

Developing Replacement Heifers

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Proper development of replacement heifers leads to:

- Higher pregnancy rate first breeding season
- Less calving difficulty
- Higher pregnancy rate second breeding season
- Consequently, higher returns

The economic importance of developing heifers can be seen by comparing Brahman crossbred heifers fed to weigh either 600 lbs or 700 lbs at the start of the breeding season. Nineteen percent more calves were weaned the first year in the group fed to weigh 700 lb (TW2) than in the group fed to weigh 600 lbs (TW1). The second breeding season 28% more cows became pregnant. This should lead to 28% more calves at weaning time the second year (Table 1). The first calves born to TW2 cows were 30 lbs heavier at weaning than calves born to TW1 cows. A 16 lb advantage for second calves was also estimated for TW2 cows. TW2 heifers weaned 21,512 lbs more calf for the first two calves than TW1 heifers, or 215 lbs more per heifer exposed. This difference in lbs of calf weaned was obtained for approximately 500 lbs of concentrate per heifer. This means each pound of concentrate fed produced 2.3 lbs more calf. With calves selling for \$0.65, each pound of concentrate was worth \$1.50 for the first two calves. Other data would indicate this trend of early calving would continue throughout the lifetime of these cows.

More cows weaned calves in the TW2 group because more cows became pregnant early in the breeding season in this group the first year and this trend was also apparent the second year (Table 2). This difference in pregnancy rate occurred because heifers were in heat and bred early in the breeding season both years.

It is apparent from these data that feeding the Brahman cross heifer to weigh 700 lbs was advantageous. Seven hundred pounds is not the magic number for heifers of all breeds and crosses. Target weight differs by breed of heifer.

Information available indicates that the number of heifers showing heat and becoming pregnant early in the breeding season is dependent on age and weight of the heifer, and the weight and age needed differs by breed of the heifer. This can be seen by looking at time of puberty in two breeds and in the cross between them. The proportion of heifers which showed heat at different ages and weights is shown in Table 3. At 12 months of age, only 15% of the Hereford heifers weighing 600 lbs had shown heat compared to 40% of the Angus heifers and crossbred heifers. The numbers of heifers weighing 600 lbs which had shown heat by 14 months of age increased to 70% in Angus heifers, 82% in A x H heifers but was still only 30% in Hereford heifers. However, 90% of the Hereford heifers had shown heat at 14 to 15 months of age

TABLE 1. Value of Developing Brahman Cross Heifers to 2 Weights.

	600 (TW)	700 (TW)	Difference
No. of Heifers	100	100	—
Calves Weaned			
1st year	58	77	19
2nd year ^a	40	68	28
Total	98	145	47
Weaning Weight			
Average			
1st year	356	386	30
2nd year ^b	408	424	16
Total lbs.	36,968	58,554	21,586
Per heifer exposed			
1st year	206	297	91
2nd year	163	288	125
Total lbs.	369	585	216
Cost of Development Per Heifer			
Hay (lbs.)	1978	1788	—190
Concentrate (lbs.)	924	1416	492
\$ for feed	100	122	22
Pregnant Cows			
2nd Breeding Season	40	68	28

^a Estimated from cows pregnant

when they weighed 700 lbs. These data indicate age, weight and breed affect time of puberty. Most of the heifers in these two breeds will show heat by 14 to 15 months of age IF they have sufficient weight. The weight needed to reach puberty varies according to breed of the heifer.

Puberty will be delayed in heifers until they attain sufficient weight. Table 4 shows the weight needed for heifers of different breeds to reach puberty at 14-15 months of age.

As an example, 50% of the Hereford heifers 14 to 15 months of age would be expected in heat at 600 lbs. This is the average weight at puberty. If you want 85-90% of Herefords heifers to show heat they should weigh 700 lbs. This doesn't mean that the group of heifers should average 700 lbs. It means each heifer should weigh 700 lbs. You can do this by sorting heifers and feeding the light heifers to gain more and the heavy heifers to gain less. Results are similar for heifers of other breeds.

