
Past. 9
83
Past. 8
104
Past. 7
89
Past. 5
89
Past. 4
92
Past. 3
91
Past. 2
79
Past. 1
83
Road Trap
47
Feeding Grounds
42
Middle Feeding Grounds
58
20
Bull Trap
214
East Feed Gds
SW Feeding Grounds
116
Middle Meadow (South)
122
East Meadow (South)
143
SE Feeding Grounds
91
Heifer Pasture
1091
Big Hill
733
West Steer Pasture
643
Middle Steer Pasture
608
East Steer Pasture
710
154
Rooleen Trap
East Creek
528
West Cow
1340
North Big Cow
715
West Big Cow
708
East Big Cow
580
Upland Pasture
Subirrigated Meadow
Feeding Grounds
Experimental Pasture
Headquarters
- Wells (40-60 ft)
- Wells (> 100 ft)
South Prong
Middle Loup River


BEEF
SYSTEMS
RESEARCH
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5412
5372


Over 2/3 of annual cow costs are due to nutrition
Calving time and Weaning time
can greatly influence this cost

Time of Calving

How Will Changing Calving Time Affect:

- ✓ Winter Feed Requirements
- ✓ Range Forage Utilization
- ✓ Cow Productivity
- ✓ Calf Productivity - At Weaning and Postweaning
- ✓ Opportunities for Alternative Postweaning Strategies
- ✓ Overall Profitability

	Season of Calving		
Risk	**Winter**	**Spring**	**Summer**
Harvested Feed	**High**	**Moderate**	**Low**
Bad Weather	**High**	**Moderate**	**Low**
Weaning Weight	**High**	**Moderate**	**Low**
Labor Conflicts	**Low**	**Moderate**	**High**

Introduction

- Grazing during the winter reduces costs (Havens et al.2006)
  - increases net returns in beef systems compared to feeding harvested forages (Adams et al. 1996)
- Producers usually provide harvested forage
  - cow/calf producers feed an average of 2938 lbs of hay per cow each year (Clark et al. 2004)
- Protein supplement fed to spring-calving cows grazing winter range
  - No benefit to cow pregnancy rate in a March calving herd
  - Fetal Programming
  - prevents decreased weaning rate, (Stalker et al., 2006)
  - prevents decreased weight at weaning and harvest, (Stalker et al., 2007; Larson et al., 2009),
  - Increases quality grade (Larson et al., 2009)

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Introduction

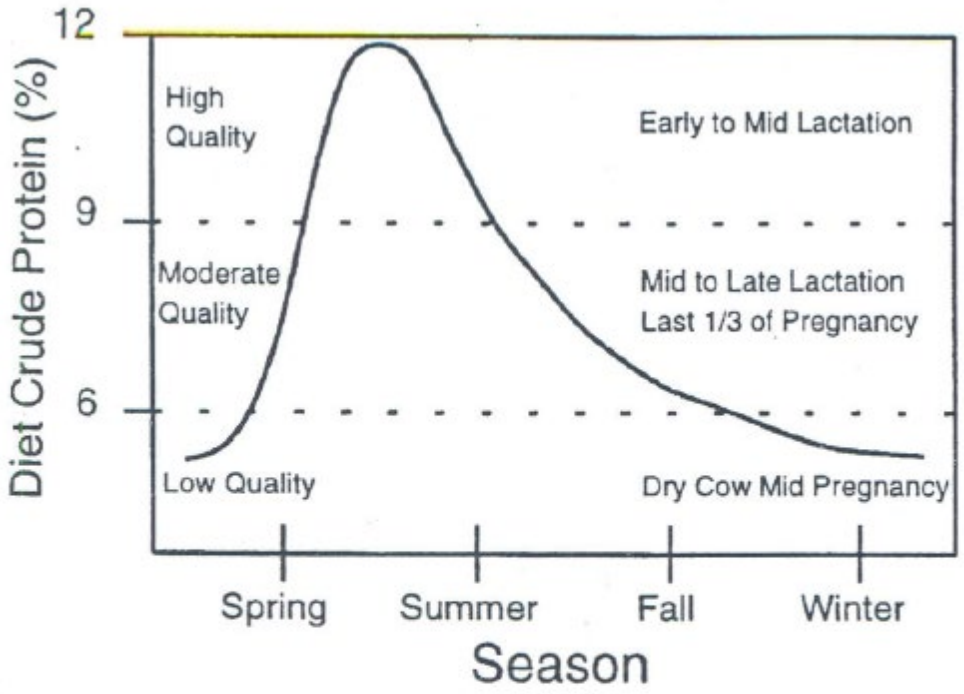
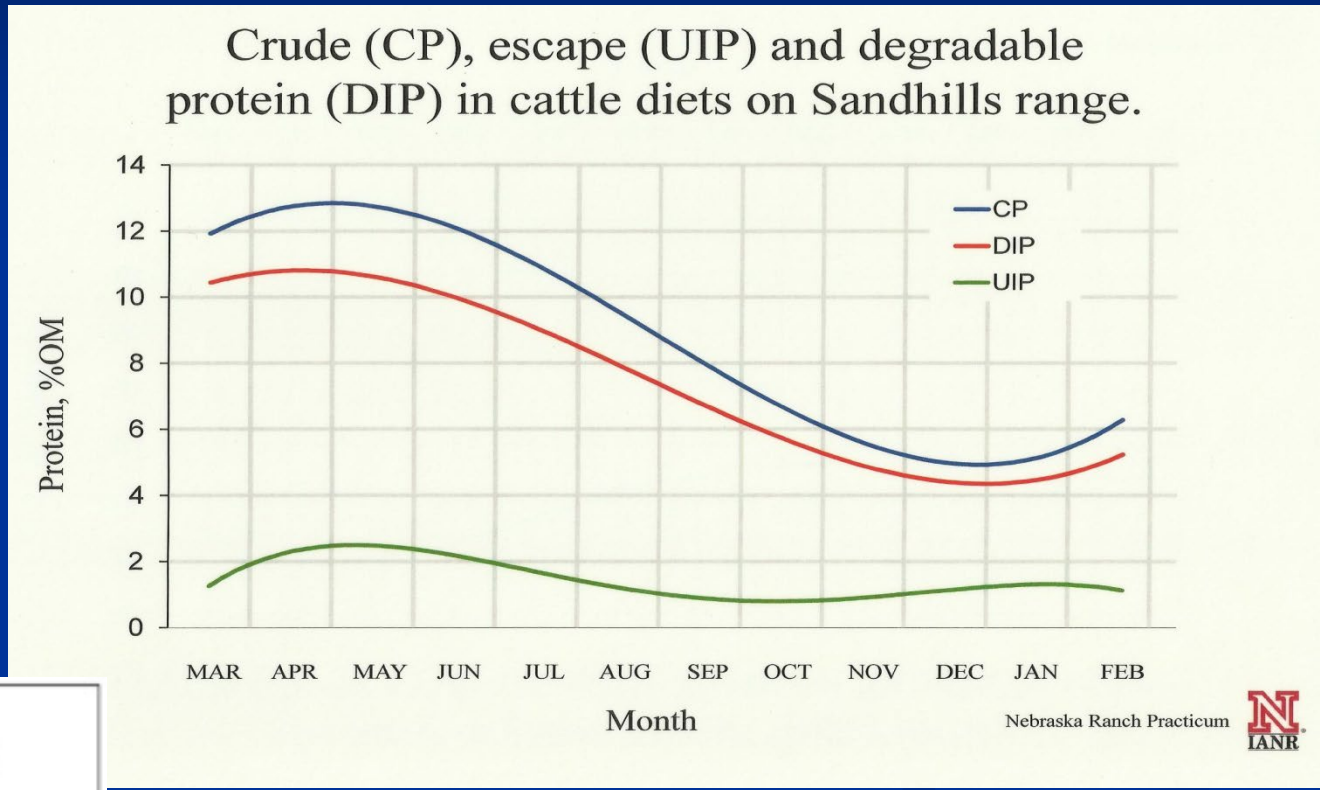
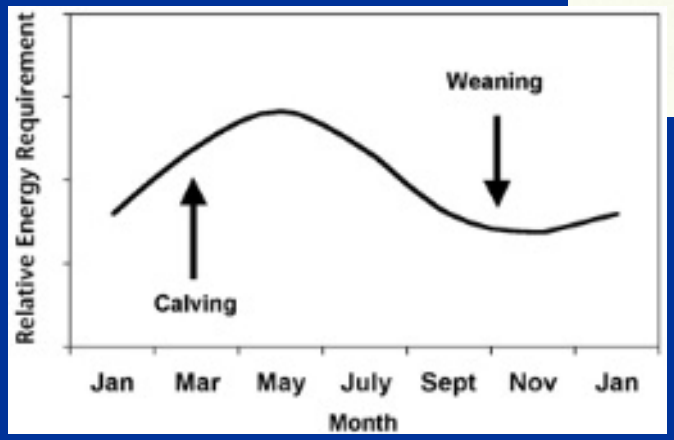


Fig. 3. *Matching the cow with forages: General seasonal changes of crude protein (forage quality) in association with requirements at different levels of lactation and stages of pregnancy. Actual relationship of crude protein and season is dependent on location and plant community composition.*

Introduction





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Calving Season

- The amount of harvested feed required to maintain cows is related to calving date (Adams et al., 1996)
- Traditional March calving date, range resources are dormant (Supplementation)
- Leads to increased cost/cow (Stockton et al., 2007)

Matching cow nutrient requirements and peak forage quality

- "Choosing a late spring calving date that matches peaks in forage quality with peak lactation has the potential to reduce costs." (Stockton et al. 2007).
- High nutrient requirements during lactation are met through high quality grazed forage as apposed to supplement
- Low nutrient requirements during mid-gestation are matched with low forage value of dormant forage.
- Extended grazing period.
- Less harvested feed needed per animal.

