CHALLENGES FOR IMPROVING CALF CROP

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Several authors have stated that reproductive performance is the most important economic trait in a beef cow herd. Willham illustrated that reproduction in relative economic terms was 10 times as important as production and 20 times as important as product. In contrast, the variation which will respond to selection is only 10% in reproduction and 40 and 50% in production and products, respectively (Table 1).

The figures in Table 1 emphasize that an economically viable beef cow operation must have good reproduction. Some improvement may come through selection; however, most improvement must come as a result of changes in environment or management. Consequently, reproduction can be improved rapidly by changing management. The challenge is to make management changes to improve reproduction in such a way that net income is increased. The information necessary to improve calf crop is readily available, yet much of it is not applied by the individual rancher. The challenge today is to apply the information that is available and that will become available in the near future to improve reproductive performance.

To meet this challenge six steps should be taken.

1. Study carefully the available information for improving calf crop and summarize into principles or laws.
2. Utilize principles to develop a plan for improving calf crop in the herd.
3. Predict the economic value of the plan using the available resources.
4. Modify the plan to make it more economically viable and physically possible on the ranch.
5. Develop a calendar so the plan can be executed.
6. Observe results and modify the plan.

To understand how to accomplish this in an operation, five of these steps will be discussed.

Step 1. Study carefully the available information and summarize into principles or laws.

Nine principles will be stated but data will not be provided. Much of the data supporting these principles will be provided in the next few days. These are my ideas. To make the challenge work, the rancher must study and generate his own principles.

First Principle:

Loss of potential calves occur in disease-free herds because:

a. Cows do not get pregnant.
b. Losses at or near birth are high.

Second Principle:

Pregnancy rates can be increased if:

a. Ninety to ninety-five percent of the cows show heat the first 20 days of the breeding season.
b. Seventy to eighty percent of the cows conceive on first service.

Third Principle:

Ninety to ninety-five percent of the cows show heat the first 20 days of the breeding season if:.

a. Cows calve in a 60 day period and heifers calve in a 45 day period.
b. Cows are in at least moderate body condition at calving time.
c. Calves are removed for 48 hours at the start

of breeding season.

d. Young cows (first calf) are separated from older cows.

Fourth Principle:

Seventy to eighty percent of the cows will conceive on first service if:

a. Cows are gaining weight at time of breeding.
b. Cows are bred by fertile bulls.

Fifth Principle:

Losses at birth are decreased if:

a. Incidence of calving problems is decreased.
b. Someone is present at time of birth and can render assistance when needed.

Sixth Principle:

Incidence of dystocia is decreased if:

a. Heifers are bred to a bull known to sire calves with light birth weights.
b. Heifers weigh at least 950 lbs at calving time.

Seventh Principle:

For someone to be present at time of birth and render assistance, cows must calve in a short, concentrated period.

Eighth Principle:

The number of non-producers can be kept low if:

a. Heifers calve at two years of age.
b. Bull numbers are minimal.

Ninth Principle:

Thin cows at calving will show heat only if calves are weaned.

Step 2. Utilize principles to develop a plan for improving calf crop. Keeping the preceding principles in mind, the following plan was developed:

a. Manage for a 60 day breeding and calving season for cows and 45 day breeding and calving season for heifers.
b. Feed cows to moderate body condition at calving time.
c. Flush cows for 2 week period prior to the start of the breeding season and first 3 week of the breeding season.
d. Remove calves for 48 hours at start of breeding season.
e. Check bulls for fertility prior to start of the breeding season.
f. Heifers.

(1) Breed at 13 to 15 months of age..
(2) Feed and manage to weigh 700 lb at the start of the breeding season and 950 lb at the start of calving..
(3) Synchronize and breed twice AI to bulls known to sire light birth weight calves. Use carefully selected clean up bulls for 20 days.

g. Bulls.

(1) One clean up bull for 200 heifers.
(2) One bull for 40 cows.

h. Pregnancy check and body condition score cows at calving. Sort and feed thin cows.

Step 3. Predict economic value of the plan using available resources.

In order to accomplish this, the reproductive performance on the ranch must first be determined and an inventory of resources must be made. Table 2 outlines the reproductive performance on a hypothetical ranch.

Using the information in Table 2 helps visualize the problem in this cow herd. Proportion calves weaned per animal (calf crop) is low (55%) because small numbers are pregnant (62%) and losses at calving are high (6%), particularly in first-calf heifers (16%). Very few animals calve early (25%). The herd has 397 (45%) non-producing animals. Thirty percent of the non producers are the yearling heifers not being bred. The gross return per animal is $171. An inventory of resources made for the hypothetical ranch include: 9000 acres of land, 10 acres per animal, land divided into twelve pastures. The nutrients available from grazing were estimated and are shown in Table 3.

Recognizing that years differ, the type of assessment in Table 3 gives an idea of when to supplement and how much supplement is needed. This assessment helps a rancher visualize more clearly when to breed and calve.

