Heifer Development Strategies

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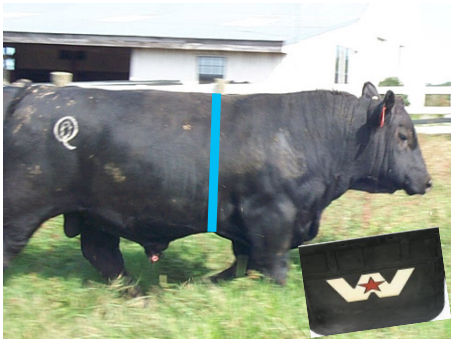
1

Genetics
Physiology
Nutritional Management
Reproductive Technologies
Animal Health
Minerals
Stress

2



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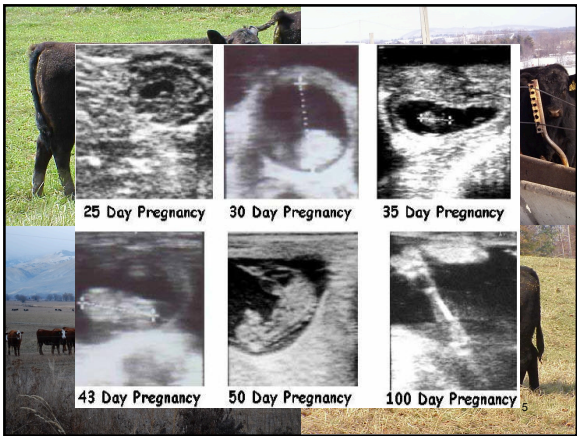

5

A pregnant heifer is not the same as an early pregnant heifer

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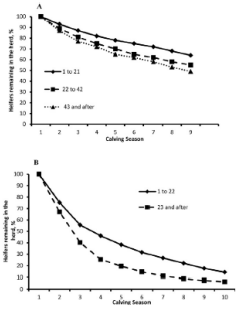
6

Early Calving Is Important



- Heifers becoming pregnant in the first 21 d weaned heavier calves through first 6 lactations.

Cushman et al., 2013

7

Preweaning

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Preweaning growth and ADG

- Weaning weight is negatively correlated with age a puberty. (Patterson et al., 1992)
- Increasing ADG preweaning decreased age at puberty (Arjie and Wiltbank, 1971).

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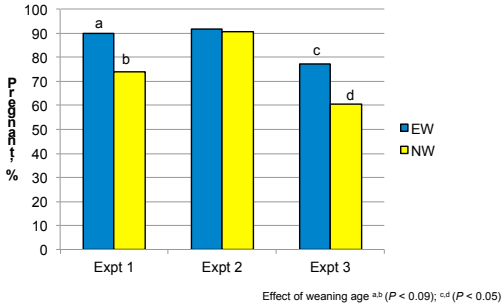
9

Early Weaning and Pregnancy Rate



Effect of weaning age ^{a,b} ($P < 0.09$); ^{c,d} ($P < 0.05$)

Day et al., 2001; Sexten et al., 2005; Watermen et al., 2012

10

Preweaning ADG and Precocious Puberty

Year	ADG (lb/d)	Precocious puberty (%)	Age at precocious puberty (d)
1990	1.7 ± 0.07	25	206 ± 14.8
1991	1.3 ± 0.04	16	158 ± 14.2

Wehrman et al., 1996

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Preweaning nutritional management can affect subsequent heifer reproductive performance.

Managers need to make decisions on when and if to employ weaning or supplementation strategies.

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12

Postweaning Strategies

	Low	Medium	High
Gain lb/day	0.5	1.0	1.5
Age at first estrus	434	412	388
Weight at first estrus	523	545	563
Conception rate first 20 days of breeding season	30%	62%	60%
Overall conception rate	50%	86%	87%

Adapted from Short and Bellows, 1971

– Heifers should gain 1.25 – 1.75 lb per day from weaning until breeding

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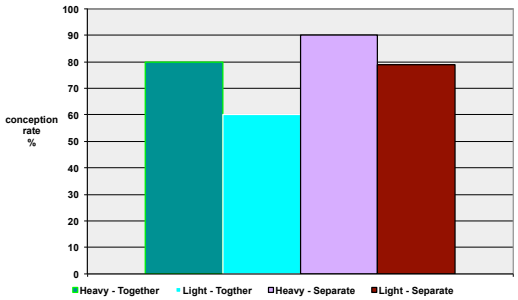
Impact of Sorting for Winter Feeding