Wintering System

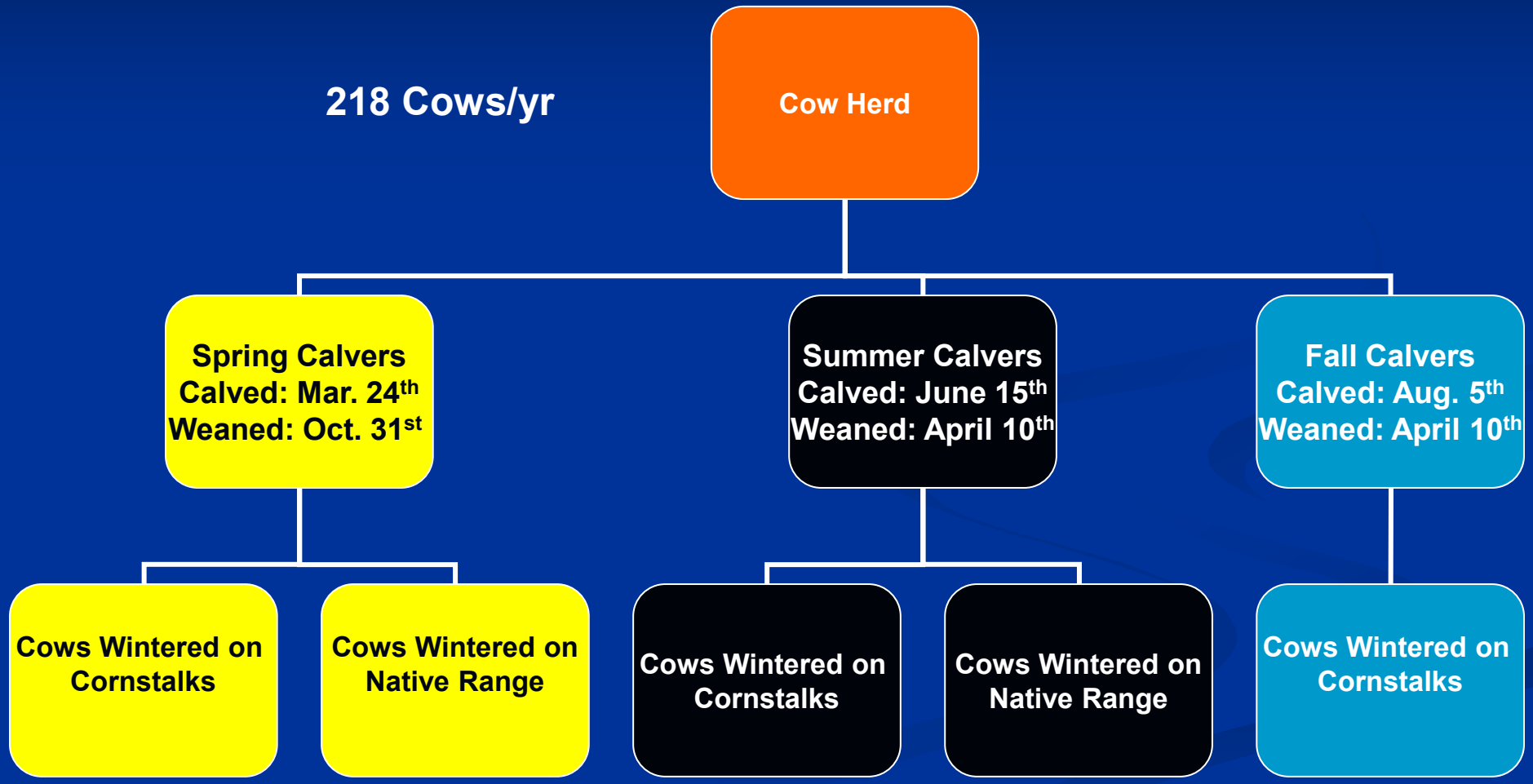
- Use of cornstalk residues can be advantageous in beef production systems (Guteirrez-Ornelas, 1989).
- Increasing stocking capacity of the ranch by using forage resources away from the ranch
- Could be cost effective way to winter cattle

Objectives

To determine the effect of 1) calving season and 2) wintering system on cow and subsequent calf performance


Cow
Treatments

Cow Management



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Calving Date Performance

Item	SP	SU	FA
Cow BW			
Pre-calving, lb	1172^{c}	1251^{b}	1384^{a}
Pre-breeding, lb	1055^{c}	1254^{b}	1296^{a}
Weaning, lb	1102^{b}	1154^{a}	1142^{ab}
Cow BCS			
Pre-calving	5.3^{c}	5.9^{b}	6.6^{a}
Pre-breeding	5.3^{b}	6.1^{a}	6.0^{a}
Weaning	5.1	5.1	5.0

^{a,b,c}Means with different superscripts are different

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Calving Date Performance

Item	SP	SU	FA
Calved, %	98.4	97.1	94.4
Calves weaned/cow[1]	0.947	0.937	0.949
Rebreeding, %	93.6	93.2	90.0

[1]P-value for FA vs SP = 0.08; SU vs. FA = 0.13; represented as per cow exposed

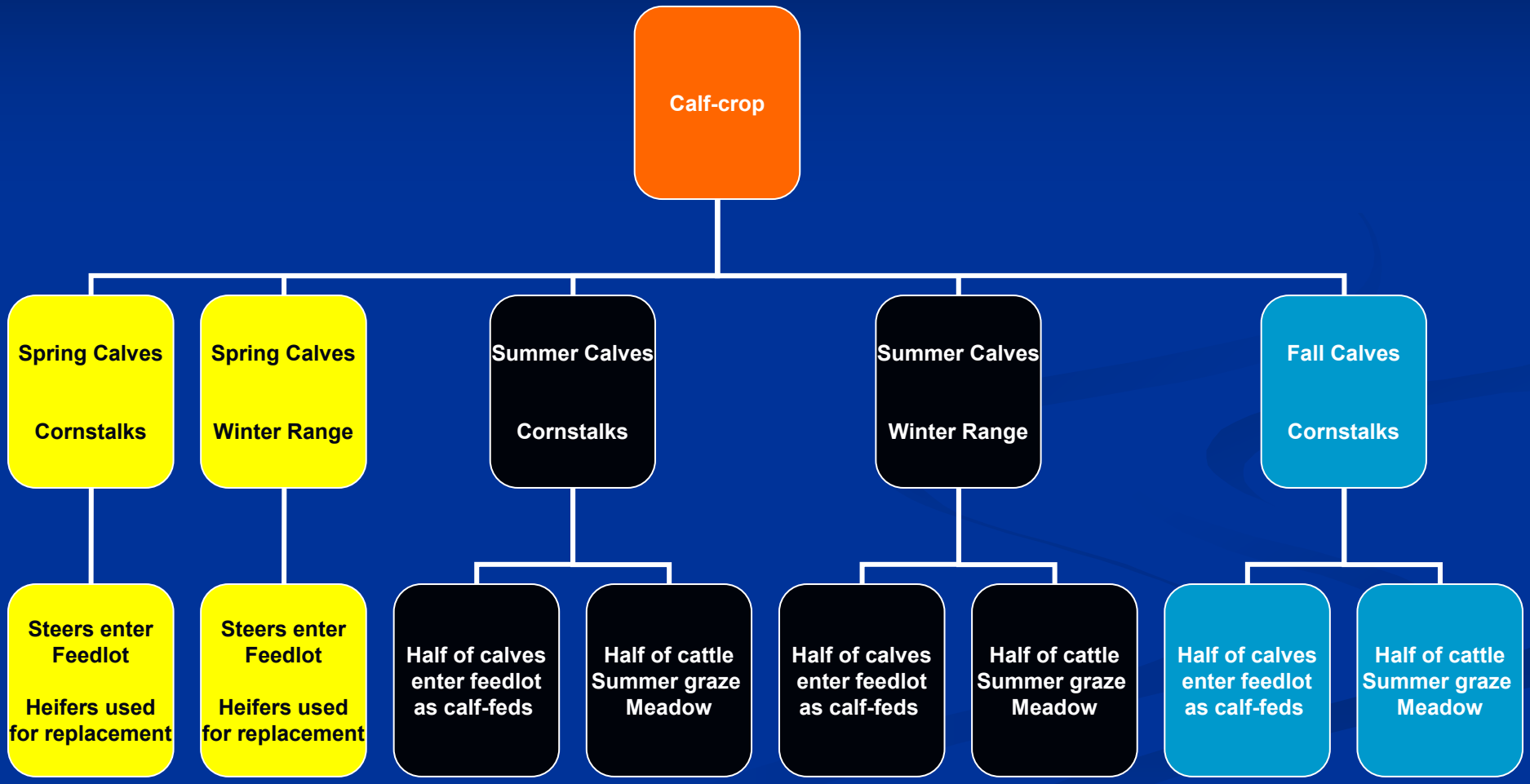
[a,b,c]Means with different superscripts are different

