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LAND & LIVESTOCK

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Low Cost Cow/Calf Program: The School – Part XV

In this issue the forage and supplement requirements of beef cows calving either 1 Feb to 17 Mar (late winter), 15 Mar to 30 Apr (early spring), 1 May to 14 Jun (late spring), or 15 Jun to 29 Jul (early summer) so that they are in a body condition score (BCS) of 5 to 6 at the start of the breeding season will be compared.

Average Shrunk Body Weight (SBW) of the cows when in BCS 5.0 is 1200 pounds; average calf birth weight 84 pounds (7% of 1200 lb); peak milk production at 8.5 weeks 17.5 lb/day; calves weaned six months after end of calving; and average calf weaning weight 600 pounds.

Management Scenarios for each Herd

Late winter: Graze rangeland mid-May to mid-January. Herd placed in pasture(s) for calving in mid-January. While on calving pasture(s) fed late bloom bromegrass hay in lieu of range forage (Table 1 – quality constituents).

Early spring: Graze rangeland mid-May to early March. Herd placed in pasture(s) for calving in early March. While on calving pasture(s) fed late bloom bromegrass hay.

Late spring: Graze rangeland year round. Due to these cows' need for additional Net Energy maintenance (NEm) for rangeland grazing activity compared to those cows fed hay in the winter and early spring months (50% vs. 20%) an energy and protein supplement was needed mid-Jan to mid-May. The cows were provided an average of 2.3 lb/day (as is basis) of #2 yellow corn for additional NEm and an average of 3.1 lb/day (as is basis) of early bloom alfalfa hay to satisfy their rumen microbe digestible intake protein (DIP) needs (Table 1 – quality).

Early summer: Graze rangeland year round. As with the late spring calving herd, these cows' also required additional NEm for rangeland grazing activity during winter and early spring.

Late Jan to mid-May these cows were provided an average of 1.7 lb/day (as is basis) of #2 yellow corn and an average of 3.1 lb/day (as is basis) of early bloom alfalfa hay (Table 1).

I recognized that feeding cattle corn on the ground, especially if ground, would result in significant waste and that feed bunks would be impractical on range due to having to move them periodically. In addition, hauling bales of hay, especially large ones, would also be impractical to rangeland cattle. Provision of a protein supplement that would furnish similar amounts of NEm and DIP as the alfalfa hay and corn would be more practical. The reasons for using alfalfa hay and corn was because market prices for them (Table 2) are readily available making it easier to compare costs and their average quality values can be obtained from the feed library.

With that said; due to the above problems with feeding alfalfa hay and corn to cattle grazing large rangeland pastures a protein cake (38% protein) was identified that contained similar amounts of NEm and %DIP to that of the alfalfa and corn in the amounts fed (Table 1) and its cost (including shipping to Buffalo) was obtained (Table 3). This cake was furnished to each of the cow herds: beginning in Mid-Nov (late winter); late Nov (early spring); mid-Dec (late spring); and late Dec (early summer) and provided until mid-May for all. All four herds grazed native range year round with no hay feeding so their grazing activity energy requirements were similar. Obviously this cake's crude protein content is higher than that of the alfalfa hay and corn so the amount of DIP per pound of cake is more than that for the alfalfa hay and corn mix.

Table 1. Quality components of bromegrass hay, alfalfa hay, corn, and a protein cake.

Quality Component	Late bloom bromegrass hay	Early bloom alfalfa hay	#2 Yellow corn	Protein cake
Dry matter (%)	88	91	88	86
NEm (Mcal/lb)	0.57	0.63	0.99	0.77
Protein (%)	10	20	10	38
Degradable intake protein (%)	59	84	45	77
Macro-minerals:				
Phosphorus (%)	0.25	0.22	0.31	1
Calcium (%)	0.30	1.63	0.03	1
Potassium (%)	2.00	2.51	0.33	1.5
Magnesium (%)	0.12	0.21	0.11	0.4
Sulfur (%)	0.18	0.54	0.14	0.4
Sodium (%)	0.01	0.12	0.01	0.6
Micro-minerals:				
Cobalt (ppm)	0.58	0.29	0.43	0.30
Copper (ppm)	9	11	5	150
Iodine (ppm)	0	0	0	4
Iron (ppm)	70	240	30	143
Manganese (ppm)	30	47	6	24
Selenium (ppm)	0	1	0	1
Zinc (ppm)	20	37	0	450

Table 2. Annual total costs for rangeland grazing, bromegrass hay, corn, alfalfa hay, and mineral supplements for four calving scenarios and resultant cow body condition (BCS) at calving and at breeding.

