December 2001

Managing Young Cows

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Proceedings; The Range Beef Cow Symposium XVII
December 11, 12 and 13, 2001, Casper, Wyoming

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Introduction

In a recent analysis of SPA records from the Northern Great Plains, pregnancy percentage, calving percentage and weaning percentage were important production variables related to profit (Dunn, 2000). The high profit group did not wean heavier calves than the medium profit group. Consistent with other studies, the high profit group had lower investment and total expenditures per cow than the medium or low profit groups. Although describing what makes a cow-calf enterprise profitable is not as simple as we might like, there is strong evidence that relatively high reproductive rate in combination with low cost of production is a very important part of it.

The value of young cow management

Management of yearling, 2-yr-old and 3-yr-old females is the biggest challenge. The pattern of pregnancy rates for a Nebraska Sandhills cow herd described by Meek et al (1999) is typical of many situations. They reported the percentage of females culled for being open in the fall as 14.7% for yearlings, 12.8% for 2-year-olds, 8.6 % for 3-year-olds and 4.2% for cows 4 and older. They used net present value (NPV) to determine how much could be invested in management of yearling and 2-year-old heifers to improve future productivity (Table 1).

Table 1. Residual net present values (NPV) for bred heifers and economic sensitivity to changes in production parameters.

Change in production	NPV	Shadow price, $
Base	1,026.86	-
Increase two-year-old pregnancy by 1%	1,032.53	5.67
Increase three-year-old pregnancy by 1%	1,029.97	3.11
Decrease calf death loss by 1% (2-yr-old dams)	1,030.61	3.75
Decrease sale of dry cows (due to calving loss) by 1%	1,033.37	6.51
Increase weaning weight 1% (2-yr-old dams)	1,030.22	3.36
Cumulative effect of all changes	-	22.40

Meek et al., 1999

A 1 % increase in the pregnancy rate of 2-year-olds was worth $5.67/head. If management of the 2-year-old has a carryover effect on the performance of 3-year-olds the net present value of the 2-year-old increased $3.11/head for every 1% increase in pregnancy rate. A change in nutrition this winter for a group of bred heifers might increase the percentage

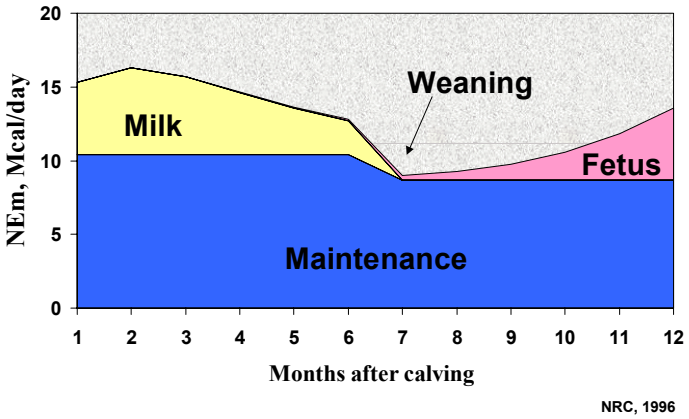
pregnant next summer by 5 %, and cause them to conceive earlier which then improves their pregnancy rate the following year by 5 %. This would raise the value of the bred heifers by $43.90/head.

Nutrition and Body Condition

Level of nutrition before and after calving is a dominant factor affecting reproductive performance (Whittier et al, 1988; Wiltbank et al, 1962; Wiltbank et al, 1964). Under nutrition prior to calving can lead to reduced birth weights (without reduced calving assistance), increased calf disease, reduced calf survival as well as reduced reproduction (Corah et al, 1975).

Regardless of age the nutrient requirements are affected by stage of production (Figure 1). Since young cows are still growing and can not consume as much dry matter, they require higher quality feeds than mature cows. NRC (1996) lists the TDN requirements for the month prior to calving as 56.2 % for mature cows and 59.9% for 2-year-olds. Because cows weaning their first calf are often thin, additional weight gain is needed prior to calving as a 3-year-old compared to mature cows.

Figure 1. Cow energy requirements



Body condition at calving and breeding is closely related to reproduction performance (Houghton et al, 1990; Whitman, 1975). Adjusting nutritional management based on body condition (Table 2) can be a valuable tool to achieve acceptable levels of reproductive performance while controlling feed costs.