Conclusions (Cow Performance)

- Changes in body condition score and BW
- Weaning weight differences are a function of days of age at weaning
- Spring born calves gain faster from calving to weaning than SU and FA calves, SU have the lowest gain
- Wintering cows on stalks shows similar performance to wintering on range

Calf Treatments

Calf Management



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WINTER PAIRS WITH DISTILLERS

Calving Date Performance

Item	SP	SU	FA
Calf Performance			
Birth, lb	81	83	84
Pre-breeding, lb	203[a]	231[b]	226[b]
Weaning, lb	523[b]	558[a]	514[b]
Calf ADG, lb/d	2.00[a]	1.60[c]	1.74[b]
Adj. Weaning, lb	491[a]	410[c]	441[b]

[a,b,c]Means with different superscripts are different

Calving Season (Observed)

Item	SP	SU	FA
Feedlot initial, lb	537[b]	592[a]	530[b]
Final BW, lb	1313[c]	1430[a]	1371[b]
Days fed, lb	217	212	217
G:F	0.174[a]	0.162[b]	0.169[ab]
HCW, lb	827[c]	900[a]	865[b]
Fat thickness, in	0.52	0.55	0.53
% Choice	86.1[a]	84.9[a]	72.6[b]
% Over 1000 lb	0.5[b]	7.9[a]	2.2[b]

Calving season and Calf Performance

Observed:

- SU heavier at feedlot entry than SP and FA
  - HCW follows same trend with SP lightest
- G:F greater for SP intermediate for FA and lowest for SU
- Lower quality grade for FA calves

Adjusted:

- No differences in performance

Objectives

To evaluate the effects of grazing dormant Sandhills winter range or meadow, with or without supplementation, on cow performance and the effects of post-weaning management on subsequent growth and performance of progeny.

Treatments

Cow Trt. 2nd Trimester

MNS, MS, RNS, RS

1-1

Calf Overwinter Trt.

5-15

Hay + 4lbs supplement

Meadow + 1lb supplement

½ Steers

½ Steers & Heifers

NP Feed Yard

Graze Range at GSL

9-30 Steers to NP

Heifers

Bred for replacements (Sup Trt)

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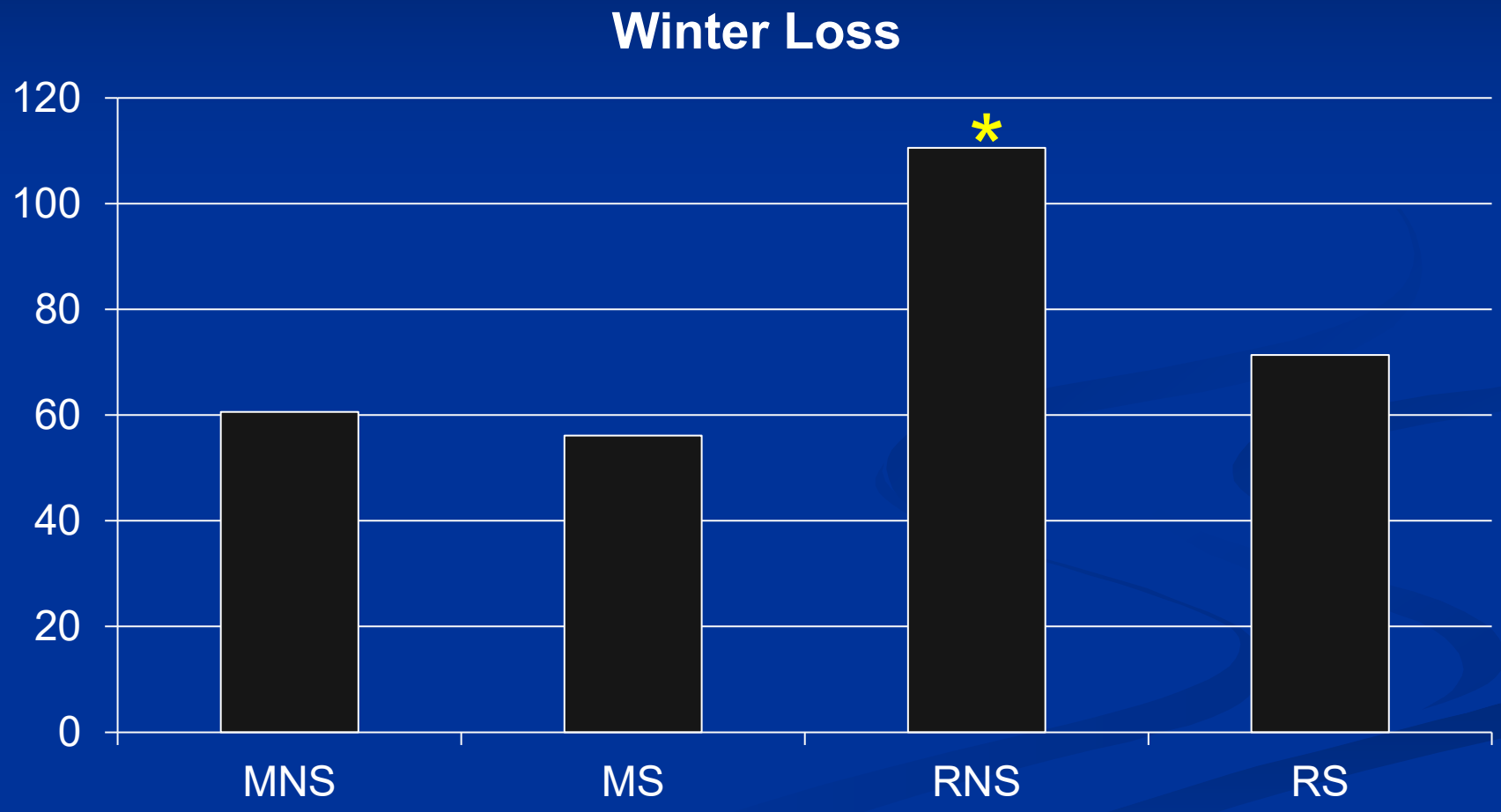
Cow Performance

Effects of Winter pasture and supplementation on Cow performance



* = P<0.05

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Effects of Winter pasture and supplementation on Cow performance

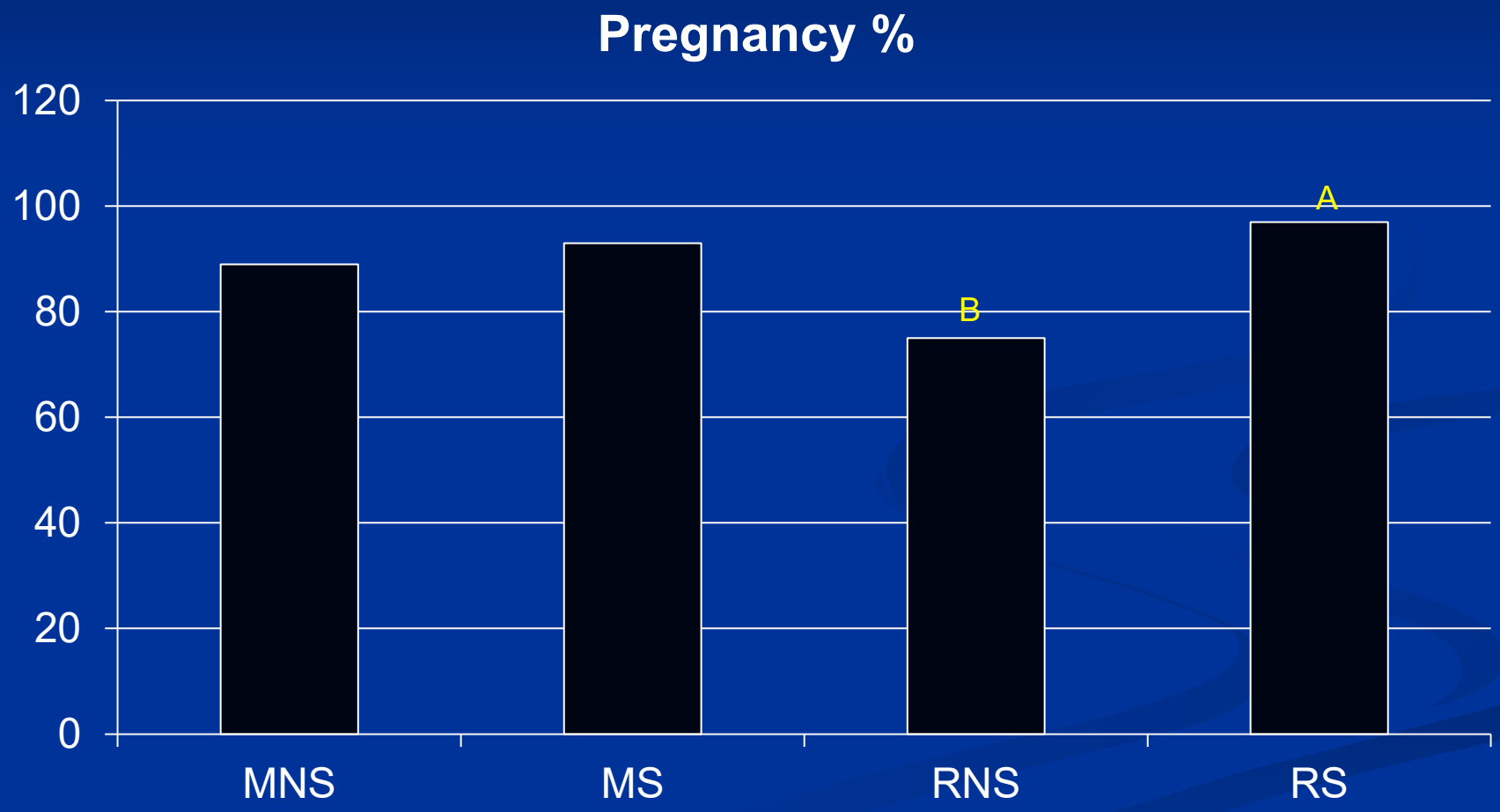

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Table 1. Effects of winter grazing treatment and supplementation on cow and calf performance.