A tool that must be used to achieve desired weight is a scale. "Eye balling" heifers for weight gain is not good enough. They must be weighed or heart girth measured monthly to make sure they are making the needed gain. If discrepancies are noted, rations should be adjusted so heifers

TABLE 2. Reproductive Pattern in Heifers Developed to 2 Weights.

	600 (TW)	700 (TW)	Difference
1st Breeding Season			
No. of Heifers Exposed Showing Estrus by (%)	110	111	
20 days	33	63	
40 days	56	80	
60 days	71	92	
90 days	97	100	
Conceived 1st Service (%)	46	63	
Pregnant by (%)			
20 days	9	39	
40 days	27	57	
60 days	47	74	
93 days	66	82	
2nd Breeding Season			
No. of Cows Exposed	65	88	
Showing Estrus by (%)			
20 days	12	24	
40 days	48	70	
Conceived 1st Service (%)	69	81	
Pregnant by (%)			
20 days	8	20	
40 days	33	57	
60 days	59	79	
90 days	68	85	

TABLE 3. Heifers in Heat at Various Weights and Ages (%).

Weight	Age in Months			
	12	13	14	15
Hereford				
500 lb.	0	0	0	0
600 lb.	15	20	30	37
700 lb.	—	65	90	90
Angus				
500 lb.	0	33	57	77
600 lb.	40	65	70	80
700 lb.	—	80	100	100
A x H				
500 lb.	27	36	73	91
600 lb.	40	75	82	96
700 lb.	—	78	96	100

TABLE 4. Weight at Which 14-15 Month Old Heifers Show 1st Heat.

Proportion desired in heat	Weight (lbs.) needed by						
	Angus	Hereford	Charolais	A x H	S x E	L x E	B x E
50%	550	600	700	550	650	650	650
65-70%	600	650	725	600	700	700	700
85-90%	650	700	750	650	750	750	750

A = Angus H = Hereford S = Simmental
 E = English L = Limousin B = Brahman

will reach desired weights.

One other point needs to be made about heifer weight at the start of breeding. This can be done by looking at some data from Mr. Tom O'Connor's Ranch. Heifers were divided into three groups by heifer weight at the start of breeding (heifers weighing less than 550 lbs, 550-600 lbs and over 600 lbs). Only 65% of the heifers weighing less than 550 lbs became pregnant in a 60-day breeding season, compared to 90% of heifers weighing over 600 lbs (Table 5). Only 40% of the heifers weighing less than 500 lbs weaned calves compared to 71% and 86% in the other two groups. Loss from pregnancy to weaning was 25% in light heifers compared to 6% and 4% in the other two groups. Thus, calf loss was higher in the light group than in the other two groups. From the light heifers group only 18% of the cows suckling calves became pregnant with a 2nd calf compared to 69% in cows from the heifers that weighed over 600 lbs at the start of breeding.

TABLE 5. Reproductive Performance in Hereford Heifers as Influenced by Weight at Start of Breeding (Tom O'Connor).

	Under 550 lbs.	551-600 lbs.	Over 600 lbs.
No. Heifers	40	166	45
Pregnant 60 days (%)	65	77	90
Calves weaned (%)	40	71	86
Losses pregnancy exam to weaning (%)	25	6	4
Wet cows pregnant 2nd year (%)	18	57	69

Other data indicate that heifers given more feed have larger pelvic openings near calving. Data on the Brahman crossbred heifers indicate a pelvic area difference of 9 cm in heifers fed to weigh 600 lbs or 700 lbs at the start of breeding and fed similar levels of feed thereafter (Table 6). Bellows reported, in 1981, a pelvic area difference of 12 cm in heifers fed on high or low levels of feed during the developmental period. There was also a 10% difference in calving difficulty in Bellows' study.

Many people underfeed their replacement heifers. Therefore, it would appear important to outline briefly a feeding program for heifers. First, the amount of weight they need to gain should be determined. This is done by choosing the target weight needed according to the breed of heifer. Use Table 4 to make this decision. Each heifer should be individually weighed and the amount of gain needed to reach target weight calculated. Some ideas about this are shown in Table 7. For purposes of this discussion, 700 lbs was chosen as the target weight. A heifer weighing only 300 lbs must gain 400 lbs, and must gain 2 lbs a day to reach target weight in 200 days. Contrast this to heifers weighing 400 lbs who only have to gain 300 lbs and can reach target weight by gaining 1.5 lbs a day for 200 days. Reaching target weight is even easier in 500 lb heifers. Doing this for each heifer will give you an idea about what it will take for each heifer to reach target weight.