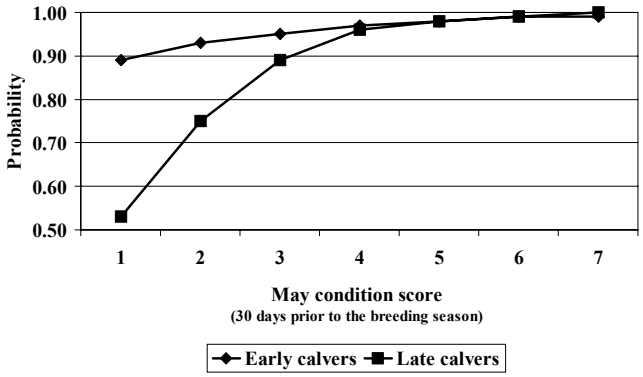
Table 2. Key points for condition scoring beef cows

	Condition score								
Reference Point	1	2	3	4	5	6	7	8	9
Physically weak	yes	no	no	no	no	no	no	no	no
Muscle atrophy[a]	yes	yes	slight	no	no	no	no	no	no
Outline of spine visible	prominent	prominent	prominent	yes	slight	no	no	no	no
Outline of ribs visible	all	all	all	3 – 5	1 – 2	0	0	0	0
Fat in brisket and flanks	no	no	no	no	no	some	full	full	extreme
Outline of hip and pin bones visible	yes	yes	yes	yes	yes	yes	slight	no	no
Fat udder and patchy fat around tail head	no	no	no	no	no	no	no	slight	yes

[a]Muscles of loin, rump and rear quarter are concave, indicating loss of muscle tissue. Pruitt and Momont, 1988

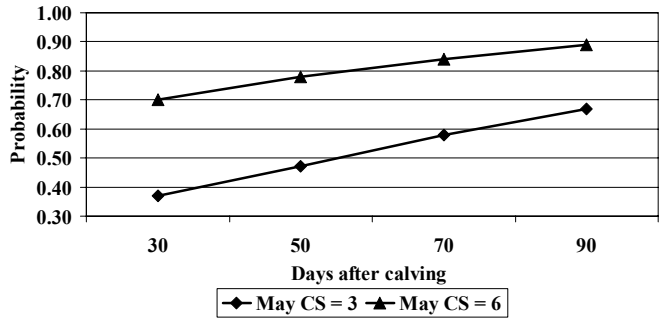
A study at the SDSU Cottonwood Research Station near Philip, SD involved cows maintained on native range pasture year round with a breeding season starting near June 6 (Pruitt and Momont, 1988). The probability of a cow becoming pregnant during a 60-day breeding season was affected by body condition and how early she calved (Figure 2). We concluded that in a similar environment a group of crossbred cows 3 years and older with an average condition score 5 at the end of the winter-feeding period would have a high pregnancy rate. Cows that calve in the first 21 days of the calving season could be thinner than cows that calve late in the season and still have a high probability of pregnancy. If they were thinner than a condition score 5 but calved early, they still could have a high probability of pregnancy. Thin cows are more likely to conceive late in the breeding season (Figure 3) and be open the following year.

Figure 2. Probability of pregnancy during a 60-day breeding season



Pruitt and Momont, 1988

Figure 3. Probability of conceiving in the first 21 days of the breeding season



Pruitt and Momont, 1988

Since young cows are more likely to be thin, this demonstrates the importance of managing yearly heifers to have a high percentage calve early in the calving season. This offers some insurance that they will not drop out of the herd at a young age.

Goehring et al (1987) concluded that 2-year-old heifers needed to be a condition score 6 at calving for a high probability of pregnancy during the following breeding season.

Breeding season and forage production

Management systems that take advantage of high quality pasture during critical periods help balance high reproduction with the need for controlling feed costs. Studies are in progress to determine the effect of time of calving on cow and calf performance (Adams et al, 2001; Pruitt et al, 2000) along with its economic impact (Carriker et al, 2001).

Cows have tremendous potential to compensate for previous under nutrition. Table 3 shows weight changes of March and April calving cows at the SDSU Cottonwood Research Station. Treatments that caused the greatest winter weight loss resulted in the highest gains during the month prior to the beginning of the breeding season in early June. The NRC energy requirements were not being met for the groups that lost 100 to 200 lb over the winter. But allowing at least 30 days of rapidly growing forage prior to the breeding season overcame under nutrition during the winter to allow high pregnancy rates.

Table 3. Cows can compensate for previous under nutrition.

Treatment	1	2	3	4
Cow weight change, lb				
Sept 14 to May 9	-98[a]	-103[a]	-151[b]	-194[c]
May 9 to June 1	44[a]	49[a]	85[b]	106[b]
Cow condition score				
May 9	4.7[a]	4.7[a]	4.1[b]	3.6[c]
% Pregnant				
21 day AI period	76.9[a]	70.0[a]	69.6[a]	34.8[b]
60 day breeding season	100	95	96	100
Conception date	June 25	June 26	June 26	July 3

[a, b] $P < .05$ Pruitt and Momont, 1994

When peak forage production and the breeding season are too far out of synch, either reproduction will suffer or additional feed will be required to achieve high reproduction.