Item	Meadow		Range		P-values		
	NS	S	NS	S	Grazing Effect	Suppl. Effect	Interaction
Cow performance							
Pre-Winter BW, lb	940	941	926	934	0.076	0.416	0.522
Pre-Winter BCS	4.6	4.6	4.7	4.6	0.333	0.036	0.742
Calving BW, lb	1037	1055	959	1019	0.004	0.031	0.213
Calving BCS	4.6	4.7	4.5	4.7	0.453	0.084	0.453
Winter BW Gain, lb	97	116	34	86	0.005	0.022	0.240
Winter BCS Gain	-0.1	0.1	-0.2	0.1	0.350	0.008	0.501
Pre-breeding BW, lb	1081	1098	1070	1091	0.457	0.131	0.850
Pre-breeding BCS	5.5	5.6	5.6	5.6	0.485	0.057	0.485
Pregnancy Rate, %	91.67^{a}	85.85^{ab}	77.45^{b}	85.05^{ab}	0.033	0.874	0.050
BW at Weaning, lb	969	969	961	961	0.334	0.987	0.987
BCS at Weaning	4.5	4.4	4.5	4.4	0.768	0.062	0.162
Lactation BW Gain, lb	-62	-84	-2	-54	0.038	0.075	0.446
Lactation BCS Gain	0.0	-0.3	0.0	-0.3	0.892	0.026	0.892
Calf Performance							
Calf Birth BW, lb	79.0^{a}	79.4^{a}	74.4^{b}	78.8^{a}	0.025	0.036	0.073
Calf Weaning BW, lb	436^{a}	436^{a}	413^{b}	438^{a}	0.143	0.081	0.076

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TOC Pregnancy Rate

Trait	March	June	August
% Pregnant	93.5	93.0	90.3
	May		
2010 3s	65		
Older	93		
2011 3s	75		
Older	93		
Heifers		High 64	Low 52

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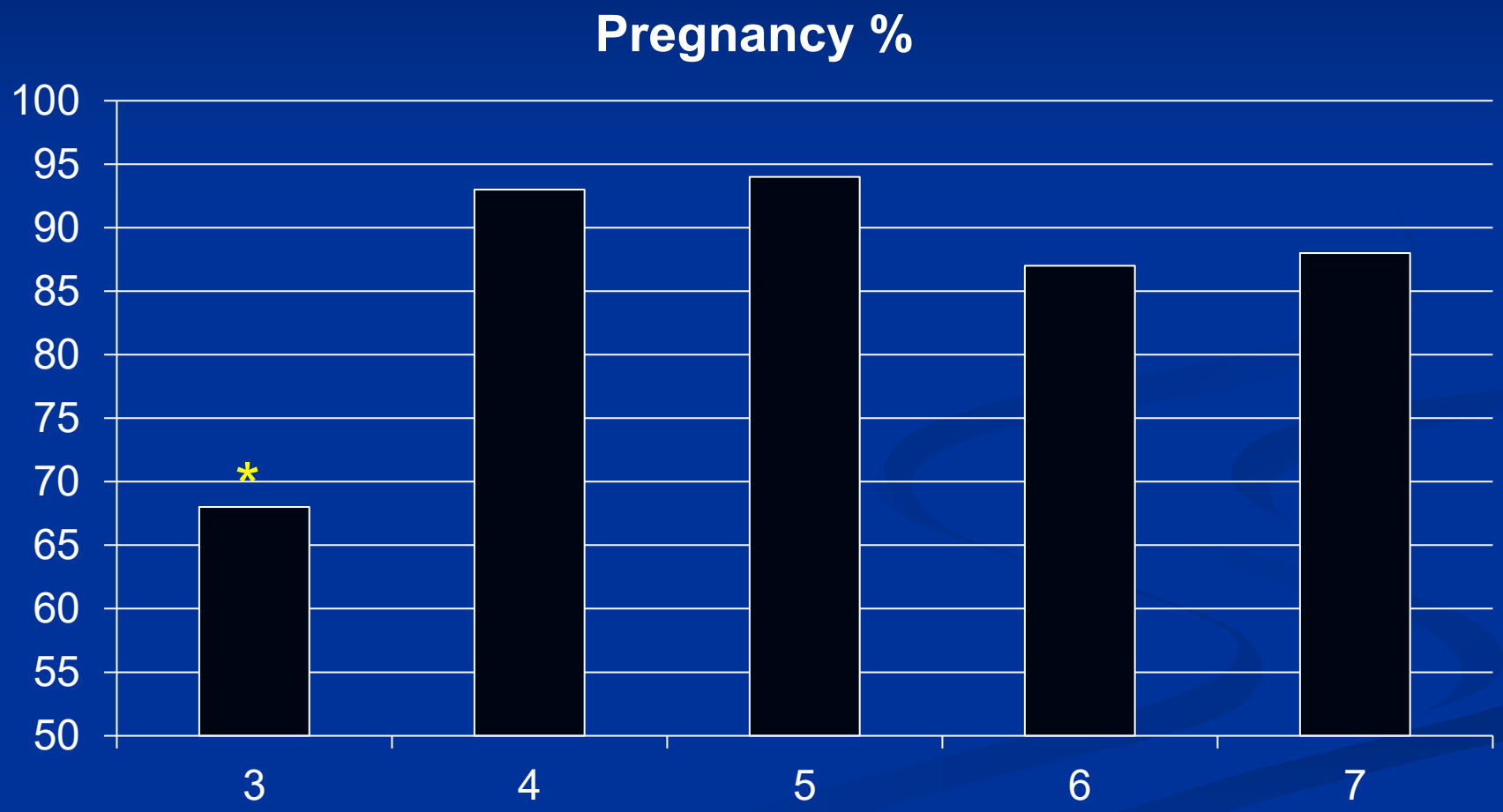
Effect of Age on Cow Pregnancy %



* = P<0.05

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Impact of heifer development system on subsequent ADG and reproduction in two breeding seasons

Introduction

- Reduced input heifer development systems have resulted in similar pregnancy rates compared to higher input systems (Funston & Deutscher, 2003; Martin et al., 2008, Eborn et al., 2013)

- Clark et al., (2005) found that it is an economically viable system to retain more heifers, develop under a low input system, sell open heifers

Objective

Determine the effect of reduced input overwinter supplementation on heifer ADG and reproductive performance in

Materials and Methods

- **Treatment duration was mid-January to mid-April**

Hay	Meadow
-Ad libitum hay -1.81 kg/d supplement	-Allowed to graze meadow -0.45 kg/d supplement

- **29.0% CP supplement cube containing;**
  processed grain by-products, plant protein products, roughage products, calcium carbonate, molasses products, urea, Vitamin A supplement, copper sulfate, zinc oxide, manganese sulfate, and monensin.

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Results: March Heifers

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March Heifer Body Weight by Treatment

	Hay	Meadow	SE	*P* - value
Weaning BW, lb	414	420	2.7	0.63
Post Treatment BW, lb	675	605	3.4	**<.01**
Pre Breeding BW, lb	701	660	3.6	**<.01**
Pregnancy Diagnosis BW, lb	807	774	4.5	0.25
Pregnancy, %	88	86		

Results: May Heifers

May Heifer Body Weight by Treatment

	Hay	Meadow	SE	*P* - value
Weaning BW, lb	425	425	2.40	0.91
Post Treatment BW, lb	596	510	2.72	**<.01**
Pre Breeding BW, lb	711	645	3.36	**<.01**
Pregnancy Diagnosis BW, lb	805	752	3.22	**<.01**
Pregnancy, %	66	61		

Conclusion

- During the treatment period, heifers fed hay gained more
- Meadow heifers experienced a compensatory gain resulting in similar body weights
- No differences in pubertal status or pregnancy rates
- Meadow treatment resulted in a $68.40 savings compared to Hay treatment

