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Economics of Rebreeding Non- pregnant Females

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Summary

A budget analysis compared the economics of selling non-pregnant spring-calving cows immediately after pregnancy diagnosis or re-breeding non-pregnant cows to be sold as pregnant fall-calving cows in more favorable market prices. Simulation performed for the last 5 yr of market prices demonstrated the strategy is cost effective in different market scenarios, excluding the year 2012/2013. Due to drought, feed prices were the highest and cow prices the lowest of the 5 yr analyzed. Other than atypical scenarios like drought, positive economic results would be possible even at low pregnancy rates, but as the pregnancy rate increases net proceeds also increase.

Introduction

Probably no single aspect of modern beef herd management is as complicated, or has potentially greater economic impact, as the cow culling and replacement decision. Conventional wisdom has been that open cows should be sold after pregnancy detection to avoid extra feeding expenses.

Most often, these non-pregnant cows are culled and sold into the slaughter market. These sales represent, on average, 10 to 20% of total gross income for the herd (*2012 Nebraska Beef Cattle Report*, pp. 35–36). The cull cow market has traditionally been seasonal, with October and November monthly average cull cow prices being the lowest for the year. Nebraska beef production is predominantly based on a spring calving system, lending itself to November cow culling.

Keeping the non-pregnant cow to re-breed is not a common option, but the variability in cull cows and feedstuff prices suggests an alternative could exist. A study was conducted to evaluate the economics of retaining ownership and rebreeding non-pregnant spring-calving cows to be marketed as pregnant fall-calving cows.

Procedure

Animals

Spring-born, crossbred females diagnosed as non-pregnant after the regular spring breeding season were utilized over a 2 yr period at 2 locations, the Gudmundsen Sandhills Laboratory (GSL; Yr 1, n = 61; Yr 2, n = 72), Whitman, and the West Central Research and Extension Center (WCREC; Yr 2, n = 15), North Platte. The GSL females were composite Red Angus × Simmental and approximately 80% were 1 and 2 yr of age at the beginning of the study. The GSL females were exposed to a 45 d natural service spring breeding season prior to the beginning of this study. Pregnancy diagnosis was determined by ultrasound 45 days after bulls were removed. The WCREC heifers were primarily Angus and 1 yr of age. At the spring breeding season they were synchronized with a MGA-PG protocol prior to AI and following AI were placed with bulls for 60 d. Pregnancy diagnosis was performed via rectal ultrasound 45 d after bulls were removed.

Synchronization protocol and breeding

GSL

Females were synchronized with a 7 d CIDR®-PG protocol prior to a 60 d natural service breeding season beginning November 13. A 1:25 bull to cow ratio was used. Pregnancy diagnosis was determined by ultrasound 30 d after bulls were removed, 2 wk later non pregnant cows were sold. Pregnant cows were sold 2 mo after pregnancy detection at livestock auction.

WCREC

Heifers were synchronized with 7 d CO-Synch + CIDR® protocol. Estrus detection patches were used to detect standing estrus and the second GnRH injection was administered at TAI only to heifers that did not have their patches rubbed off. Heifers were AI November 11 and after AI were placed with bulls until sold at livestock auction (approximately 170 d). Pregnancy was determined by ultrasound 135 d after AI.

Diet

GSL

Hay and supplement were fed from November to February. The supplement containing 29% CP was fed in the amount of 1.2 lb/hd/d. The cows diagnosed as non-pregnant were sold March 1. Pregnant cows grazed meadow pastures (Yr 1) or were fed hay (Yr 2) until they were sold the second week of April.

WCREC

Heifers grazed winter range pastures from November to April with a self-fed cooked molasses 30% CP tub consuming approximately 0.5 lb/hd/day. The non-pregnant heifers were sold April 14 and the pregnant heifers 2 wk later.

Economic Analyses

A partial budget analysis was performed to compare economics of selling non-pregnant cows immediately after diagnosis as non-pregnant (November) or retaining ownership and re-breeding non-pregnant cows to be sold as pregnant fall-calving cows in a potentially more favorable market (April).

Hay prices ranged from $75 to $130/ton during the study, an average hay cost of $110/ton for Yr 1 and $88.21/ton for Yr 2 was assumed. Grazing meadow cost per animal was considered to be $1/d, the cost of grazing winter range per animal was also $1/d and basic management and yardage for each female was estimated at $0.30/d. Supplement ($385/ton, DM basis) was comprised of processed grain by-products, plant protein products, roughage products, calcium carbonate, molasses products, urea, vitamin A supplement, copper sulfate, zinc oxide, magnesium sulfate, and monensin.