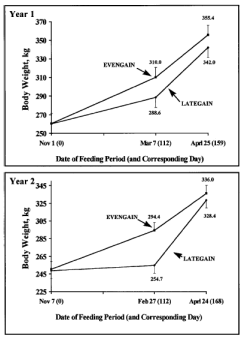


Varner et al., 1977 15

Impact of pattern of gain on pregnancy rates in replacement beef heifers

		Pattern of Gain			
Study	No. of heifers	Even gain	Slow - Fast	Fast - Slow	Fast-Slow-Fast
Clanton et al., 1983	180	82.0 %	75.0 %	73.0 %	--
Lynch et al., 1997	160	87.4 %	87.2 %	--	--
Poland et al., 1998	96	75.0 %	--	--	89.6 %
Grings et al., 1999	210	81.8 %	--	--	86.6 %

16



Lynch et al., 1997

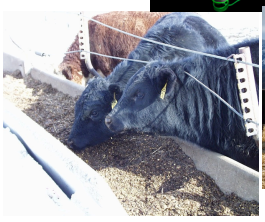
Delaying gain until closer to breeding

- Decreases feed costs 10%
- Still have similar prebreeding weights
- Similar % cycling and pregnant
- May increase follicular reserve/longevity

17

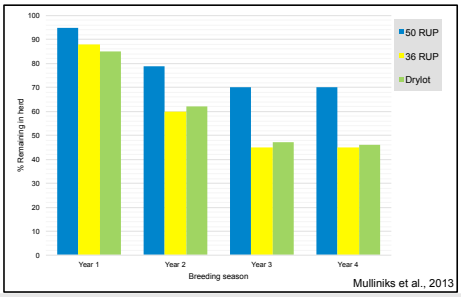
$C_{17}H_{31}COOH$

UIP



18

Impact of RUP During Development on Cow Longevity



Mulliniks et al., 2013

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19

20

Ionophores

- Bovatec, Rumensin, Bambermycins
- Increase feed efficiency
- Decrease age at puberty by 14 to 21 days in several studies.

21

There is considerable flexibility in designing postweaning development systems.

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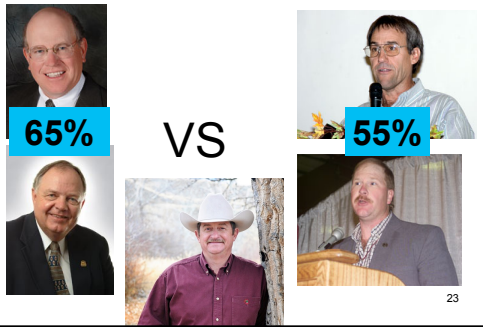
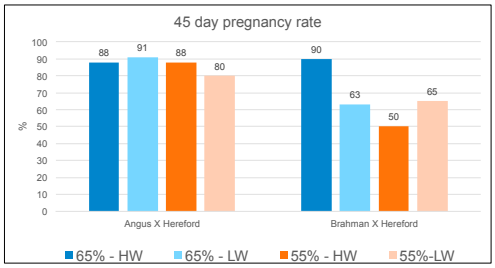
22

The Target Weight Debate



23

Why a 65% Target?



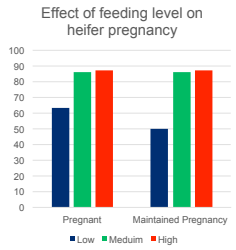
Breed X Target Weight X Weight Block interaction (P < 0.05)

Patterson et al., 1989; 1992

24

Why a 65% Target?

- Greater dystocia in 55% target wt heifers. (Patterson et al., 1991)
- Large framed heifers developed under restricted conditions have poor reproduction. (Buttram and Wilham, 1987)



Short and Bellow, 1971

25

Argument for 65%

Pro	Con
• Works! – Breed, biotype, environment • Less calving difficulty • Advantageous if: – Heifer values high – Feed cost low – Pasture costs high • "Forgiveness"	• High feed prices • Reduced selection pressure for early puberty • Overconditioning • "Pasture crash" risk

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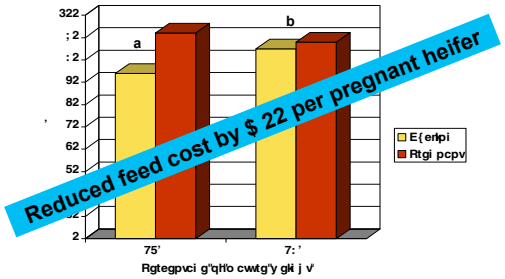
26

Why a 55% Target?