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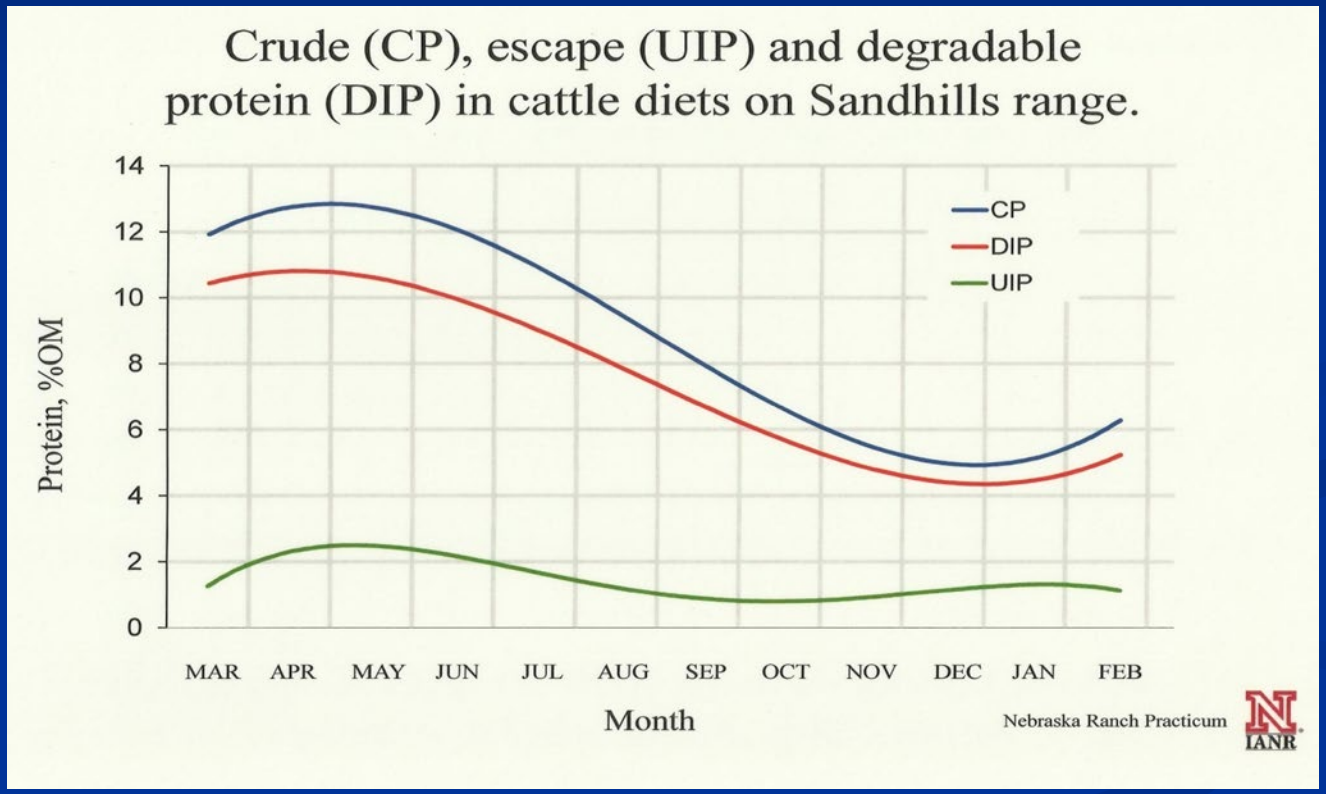
Supplemental Effects on Heifer Pregnancy %



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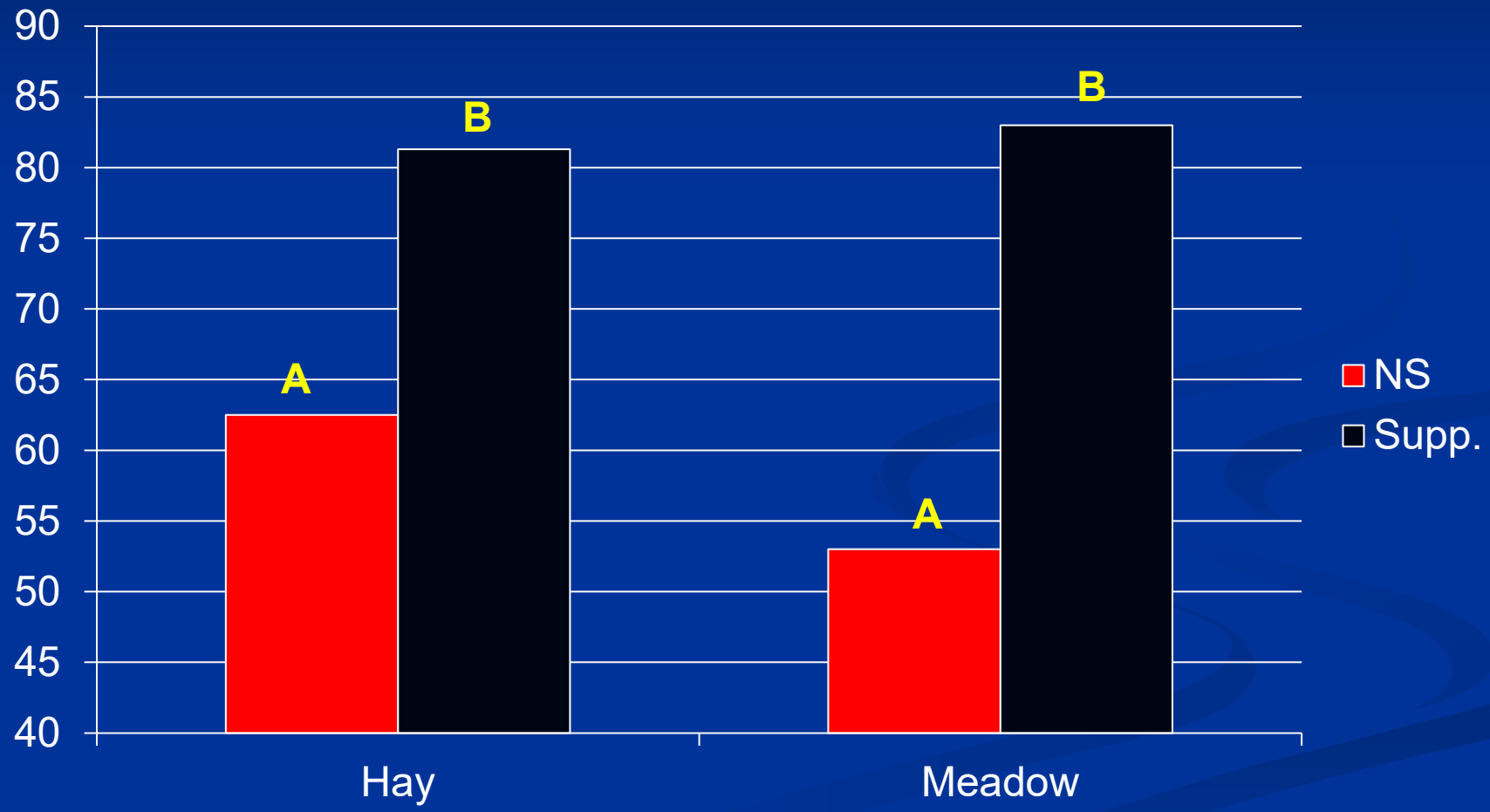
Supplemental Effects on Heifer Pregnancy %



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Steer Performance

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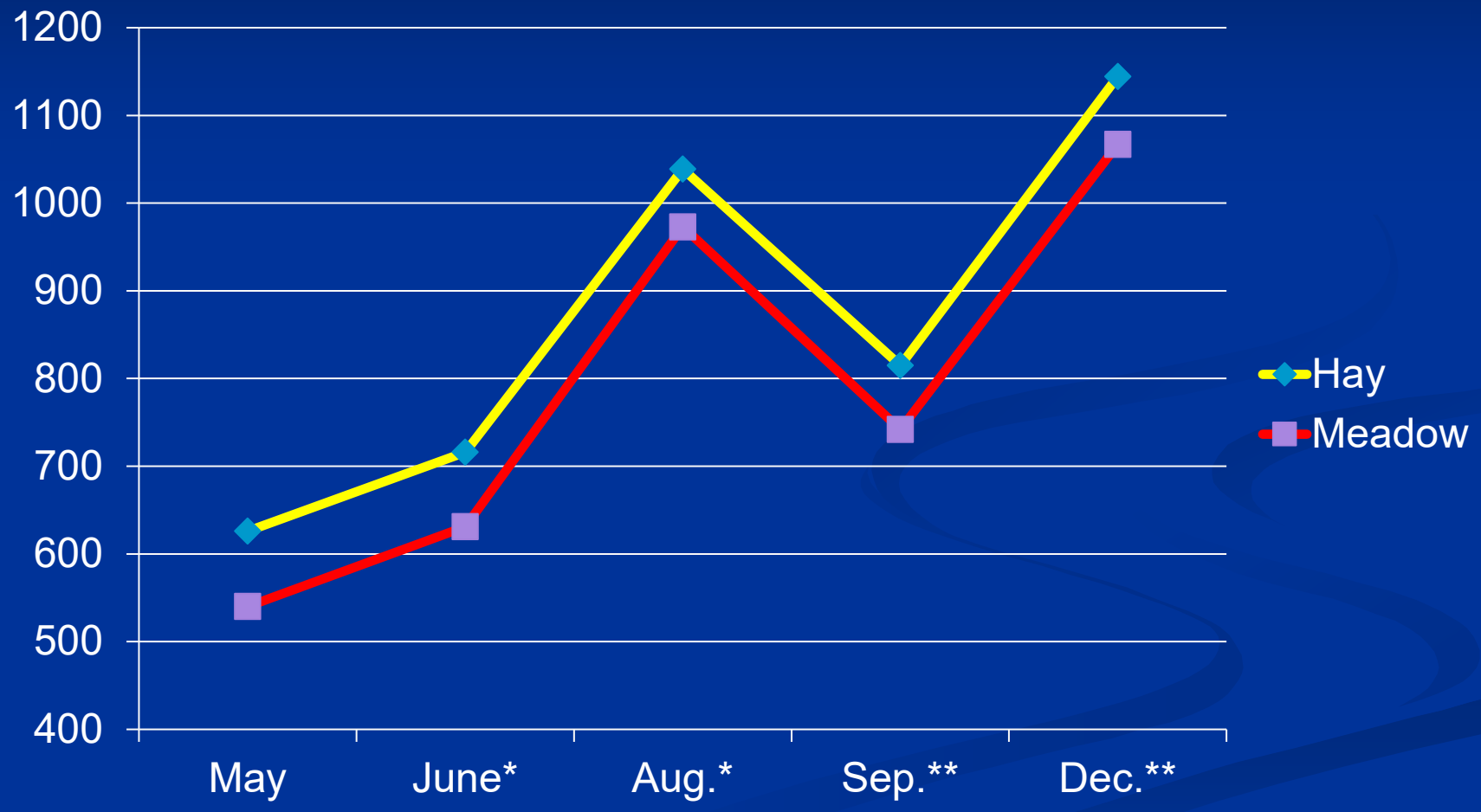
Effects of Winter Treatment on Steer Performance