Records for management decisions

Current technology allows us to gather data and information faster than has previously been possible. The hard drive on most new computers will hold more data than a person can use. For some of us information overload has already happened.

"What do I do with all of this data?" is a common question. Good questions to ask are: “What information is the most important?” and “What information will I actually use to make decisions?”

If the unit cost of production is the dominant factor affecting the profitability of commercial cow herds, records to calculate the cost per pound produced would be the most useful. Since reproductive performance is an important factor affecting profitability, a record system to

monitor reproductive performance in order to make management decisions is an extremely valuable tool. I would not want to discourage anyone from keeping complete records, but if time and energy is limited, monitoring pregnancy rates of various age groups may be more valuable than individual weaning weights and individual cow production records.

Table 5 shows a SPA EZ Production report. It can be used to identify management strengths and areas that could be improved. Taking the optional production information one step further (Table 6) would make it possible to target the age group where the biggest improvement is possible. If more than one breed group is represented in a cow herd, determining which group has the highest pregnancy rate would be a great way to determine which breeds actually fit your environment the best. If there are some straightbred cows and crossbred cows in the herd, you can determine how important maternal heterosis is in your production system.

Table 5. An example of SPA EZ Production information

Cows				
1	Exposed females (number of females in breeding herd at beginning of breeding season)			**112 hd**
2	Pairs or pregnant females sold/transferred out of herd before weaning			**20 hd**
3	Pairs or pregnant females purchased/transferred into herd before weaning			**0 hd**
4	Adjusted exposed female inventory (line 1 minus line 2 plus line 3)			**92 hd**
Calves		Steers/bulls	Heifers	**All calves**
5	Total head of calves weaned	40 hd	34 hd	**74 hd**
6	Total pounds of calves weaned (line 7 times line 5)	25,000 lb	19,244 lb	**44,244 lb**
7	Average weight of calves weaned (line 6 divided by line 5)	625 lb	566 lb	**598 lb**
8	Average price (value) per pound of calves on 10/05/00			**$.85/lb**
Totals				
9	Percent weaned calves [(line 5 divided by line 4) x 100]			**80.40%**
10	Total dollar value of all calves weaned (line 8 times line 6)			**$37,607.40**
11	Pounds weaned per exposed female (line 6 divided by line 4)			**481 lb**
12	Total acres (grazing + hay + aftermath)			**353 acres**
13	Total breeding females			**112 hd**
	Number of exposed females (mature + replacement) on premises at beginning of fiscal year			
Optional Production Information				
OP 1)	Number of females that are pregnancy tested			**112 hd**
OP 2)	Number of females diagnosed as pregnant			**102 hd**
OP 3)	**Pregnancy percentage** (OP 2/OP 1)			**91.0%**
OP 4)	Total females calving (full term live or dead calvings)			**79 hd**
	Divided by Exposed Females (line 4 plus pairs transferred out after calving)			**92 hd**
	Equals **Calving Percentage**			**88.0%**
OP 5)	Calving Distribution (all females calving)			
	early	3/6 or earlier	17/79	**21.5%**
	day 21 or earlier	3/27	62/79	**78.5%**
	day 42 or earlier	4/17	69/79	**87.3%**
	day 63 or earlier	5/8	75/79	**94.9%**
	after day 63	> 5/8	4/79	**5.1%**
OP 6)	Calf death loss due to calving problems		3/82	**3.7%**
OP 7)	Calf death loss first 30 days after calving		3/82	**3.7%**

Table 6. Additional information to aid in management decisions.

	Yearlings	2-yr-olds	3-yr-olds	Cows 4 & older
Pregnancy percentage	83%	95%	85%	96%
Calving distribution				
early		75%	0%	3%
day 21 or earlier		90%	72%	74%
day 42 or earlier		100%	89%	82%
day 63 or earlier		100%	94%	95%
after day 63		0%	6%	5%

	Breed A	Crossbreds
Pregnancy percentage	89.4%	96.20%

Conclusion

Maintaining relatively high reproductive rate and doing it at below average cost is a challenge but is an important component of profitability. Young cows require higher quality feeds and usually more management than mature cows for the same level of reproduction. Using body condition to adjust nutrition, scheduling the breeding season to be compatible with forage production and record systems that aid in important management decisions are ways to achieve above average reproductive performance while controlling cost.

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