Calving Seasons:			**Late Winter**		**Early Spring**		**Late Spring**		**Early Summer**	
Forage/Feed	**Price**	**per**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**
Range forage	$4.20	Acre	42.2 ac	$177.11	46.8 ac	$196.40	57.0 ac	$239.45	57.0 ac	$239.45
Brome hay[1]	$100.00	Ton	2.2 T	$221.06	1.5 T	$153.96				
Whole corn[1]	$140.00	Ton					313 lb	$21.88	208 lb	$14.57
Alfalfa hay[1]	$200.00	Ton					416 lb	$41.55	369 lb	$36.90
Hay feeding	$4.20	Acre	3.7 ac	$15.68	2.6 ac	$10.92				
Sub-Totals				*$413.85*		*$361.28*		*$302.71*		*$291.07*
Minerals	**Price**	**per**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**
DiCal	$0.18	Lb	28.9 lb	$5.19	35.1 lb	$6.32	54.1 lb	$9.74	51.0 lb	$9.17
KCl	$0.15	Lb	18.8 lb	$2.81	24.3 lb	$3.65	43.8 lb	$6.56	44.4 lb	$6.66
MgO	$0.14	Lb	14.3 lb	$2.01	14.5 lb	$2.03	16.0 lb	$2.25	16.0 lb	$2.34
Salt (block)	$0.10	Lb	31.5 lb	$3.15	29.3 lb	$2.94	26.0 lb	$2.60	26.0 lb	$2.60
$CuSO_4$	$2.20	Lb	5.6 g	$0.03	4.2 g	$0.02	4.5 g	$0.02	4.0 g	$0.02
EDTA	$0.13	Gram	4.1 g	$0.53	4.0 g	$0.51	3.8 g	$0.50	3.9 g	$0.51
$MnCO_3$	$0.30	Lb	141 g	$0.09	117 g	$0.08	75.3 g	$0.05	64.4 g	$0.04
$NaSeO_3$	$0.09	Gram	4.8 g	$0.43	4.6 g	$0.41	4.5 g	$0.41	4.5 g	$0.41
$ZnSO_4$	$0.32	Lb	573 g	$0.40	561 g	$0.39	572 g	$0.40	597 g	$0.42
Sub-Totals			*95.1 lb*	*$14.64*	*104.7 lb*	*$16.35*	*141.4 lb*	*$22.53*	*138.9 lb*	*$22.05*
Totals				**$428.50**		**$377.63**		**$325.24**		**$313.12**
First calving cow's body condition score:		@ calving		6.0		5.5		5.2		5.3
		@ breeding		5.9		5.7		5.5		5.5
Last calving cow's body condition score:		@ calving		6.0		5.8		5.7		5.6
		@ breeding		6.0		6.0		5.9		5.7

[1]For brome hay, whole corn, and alfalfa hay the amounts include 10% wastage; e.g., the 2.2 T of brome hay for the Late Winter calving cows includes 2.0 T that are consumed by the cow and 0.2 T that is wasted (trampled, etc.). In addition, all values are on an as is basis.

For each calving herd the macro- and micro-mineral shortfalls were determined and the appropriate mineral supplements to address these shortfalls was provided. Total annual amount and costs of each mineral ingredient for each herd is shown in Table 2.

In order to have a relatively fair comparison of what forage and supplement costs were for each herd it was necessary to include a cost for the rangeland forage, as well as a cost for the acres used by the late winter and early spring calving cows when they were fed bromegrass hay in lieu of rangeland forage. Costs to fed hay and supplements were not estimated but it is probably safe to assume that cost in labor and equipment for feeding hay instead of the cows grazing rangeland would be greater than costs to provide a protein/energy supplement to these cows when needed.