* Early shipped NP steers only
**GSL steers grazed to September only

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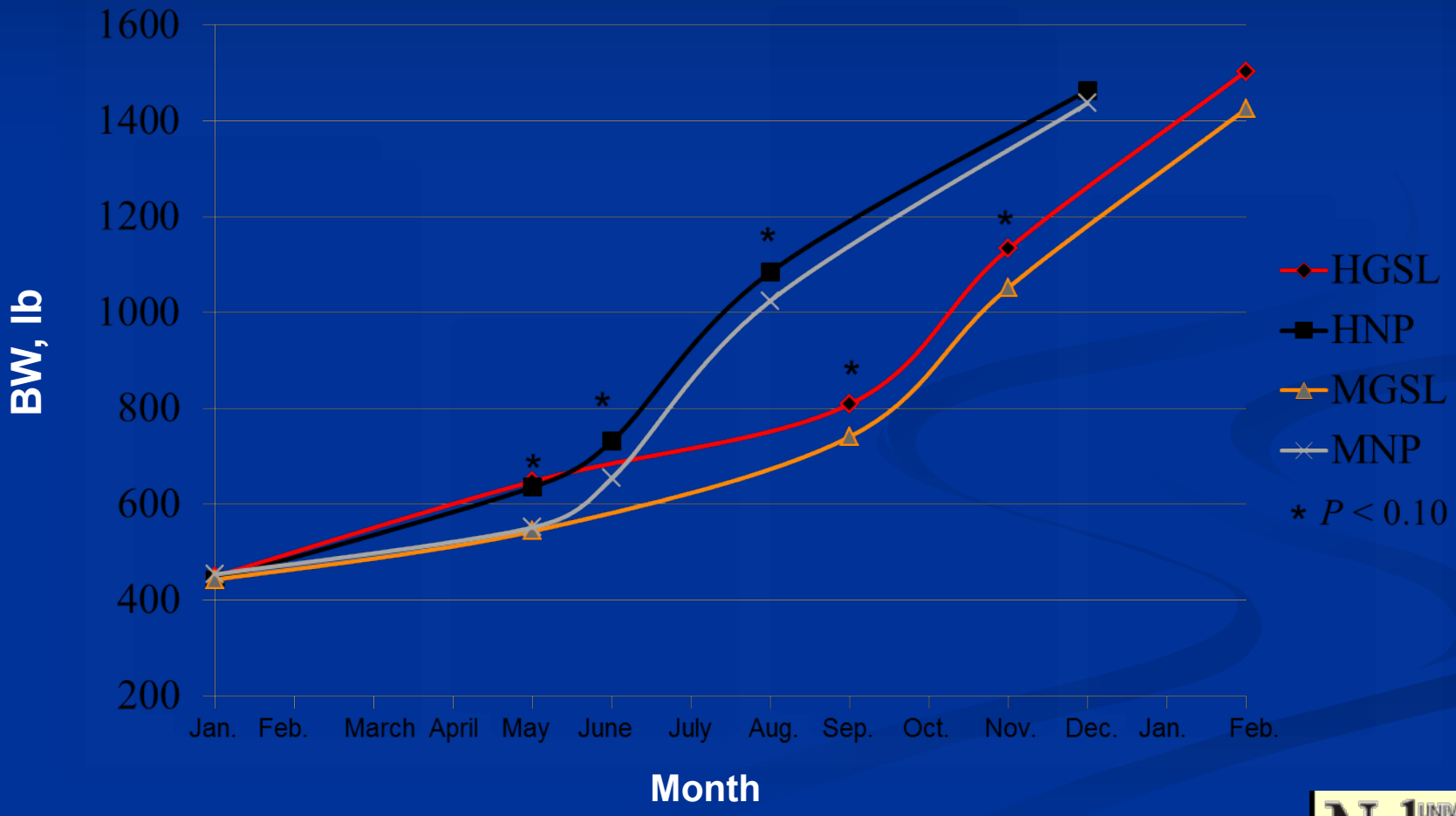
Table 2. Effects of winter treatment and feedlot system on steer performance

Item	Hay		Meadow		P-value		
	Yearling-fed	Calf-fed	Yearling-fed	Calf-fed	Winter trt (W)	Feedlot System (F)	W*F
May BW, lb	622	607	534	570	0.009	0.563	0.101
Winter ADG, lb	1.45	1.38	0.76	1.04	0.010	0.533	0.145
Feedlot Entry BW, lb	894	689	827	620	<.001	<.001	0.930
Final BW, lb	1500	1419	1446	1385	0.029	0.001	0.593
HCWT, lb	944	894	908	871	0.019	0.001	0.571
Feedlot ADG, lb	4.15	3.90	4.18	4.11	0.150	0.053	0.285
Marbling	499	475	498	503	0.230	0.363	0.179
Fat thickness, in	0.6	0.6	0.6	0.6	0.674	0.268	0.920
REA, in^2	14.7	14.6	14.6	14.3	0.221	0.237	0.642
Observed DMI, lb	27.5	24.8	26.4	24.2	0.150	<.001	0.679
RFI	0.084	0.215	-0.138	-0.065	0.129	0.523	0.855
GF	0.151	0.159	0.157	0.173	0.006	0.002	0.272

Effects of overwinter treatment and feedlot system on BW



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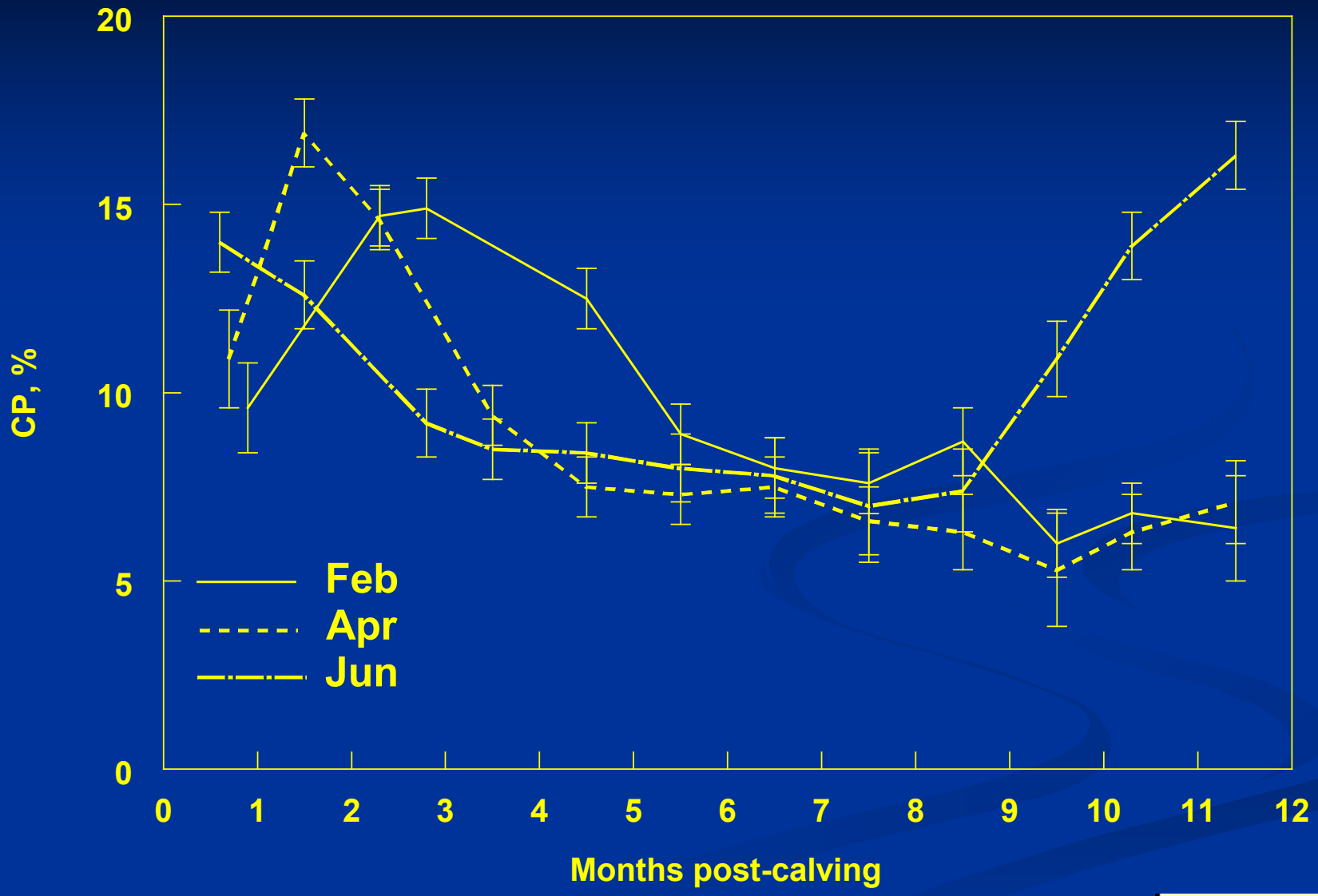
Cost of Early vs. Late Calving