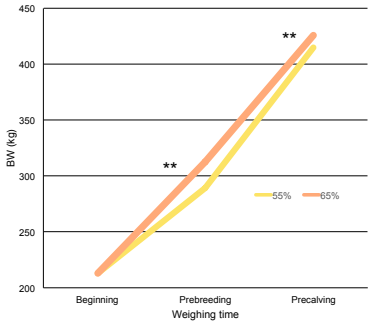


a,b Effect of target weight P < 0.01

Funston and Deutscher., 2004

27

Impact of 55% Target Weight



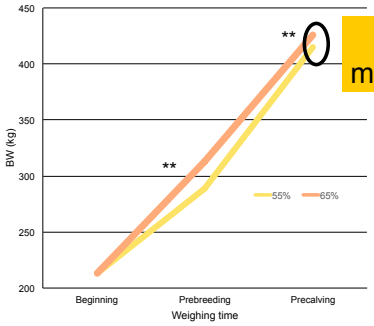
- No significant decrease in pregnancy rates
- Average calving date equal
- Longevity similar through 3 calvings

** Effect of target weight P < 0.01

Funston and Deutscher., 2004

28

Impact of 55% Target Weight



85-90% of mature weight

- pregnancy rates
- Average calving date equal
- Longevity similar through 3 calvings

** Effect of target weight P < 0.01

Funston and Deutscher., 2004

29

30

Cautions with 55% Target

- Heifers must gain weight during the breeding season.
- Going below 55% may be detrimental
  - Decreased WW as 2yr old
  - Delayed calving as 3yr old
  - Offset of reduced development costs

Creighton et al., 2005

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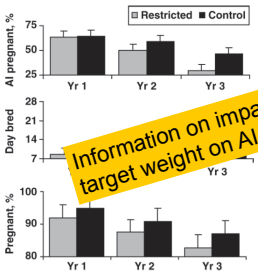
Lower Target Weight and AI



Information on impacts of reduced target weight on AI success is limited.

- Restriction tended (P<0.08) to ease AI
- Partially influenced by preweaning and pre-trial ADG
- May delay date of conception

Roberts et al., 2009

32

Argument for 55%

Pro	Con
• Works! – Need to gain weight during breeding • Reduced development costs • Reproduction similar • Increases adaptability	• Data from early maturing composites • < 55% risky • May not be compatible with AI • No forgiveness

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Factors in Selecting Target Weight

65% of Mature Weight

- Purebred or straightbred heifers
- Later maturing breeds
- Large frame cows
- Limited cow numbers
- Good forage resources
- High replacement heifer value
- Limited marketing options for open heifers

55% Mature Weight

- Crossbred heifers
- Earlier maturing breeds
- Moderate framed cows
- Large herd(>200 cows)
- Limited forage resources
- Average replacement heifer value
- Ability to retain ownership on heifers in feedlot

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Impact of Development System on Heifer Reproduction and Gain

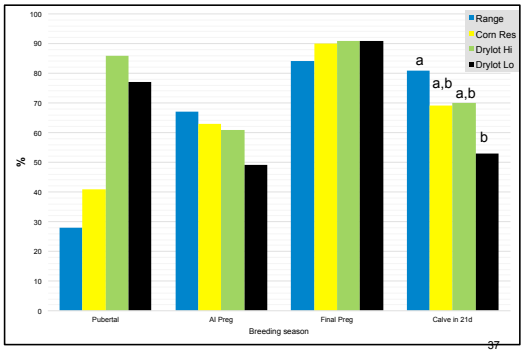
Springman et al., 2017

- Range = upland range + protein
- Corn Res = Corn residue + protein
- Drylot Hi = 74% hay + 21% Wet CGF + suppl.
- Drylot Lo = 83% hay + 12% Wet CGF + suppl.

	Range	Corn Res	Drylot Hi	Drylot Lo
Development ADG	0.97	0.89	1.57	1.26
% Mature weight	59	60	67	63
Synch. ADG	1.57	1.79	1.52	1.72
Breeding ADG	1.68	1.76	1.01	1.26
Final Preg Check Wt.	941	941	985	952

36

Impact of Development System on Heifer Reproduction



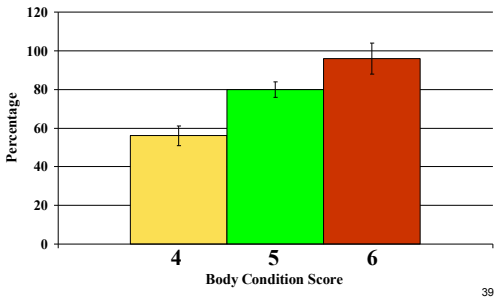
37

a,b Effect of system P < 0.02

Springman et al., 2017

38

Effect of Body Condition Score at Calving on Subsequent Pregnancy Rate in First Calf Heifers



39

From Spitzer et al., 1995

Effect of BCS at Calving on Cumulative Pregnancy Rates

		Day of the Breeding Season		
	BCS	d 20	d 40	d 60
		Cumulative % Pregnant		
Mature Cows	≤ 4	41	67	84
	≥ 5	51	79	91
		Cumulative % Pregnant		
First Calf Heifers	4	27	43	56
	5	35	65	80
	6	47	90	96

40

Summary

- Select early born replacements
- Monitor pre-weaning environment
- Choose target weight for your operation
- Develop post-weaning nutritional plan
- Feed for the cow environment
- Use reproductive technologies

41

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42