TABLE 6. Effect of Heifer Development on Pelvic Opening Near Calving.

	Target Weight at Breeding		
	600	700	Difference
No. Heifers	69	89	
Pelvic Area (cm ²) ^a	249	258	9
	Feed Level During Winter After Weaning (Bellows, 1981)		
	Low		High
No.	30		30
Precalving Pelvic Area (cm ²)	240		252
Calving Difficulty (%)	46		36

^a 50 days prior to start of calving season.

TABLE 7. Weight Gain and Days To Reach Target Weight of 700 lbs.

Initial Weight	Total Gain	Days To Reach Target Weight When ADG Is		
		1.0	2.0	2.5*
300	400	400	200	160
400	300	300	150	120
500	200	200	100	80

* This gain is difficult to achieve for a 300 lb. heifer.

TABLE 8. Corn (lb.) Needed Daily From Initial Weight To Target Weight of 700 lbs.^a

Initial Weight	ADG		
	1.0	2.0	2.5
300 lb.	2	8	12*
400 lb.	2	7	10
500 lb.	0	6	9

^a All heifers assumed to have full feed alfalfa hay.

* This amount of grain consumption is difficult to achieve.

The approximate amount of corn needed to make different weight gains is shown in Table 8. To make 2 lbs a day gain, 6-8 lbs of grain per head per day is needed, whereas 1.5 lbs per day gain could be achieved in a 400 lb heifer with 4 to 5 lbs of corn and a full feed of hay. Thus, costs would be considerably greater in lighter animals.

Feed intake of light heifers is extremely limited. As an example, a 300 lb heifer will only eat 9 lbs of hay and grain. This must be considered as you try to force light animals to make large gains. If you are striving to reach a target weight of 700 lbs with a heifer having an initial weight of 300 lbs, a gain of 2.5 lbs will be difficult to achieve because a light heifer cannot eat the amount of grain necessary to achieve this gain. A person must be realistic about what he can achieve with heifers. They will only eat about 2.5 to 3.0% of their body weight. Remember, many heifers are light because they are young. Even when they reach target weight, they may not show heat as they are only 11 or 12 months of age.

The heart of a good reproductive program is a heifer replacement program. You must plan to consistently have heifers old enough and heavy enough to breed early in the breeding season.

Heifers which do not attain sufficient weight at the start of breeding have three problems: (1) pregnancy rate at first breeding is low; (2) losses are high at first calving; and (3) cows suckling calves do not breed for the second calf. Feed heifers to achieve target weight and reproductive performance in the whole cow herd will improve and net income will increase.

A problem is given to help understand the importance of weight and breed on puberty.

Problem #6

On October 13 a rancher weans 160 heifers:

Breed	Weight (lbs.)	Age (months)
Hereford	450	7
Hereford	400	7
Hereford	350	6
Hereford	350	5
Hereford X Angus	450	7
Hereford X Angus	400	7
Hereford X Angus	350	6
Hereford X Angus	350	5

Calculate the number of showing heat and pregnant in the first 20 days of breeding for each description given. Use 60% conception rate and the next table.

Heifers expected in heat by weight and age

Showing Heat (%)	Group A (A, AXH)	Group B (H, SXA)	Group C (S, L, Ch)	Group D (Br. Cross)
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Showing heat at various weights at 14 months of age or older

20	a	575	600	600
40	500	600	650	650
60	550	625	675	700
80	625	675	725	750
100	675	725	775	b

Showing heat at various weights at 13 months of age

20	500	600	650	c
40	550	650	675	
60	600	700	725	
80	700	b	775	
100	b	b		

Showing heat at various weights at 13 months of age

20	550	600	c	c
40	600	b		
60	b	b		
80	b	b		
100	b	b		

a = No data

b = Data indicate none attained this level

c = Few reach puberty at this age

A = Angus, AXH = Angus × Hereford,

H = Hereford, SXA = Simmental × Angus.