COW MANAGEMENT

3 herds with 35 d breeding season

- February 1 calving
  - Wean in August (190 days of age)
  - Wean in October (240 days of age)
- April 1 calving
  - Wean in October (190 days of age)
  - Wean in December (240 days of age)
- May 25 calving
  - Wean in October (140 days of age)
  - Wean in December (190 days of age)

Diet crude protein



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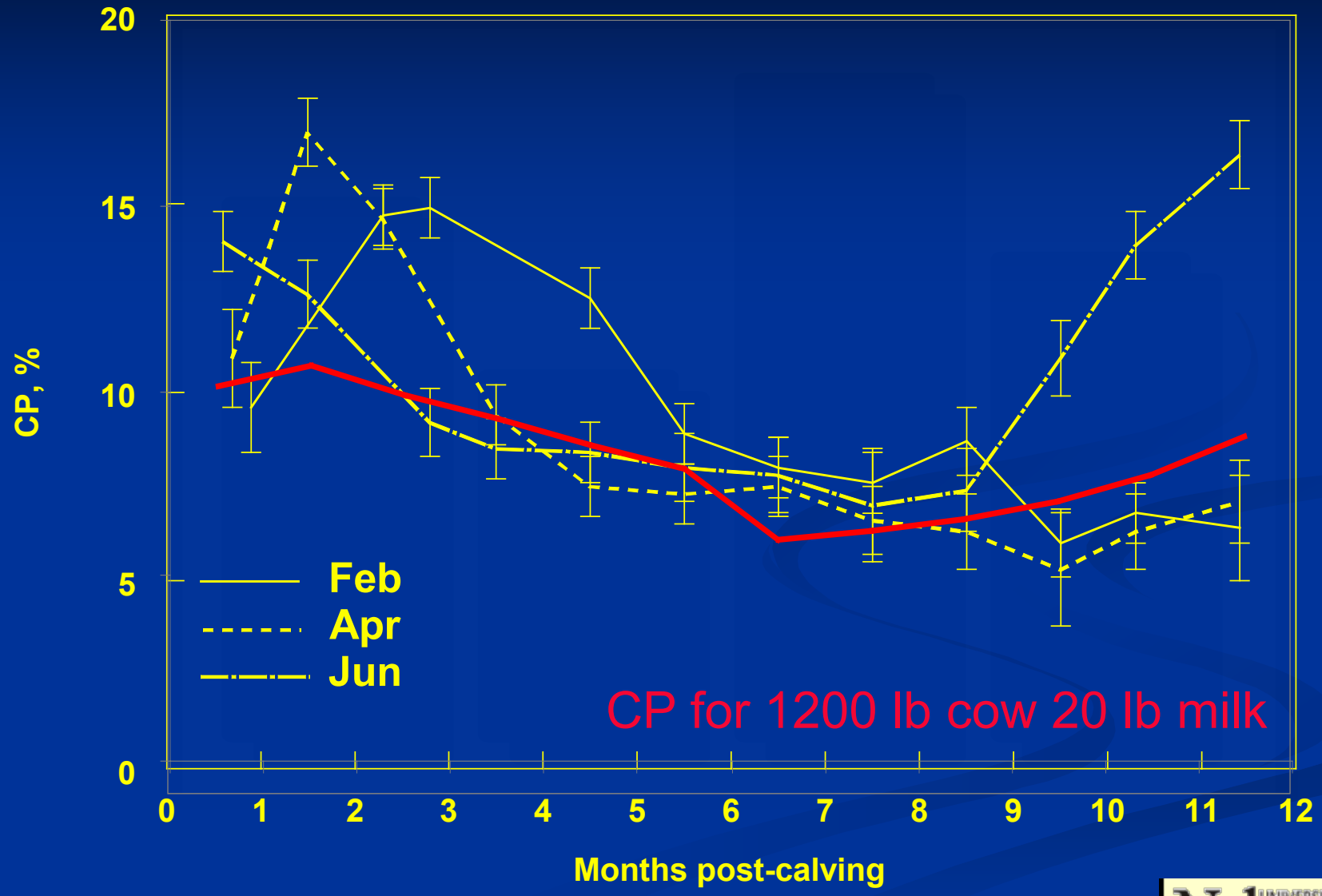
Diet crude protein



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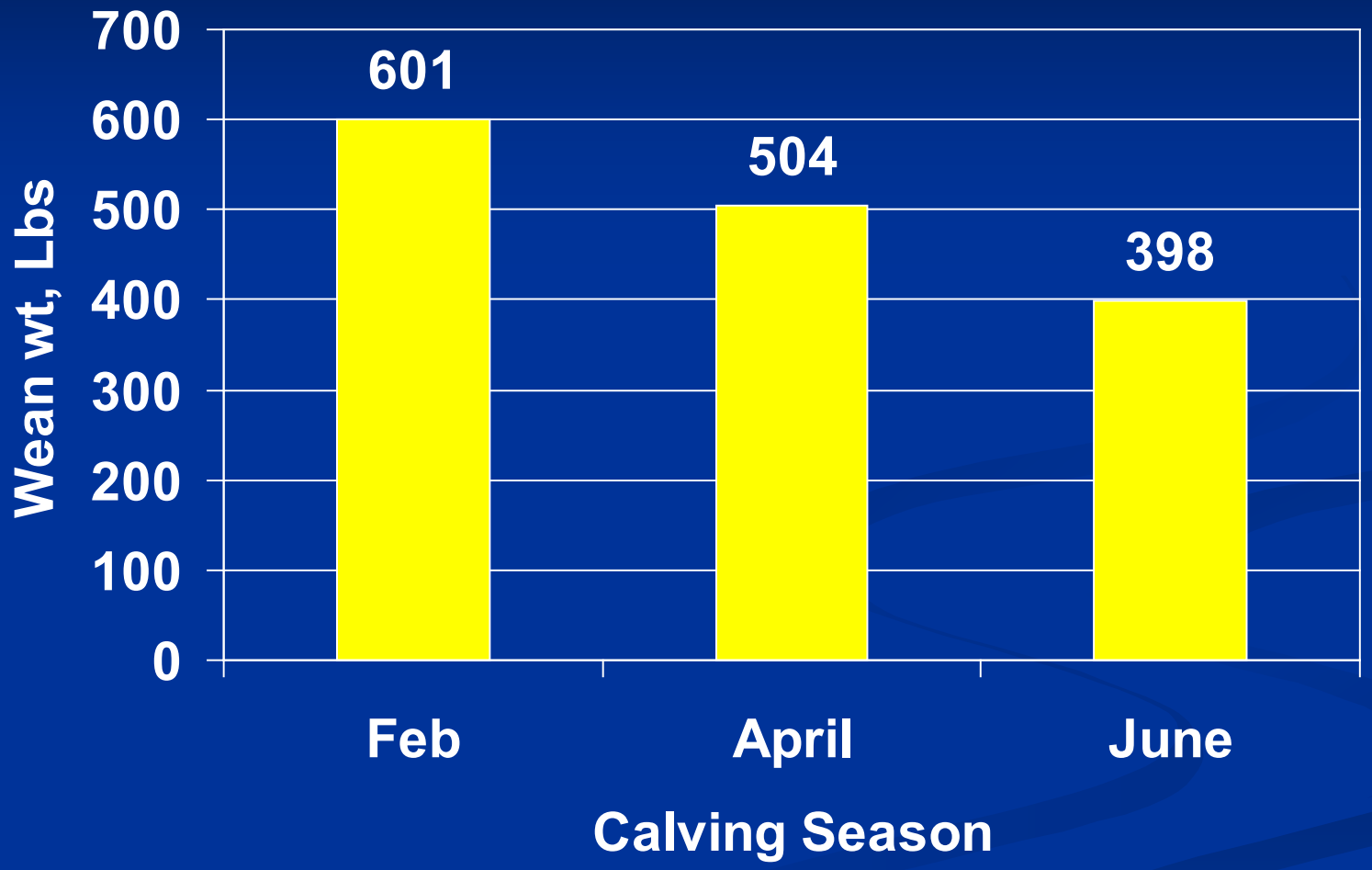
October Wean Wt