Cow value at the beginning of the study (November) was calculated from the Nebraska average price reported by the USDA Agricultural Marketing Service for the corresponding date and respective average BW. Total breeding cost for GSL females included CIDR® cost at $11.25/cow, a single $PGF_{2\alpha}$ injection at $2.87/cow and labor expense of $5/cow. Breeding cost for the WCREC heifers included CIDR® cost at $11.25/heifer, a single $PGF_{2\alpha}$ injection at $2.87/heifer, GnRH injection at $2.68/injection, estrus detection aids at $1.16/patch, semen at $25/dose and technician expense of $8/heifer.

Total cost was calculated by adding the purchase price, total feeding cost, breeding expenses, and 6% annual interest rate on the purchase price. The net cost of 1 pregnant cow was calculated as the difference between total cost and cull value, divided by the number of pregnant cows. Net gain was calculated as the difference between pregnant female price and net cost.

Sensitivity Analysis

A sensitivity analysis evaluated the economics of retaining and rebreeding for the last 5 yr of market scenarios at different pregnancy rates. An analysis was performed for each location (WCREC and GSL), considering the WCREC heifers were timed AI and the GSL heifers were synchronized and placed with bulls.

Feeding was assumed to be similar for the 2 locations, hay and supplement for a 160 d period. Average hay prices for each year were obtained from the Nebraska average price reported by the USDA Agricultural Marketing Service (2010 to 2015).

Cow and heifer value in November, March, and April was calculated from the Nebraska average price reported by the USDA Agricultural Marketing Service (2010 to 2015) for the corresponding date and respective average BW. Total breeding costs were assumed to be similar each yr. Breeding expenses for GSL females included CIDR® cost, a single $PGF_{2\alpha}$ injection and labor. Breeding cost for the WCREC heifers included CIDR®, $PGF_{2\alpha}$, GnRH injection, heat detectors, semen, and technician labor.

Table 1. Reproductive performance in the re-breeding season

Description	GSL[a]	WCREC[b]
AI pregnancy rate, %	—	53.3
Overall pregnancy rate, %	86.1	80.0
Conceived in the first 21 d, %	84.4	66.6

[a]Gudmundsen Sandhills Laboratory: synchronized with 7-day CIDR®-PG protocol prior to a 60 d natural service breeding season, 1:25 bull to cow ratio was used.
[b]West Central Research and Extension Center: synchronized with 7-day CO-Synch + CIDR® protocol and timed artificial inseminated (TAI). After TAI heifers were placed with bulls for 170 days.

Table 2. Partial budget analysis of rebreeding an open female

Description	$/unit	
	GSL[a]	WCREC[b]
Cow initial value (Nov), hd	1,168.89	1,422.41
(re)Breeding expenses,[c] hd	19.12	57.63
Feeding expenses[d]	270.58	188.16
Interest (6%), hd	29.03	35.56
Total cost, hd	1,487.63	1,703.75
Cull cow value (Mar), hd	1,475.45	1,549.26
Net Cost, pregnant cow	1,502.71	1,742.38
Sale value (Apr), pregnant cow	2,023.00	2,359.19
Net gain, pregnant cow	520.29	616.81

[a]Gudmundsen Sandhills Laboratory.
[b]West Central Research and Extension Center.
[c]Breeding expenses include-GSL: cost of technician, CIDR® and $PGF2_{\alpha}$ injection.—WCREC: cost of technician, semen, CIDR®, $PGF2_{\alpha}$, heat detectors and GnRH injection.
[d]Feeding expenses for a period of approximately 160 days—GSL Yr 1: hay and supplement from November to February and meadow pastures from March to April.—GSL Yr 2: hay and supplement from November to February and hay from March to April.—WCREC: Winter range pastures and supplement from November to April.

Results

The overall pregnancy rate was 86.1% for GSL and 80.0% for WCREC (Table 1). A high percentage conceived in the first 21 d of the breeding season (84.4 and 66.6% for GSL and WCREC, respectively). Since they will calve sooner, it increases the likelihood these cows will adapt to the fall calving system and be more productive as fall-calving cows (2012 Nebraska Beef Cattle Report, pp. 18–19).