It was estimated that each acre of rangeland provided 200 lb of grazable forage (dry matter basis). This amount is 25% of total annual plant growth which would leave an adequate amount of forage for wildlife and plant health. If each cow consumed an average of 32 lb of range forage each day an acre would provide 6.25 days of grazing (200 lb/acre ÷ 32 lb/day). Thus, each cow would need about five acres for a month of grazing (31 days ÷ 6.25 days). Based on a $21 per month grazing rate for a cow/calf pair (Wyoming 2014 Agricultural Statistics) each acre of rangeland would cost about $4.20 ($21 ÷ 5 acres). This is what is known as an opportunity cost; what you could receive per acre if you leased it for grazing. This $4.20 per acre rate was also charged to the cow herd when in the calving pasture. Each cow was allotted one acre per month when in this pasture.

Forage and supplement costs were determined for the first calving cows of the herd as well as for the last. However, all cows within each herd were treated the same, thus costs were the same between them but the end of the calving season cows generally ended up in a higher BCS at the beginning of the breeding season due to their calves being weaned 45 days sooner (Table 2).

RESULTS AND DISCUSSION

Total cost for rangeland forage, brome hay, and minerals for the early spring calving herd was $51 per cow less than that for the late winter calving herd (Table 2). The difference was due primarily to less brome hay needed by the early spring calving cows. By the start of breeding for both of these herds the cows' average BCS was basically the same.

Because the late spring calving herd grazed rangeland year round compared to the late winter and early spring calving herds the cost for that rangeland forage was $62 and $43 per cow more, respectively, because of the need for additional acres (Table 2). However, due to not having to feed any brome hay to the late spring herd there was a savings of $237 and $165 per cow, respectively, but some of this savings was offset by the cost for the corn and alfalfa hay fed the late spring herd as well as for additional minerals, especially DiCal and KCl. Thus, total costs for forage, feed, and mineral supplements for the late spring herd was $103 and $52 per cow less, respectively, compared to that for the late winter and early spring herds. How much of an additional savings there would be by not having to feed brome hay is hard to determine, especially when there would be a cost to feed the corn and the alfalfa hay as well.

Body condition at the beginning of breeding for the first calvers of the late spring calving cows was slightly less compared to those of the late winter and early spring calving herds (Table 2). However, BCS at breeding for the last calvers of all three of these hers was nearly the same.

Grazing, hay, corn, and mineral costs for the early summer calving cows was $115, $65, and $12 less per cow compared to the late winter, early spring, and late spring cows, respectively

Table 3. Annual total costs for year round rangeland grazing with a range cake (38% protein) supplement when needed and mineral supplements for four calving scenarios and resultant cow body condition (BCS) at calving and at breeding.

Calving Seasons:			**Late Winter**		**Early Spring**		**Late Spring**		**Early Summer**	
Forage/Feed	**Price**	**per**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**
Range forage	$4.20	Acre	57.0 ac.	$239.45	57.0 ac.	$239.45	57.0 ac.	$239.45	57.0 ac.	$239.45
Range Cake[1]	$574.00	Ton	720 lb	$206.64	696 lb	$199.75	612 lb	$175.65	600 lb	$172.20
Sub-Totals				*$446.09*		*$439.20*		*$415.10*		*$411.65*
Minerals	**Price**	**per**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**	**Per cow**	**$/cow**
DiCal	$0.18	Lb	29.2 lb	$5.25	29.3 lb	$5.27	31.9 lb	$5.74	27.5 lb	$4.94
KCl	$0.15	Lb	54.7 lb	$8.20	46.0 lb	$6.90	48.1 lb	$7.22	38.9 lb	$5.84
MgO	$0.14	Lb	14.6 lb	$2.05	12.1 lb	$1.69	14.4 lb	$2.02	13.8 lb	$1.93
Salt (block)	$0.10	Lb	17.8 lb	$1.78	19.8 lb	$1.98	19.3 lb	$1.93	18.8 lb	$1.88
$CuSO_4$	$2.20	Lb	4.7 g	$0.02	3.1 g	$0.02	4.5 g	$0.02	4.0 g	$0.02
EDTA	$0.13	Gram	4.0 g	$0.52	4.0 g	$0.52	3.9 g	$0.51	3.9 g	$0.51
$MnCO_3$	$0.30	Lb	87.7 g	$0.06	90.2 g	$0.06	78.9 g	$0.05	79.1 g	$0.05
$NaSeO_3$	$0.09	Gram	4.5 g	$0.41	4.5 g	$0.41	4.5 g	$0.41	4.5 g	$0.41
$ZnSO_4$	$0.32	Lb	343 g	$0.24	377 g	$0.27	378 g	$0.27	404 g	$0.28
Sub-Totals			*117.3 lb*	*$18.53*	*108.2 lb*	*$17.11*	*114.8 lb*	*$18.17*	*100.0 lb*	*$15.86*
Totals				**$464.62**		**$456.31**		**$433.27**		**$427.501**
First calving cow's body condition score:		@ calving		5.9		5.6		5.0		5.3
		@ breeding		4.7		5.0		5.3		5.5
Last calving cow's body condition score:		@ calving		5.6		5.4		5.5		5.6
		@ breeding		5.1		5.4		5.7		5.8