Age	240	190	140

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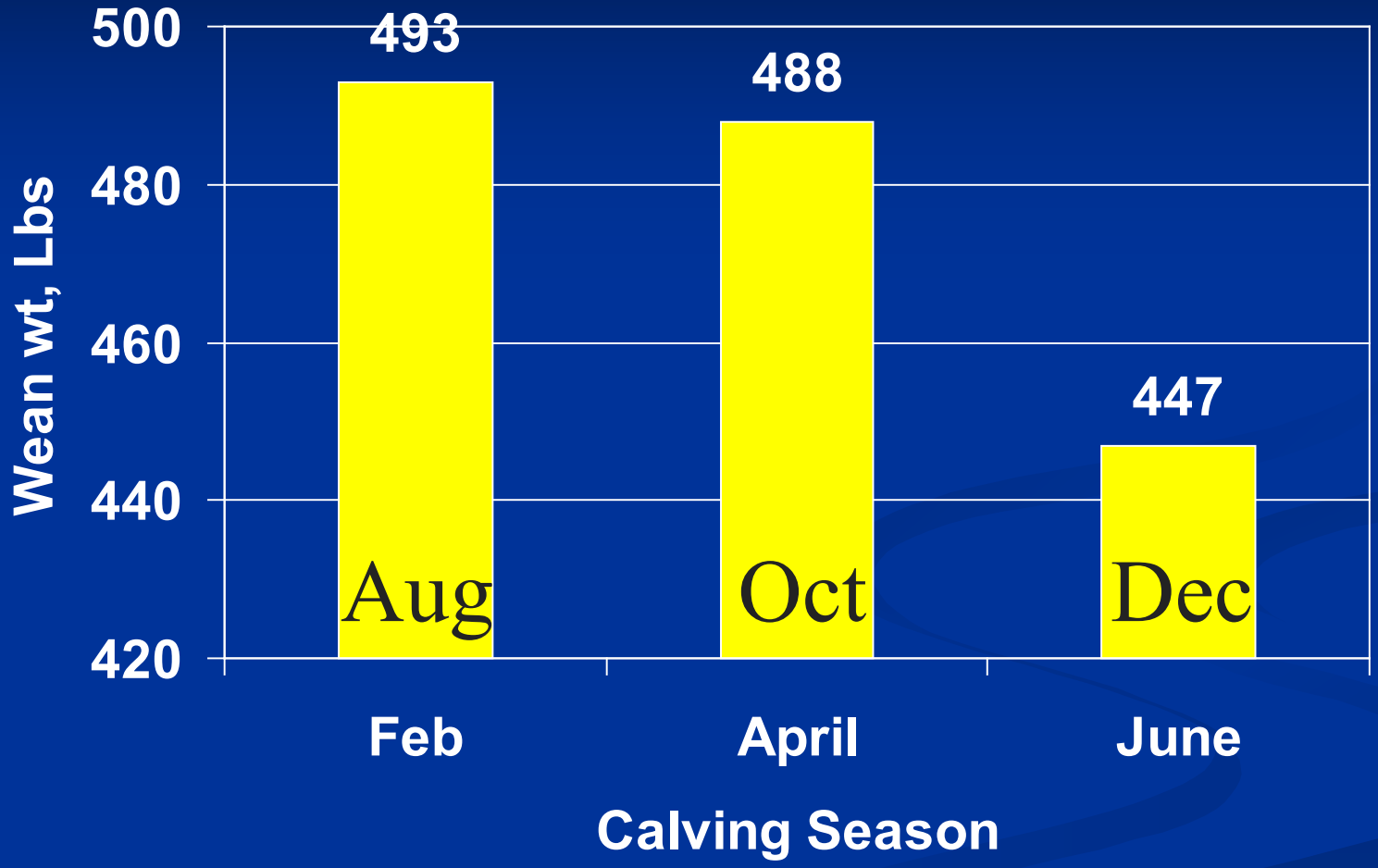
190 day Wean Wt



Approximate Feed Inputs
Lb/cow/year

	Hay	Silage	Cake & grain	Total
February	1914	1023	352	3289
April	2143	220	352	2706
June	1012	-	166	1177

Reproductive performance

- No effect of calving season on pregnancy rates (~87%)
- No effect of previous year's weaning time on pregnancy rates

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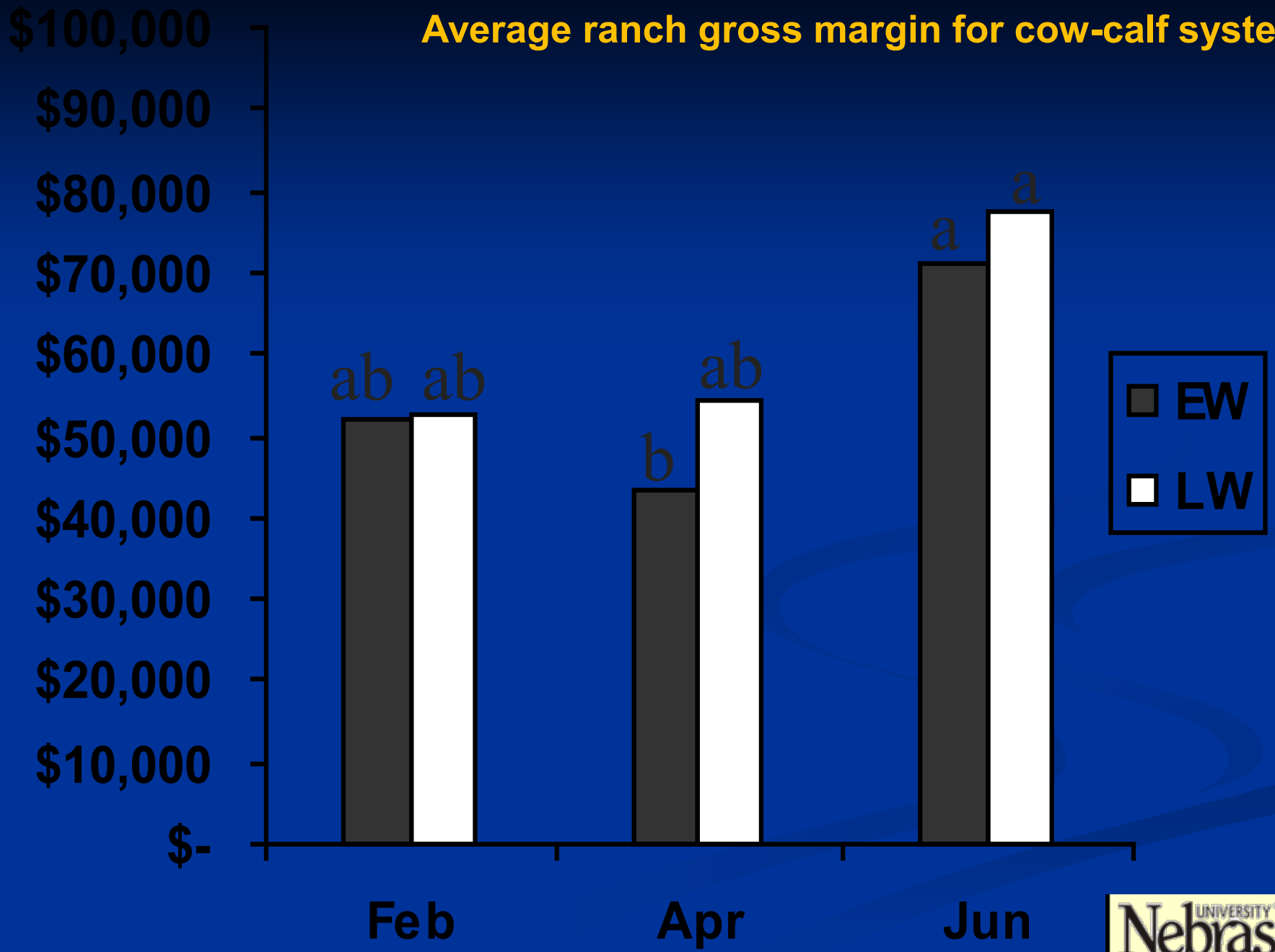
Average ranch gross margin for cow-calf systems



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Summary

	Feb	April	June
Wt change	Most		Least
Peak Milk	Latest		
Tot Milk*	Most		Least
WW (same date)	Most		Least
WW (same age)			Least
Feed inputs*	Most		Least

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Considerations

- Changes entire production cycle, not just calving date
- Can change market
- Must have feed resources

Observations: Later Calving

- Fewer health problems
- Conception rates vary
- Nutrition may be limiting during the breeding season
- Smaller calves at a constant age
- May be offset by higher price/cwt
- Higher calf prices in December and January
- Many have integrated yearling operations
- April may be a good compromise

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Southeast Region

calving date considerations

Heat Stress/Environment

- Combination of high temperature and high humidity
- Extreme heat index potential
- Increased parasite load
- Hurricane season, heavy rainfall, standing water

Potential Challenges

- Reduced reproduction in both the male and female
- Reduced calf performance
  - Parasites
  - Standing Water
- Low nutrient quality of mature/dormant forage
  - Maintaining BCS
  - Low reproductive success

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Southeast Region

Management Strategies

- Breeding and calving timed to avoid high heat index and extremes in weather
- Heat tolerant Bos Indicus crossbreeding
- Aggressive vaccine and parasite treatment schedule
- Supplementation protocol to address nutrient deficits
- Selecting for a cow that matches her environment
  - moderate frame
  - moderate milk production

Questions???

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