In this herd dry cows need to be supplemented in December and January and the wet cows September through March. The present calving season (December 15 to March 25) does not match the feed supply. It appears calving needs to be changed to February or wet cows need to be supplemented in December, January and February. In this plan the calving season was changed.

Growing heifers need supplemental feed from September through February if heifers are to be bred at 13 to 15 months of age.

Other resources available include:

High energy feed	$155 per ton
Molasses	$ 80 per ton
Protein supplement	$240 per ton

No hay
Working corral with alley
Close access to four pastures
1 man for working cattle

Needed:

20 tubs for molasses
2 self-feeders for heifers
Chute for breeding AI
Help for AI program
Help for first 20 days of calving
Help at start of breeding season to work cows and remove calves

Utilizing the information available about the principles, reproductive performance was predicted (Table 4). The number of animals in the herd remained the same; however, herd composition changed. Only yearling replacement heifers are in the planned herd, bull numbers are decreased and there are two-year old cows. Calving starts February 1 and ends April 2, thus calving more closely parallels the supplies of feed available for a wet cow.

Calves are younger at weaning but are suckling cows when adequate grazing levels are available and, consequently, should grow more rapidly. The number of calves sold increased by 238. The return per animal is $275. Gains needed by replacement heifers to reach target weight are obtainable as shown in Table 5. Increased costs were estimated in Table 6.

A comparison of the plan and present situation was made (Table 7). The proportion of the herd that was non producing was estimated to decrease by 32% and pounds-of-calf-sold increased by 103,655 pounds. The costs were estimated to increase by $64 per animal. Even with this increase $38 more return per cow was estimated.

Step 4. Modify the plan to make it economically viable and physically possible.

This step is difficult to do without actual ranch situations. Steps should be taken to decrease feed and labor costs. Practices such as utilizing pasture for thin cows, developing pastures for bulls and for heifer development, and pastures for young cows will need to be thought about.

Step 5. Develop a calendar so plan can be executed.

Based upon the plan presented, the following calendar (Figure 1) was developed.

CALENDAR 1991 BREEDING AND 1992 CALVING SEASON

Date	Event
March 1	Line up help for AI & start of breeding, order semen & supplies
April 1	Have feed delivered for flushing cows and heifers (60 ton)
April 11	Start feeding of breeding cows and heifers (4 lbs/day). Implant heifers
April 14	Put bulls in corral
April 15	Fertility check bulls
April 16	Sell infertile bulls
April 20	Remove implants
April 22	Breed heifers AI

April 23-24	Round up cows and calves
April 25	Sort cows from calves. Turn in bulls.
April 27	Work calves. Return calves to cows.
May 7	Reimplant heifers, use used implants
May 14	Remove implants, start heat check
May 15 & 16	Heat check & breed heifers AI
May 17	Heat check & breed heifers AI, stop feed on cows & heifers
May 19	Turn in clean up bulls for heifers
June 8	Remove bulls from heifers
June 24	Remove bulls from cows
July 15	Line up help for pregnancy checking
August 16-17	Precondition calves
August 20	Order feed for thin cows (21 ton) order feed for replacement heifers (47 ton)
September1-2	Wean calves, pregnancy check and body condition score cows. Sort thin cows.
September 3	Sell open cows, start replacement heifers on self feeders
September 4	Start program for thin cows
November 15	Order molasses (252 ton) and protein (43 ton) for cow herd and pregnant heifers
December 1	Start molasses and protein to cow herd and pregnant heifers (4 lbs molasses-1 lb protein)
January 4	Order calving supplies, line up help for calving
January 24	Start calving
February 1	Increase molasses in wet cows, continue protein
March 1	Stop molasses and protein
April 2	Finish calving

With the calendar generated, work can proceed in the cow herd portrayed here. The change from a long-breeding to a short-breeding season would be made in one year. In other herds changing the calving season might require several years, especially if the start of the breeding season remained the same.

SUMMARY

The challenge for improving calf crop is to apply the information available today to individual ranches. Six steps were outlined to accomplish this:

1. Study information available for improving calf crop and summarize into principles or laws.
2. Utilizing available information develop a plan for improving calf crop in your herd.
3. Predict economic value of plan using resources available to you.
4. Modify plan to make it more economically viable and physically possible on your ranch.
5. Develop a calendar so plan can be executed.
6. Observe results and modify plan.

An example was used, and in this example return was increased $38 per cow if the plan was applied.