[1]Range cake: Price includes shipping cost.

(Table 2). As with the late spring herd the lower cost for the early summer herd was due to not feeding brome hay. The lower cost for corn and alfalfa hay for the early summer herd compared to the late spring herd was due to less corn fed per day and fewer feeding days for both. The BCS of the early summer calving cows at breeding was literally the same as for the late spring calving cows.

Whether the late spring and/or early summer calving cows really needed to be fed corn for additional energy is probable debatable. The reason it was provided was to ensure that these cows would be in at least a BCS of 5.5 at the time they would be ready to breed. If the corn was not furnished but the same amount of alfalfa hay was (protein supplement) than BCS of the cows of these two herds at breeding would have averaged (First and Last calvers) 5.3 for the early summer cows and 5.2 for the late spring ones. This is probably acceptable. If the amount of alfalfa hay was reduced to the minimum amount required to satisfy the rumen bugs protein needs (daily average 2.2 lb/day as is, both herds) than the cows would have been in an average BCS of 5.2 and 5.1, respectively. Not feeding the corn and only the minimum amount of alfalfa hay that was needed would have saved an additional $24 and $33 per cow for the early summer and late spring calving herds, respectively (Table 2).

Both the late winter and early spring calving cows had an average BCS of 6.0 and 5.9 at breeding, respectively (Table 2) but if brome grass hay was not fed to them until they were put in the calving pastures their average BCS at breeding would have been slightly less at 5.8 and 5.6, respectively. The savings due to not feeding brome grass hay two weeks prior to the start of calving would have saved about $30 per cow for both herds. However, waiting until the cows start calving to put them in the calving pastures and change their diet somewhat to boot is probably not wise animal husbandry.

Year round grazing and range cake

The recommended amount of the 38% protein range cake to furnish cattle when rangeland forage is deficient in DIP is two to four pounds per day. Providing the cows of all four calving scenarios the maximum suggested daily amount resulted in cows of the late winter, early spring, late spring, and early summer herds to be in an average BCS of 4.9, 5.2, 5.5, and 5.6 at breeding, respectively (Table 3). The number of days the cake needed to be furnished was 180, 174, 153, and 150 for the late winter, early spring, late spring, and early summer cows, respectively. The difference in total annual cost for rangeland grazing, range cake, and mineral supplements between the late winter calving herd (highest) and the early summer herd (least) was $37 per cow.

Calving on open range between February and April is probably not wise even if a protein supplement that met the cows' needs at a lower cost was used. Whereas calving on open range in May and well into the summer has been done successfully. However, the 38% protein range cake used in this exercise would not be the protein supplement to use as it cost an average of $111 per cow per year more compared to the corn and alfalfa hay.

CONCLUSIONS

Based on this exercise, calving in late spring to early summer should result in a lower annual cost for forages and supplements compared to calving in the late winter to early spring period. However, selection of hay(s), feeds, and protein supplements needs to be monitored carefully. Had the brome hay contained less protein it would have needed to been supplemented with either alfalfa hay or a protein supplement which would have increased costs.

All ranch operations are different so there may be very good reasons for when a rancher has his/her cattle calve. The important thing is that the reasons are good and sound.

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Issued in furtherance of Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Glen Whipple, Director, University of Wyoming Extension, University of Wyoming, Laramie, Wyoming 82071.

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