The partial budget analysis of rebreeding a female that would be culled is presented in Table 2. The total cost/female was $1,483.51 and $1,703.75 for GSL and WCREC, respectively. Feeding expenses were lower for WCREC heifers, as no hay and only a small amount of supplement was fed. Re-breeding expenses were lower for GSL as the cows and heifers were not AI. An important breeding expense in natural breeding systems is bull cost; nevertheless, it was not included in the breeding expenses in this study because it was assumed the operation already had bulls not in use after the spring breeding season. A different approach that could be used to calculate the bull cost is split the costs for the 2 breeding seasons, the regular spring breeding season and the re-breeding season. In this way the re-breeding season has the additional advantage of increased use of bulls, reducing the breeding costs of the regular breeding season.

Despite the differences in breeding and feeding costs between the 2 locations, the difference in the total cost between 2 locations is mainly due to the animal's initial price. WCREC heifers were all 19 mos of age and had higher market price/cwt in November compared with older females.

The best candidates for this strategy, in fact, would be young females that have more productive life remaining and the greatest potential for added value when sold later as a bred cow compared with her current value as a cull cow. Older cows have less productive life remaining and it's unlikely there would be enough extra value to capture to make the effort worthwhile.

Table 3. Sensitivity analysis of rebreeding non-pregnant females for the last 5 yr market scenarios at different pregnancy rates—GSL

Net Proceeds—$/Heifer Exposed (GSL-NSB)[a]					
Pregnancy Rate (%)	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
10	−92.16	−207.67	−802.44	63.66	−84.79
30	52.44	−55.82	−730.17	147.12	85.58
50	197.03	96.02	−657.91	230.59	255.95
70	341.62	247.86	−585.65	314.05	426.31
90	486.21	399.71	−513.38	397.51	596.68

[a]Gudmundsen Sandhills Laboratory–Natural Service Breeding: synchronized with 7-day CIDR®-PG protocol prior to a 60 d natural service breeding season, 1:25 bull to cow ratio was used. Feeding was considered to be hay and supplement for a 160 days period.

Table 4. Sensitivity analysis of rebreeding non-pregnant females for the last 5 yr market scenarios at different pregnancy rates—WCREC

Net Proceeds-$/Heifer Exposed (WCREC-TAI)[a]					
Pregnancy Rate (%)	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
10	−91.01	−206.05	−860.31	92.52	−57.27
30	35.56	−76.86	−808.62	150.11	83.81
50	162.14	52.34	−756.94	207.69	224.89
70	288.72	181.54	−705.26	265.27	365.97
90	415.29	310.73	−653.57	322.86	507.05

[a]West Central Research and Extension Center–Timed artificially inseminated: synchronized with 7-day CO-Synch + CIDR® protocol prior to fixed time artificial insemination (TAI). After TAI heifers were placed with bulls for approximately 170 d. Feeding was considered to be hay and supplement for a 160 d period.

The remaining non-pregnant females were sold in March, and they had a market price lower than the total cost for both locations (Table 2), adding to the net cost. In this way, as the percentage of open cows increase or the value of these animals decrease, the net cost/pregnant female increases.

Pregnant cows sold in April increased in value compared with November prices by approximately 73 and 66%, for GSL and WCREC heifers, respectively. The increasing cow prices from November to April and a greater market price for pregnant females resulted in a net gain of $525.13 and $616.81 per pregnant female. The higher net gain for WCREC is due to the better sale prices for bred heifers compared with older bred cows. All females at WCREC were 19 mos and only 80% were 19 mos at GSL.

The sensitivity analysis performed is presented in Tables 3 and 4 for GSL and WCREC, respectively. Considering the feed costs were the same for both locations and considering all animals 1 yr old heifers, GSL had the greatest return. However, when available, less expensive feeding strategies should be considered in order to improve economic return.

Due to differences in drugs necessary for the synchronization protocol and semen, the natural service breeding season had reduced breeding costs, raising net proceeds/heifer exposed at a given pregnancy rate. In the present study all females were sold at livestock auction and AI bred females were not priced differently compared with bull bred females. Furthermore, the USDA Agricultural Marketing Service does not provide different prices for AI and bull bred females. If the producer would have higher market prices for AI bred heifers and cows that exceed the increased AI costs, it is recommended to use AI in order to increase profits.

The strategy was not cost effective in the 2012/2013 scenario. As a result of the 2012 drought, feedstuff prices in 2012 were highest and the market prices were lowest for the last 5 yr; consequently, the production costs were greater than gross proceeds. As a result, in 2012/2013 this management practice was not profitable, regardless of pregnancy rate. With the exception of 2012/2013, the strategy appears to be cost effective even at a modest pregnancy rate. However, as the pregnancy rate increases the net proceeds also increase.

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