Table 1. Economic and Genetic Importance of Various Traits		
	Relative economic values	% Selection variation
Reproduction	20	10
Production	2	40
Product	1	50

Table 2. Present Situation on EZ Ranch

	Cows		Replacement heifers		Bulls	Total
	3 yr old	**4 yr and older**	**1 yr old**	**2 yr old**		
Number	115	485	120	120	45	885
Pregnant	26	85	0	0	0	62
Calving (%)	25	83	0	0	0	61
Weaning a calf (%)	24	77	0	0	0	55
Non-producers(%)	76	23	100	100	100	45
Non-producers in this category(%)	22	23	30	9	11	
Calves born after season starts (cumulative, %)						
20 days	7	31	0	9	0	25
40 days	14	62	0	24	0	52
60 days	21	72	0	47	0	66
80 days	69	83	0	71	0	80
100 days	100	100	0	100	0	100

Weaning weight and financial returns

	Average (lb)	Number	Total weight (lb)	Price per cwt ($)	Total ($)
Steers	500	244	122,000	88	107,360
Heifers	460	---	—	—	—
Replacement	480	120	—	—	—
Sell	440	124	54,560	0.85	46,376
All calves	480	488			
Total sold		368	176,560		153,736
Per animal		.55	200		171

Table 3. Estimate of nutrient requirements available from grazing in different months

			Replacement heifer		
	Wet cow (%)	Dry cow (%)	Growing (%)	Pregnant (%)	Bull (%)
January	50	90	80	90	85
February	90	100	85	100	100
March	95	100	95	100	100
April	100	100	100	100	100
May	100	100	100	100	100
June	100	100	100	100	100
July	100	100	100	100	100
August	100	100	100	100	100
September	85	100	70	100	100
October	75	100	65	100	100
November	55	100	60	90	100
December	45	85	60	75	75

Table 4. Predicted situation on EZ Ranch						
	2 yr old	**3 yr old**	**4 yr and older**	**Replacement heifer 1 yr old**	**Bulls**	**Total**
Number	121	105	477	160	22	885
Pregnant (%)	91	95	95	90	0	91
Calving (%)	89	93	93	88	0	89
Weaning a calf (%)	87	90	90	84	0	87
Non-producers (%)	13	10	10	16	100	13
Non-producers in this category (%)	13	8	39	21	18	
Calves born after season starts (cum., %)						
20 days	80	80	80	80	0	80
40 days	91	91	91	100	0	92
60 days	100	100	100		0	100

Weaning weight and financial returns					
	Average weight (lb)	**Number**	**Total weight (lb)**	**Price ($) per cwt**	**Total ($)**
Steers	490	383	187,670	.88	165,150
Heifers	450				
Replacement	500	160			
Sell	415	23	92,545	.85	78,663
All calves	470	766			
Total sold		606	280,215		243,813
Per animal			317		275

Table 5. Growth of Replacement Heifers	
Number	160
Average weight weaning (lbs)	500
Desired weight at breeding (lbs)	700
Gain needed (lbs)	200
Days weaning to breeding	236
ADG weaning to breeding	0.8
ADG during breeding	1.0
Weight at end of breeding	745
Desired weight at calving	950
Weight gain needed	205
Days end breeding to calving	237
ADG needed	0.86

Table 6. Estimated Increases in Cost

	Dry cows						
	Total	**Thin**	**Wet cows**	**Heifers**	**Bulls**	**Total ton**	**Total $**
Number animals	703	140	703	160	22		
Feed							
Molasses							
Months fed	Dec-Jan		Feb-Apr		Dec-Jan		
Days fed	60		75		60		
Lb/head/d	4		6		4		
Total (tons)	85		158		3	246	19,680
Protein							
Months fed	Dec-Jan		Feb-Mar		Dec-Jan		
Days fed	60		60		60		
Lb/head/d	1		1		1		
Total (tons)	21		21		1	43	10,320
High Energy							
Months fed		Sep-Oct	Apr-May	Sep-Feb			
Days fed		60	35	180			
Lb/head/d		5	4	4			
Total (tons)		21	49	58		128	19,840
Total all feed							$49,840

AI Program for heifers

Technician - 230 heifers bred x $5	$1150
Semen - 230 x $10	2300
SMB - 160 x $5.50	880
Labor - work heifers and heat check	800
Total	$5,130
Calving - 20 days labor x $74 per day	1,500
Help at start of breeding, sort and work calves 2 days x $100 per day	200
Total Financial Costs	$56,670

Table 7. Comparison of Plan with Present Situation			
	Present situation	Plan	Difference
Number of animals	885	885	0
Animals pregnant (%)	62	91	29
Animals weaning calf (%)	55	87	32
Non producers (%)	45	13	32
Calved days after calving started (cumulative, %)			
20 days	25	80	55
40 days	52	92	40
60 days	66	100	34
Ave. weaning age (days)	265	200	65
Ave. weaning weight (lbs)	480	470	10
Total pounds sold	176,560	280,215	103,655
Lbs. sold per animal	200	317	117
Return ($)	153,736	243,813	90,077
Return per animal ($)	174	275	101
Increase in costs			
Total ($)	0	56,670	56,670
Per animal ($)	0	64	64
Return minus increase in cost			
Total ($)	153,736	187,143	33,407
Per animal ($)	173	211	38