ENERGY LEVEL AND NITROGEN SOURCE FOR FALL CALVING COWS

Larry Foster, R. J. Raleigh, and H. A. Turner

Fall calving looks promising and profitable for many ranch operators on high desert ranges. Light weaning weights, poor calving weather, and long breeding seasons have plagued ranchers with a spring calving problem. Calving in the fall does much toward eliminating these problems. However, due to the calving in the fall, this means lactating cows must be carried through the winter which is a change in practice from most ranching operations. Energy requirements for wintering lactating cows are critical. The energy level must provide for lactation and conception requirements. However, excess energy is inefficient from the standpoint of economics as well as animal utilization. This excess energy can more efficiently be fed directly to the calf.

The major objective of this study was to determine the minimal energy level necessary for wintering lactating cows to provide for optimum production, and secondly, to evaluate biuret, urea, and cottonseed meal for protein supplements.

EXPERIMENTAL PROCEDURE

This report includes three years data with a total of 282 cow-calf pairs. The pairs were stratified by age and production index of the cows, and age and sex of the calf for allotment to treatments. Treatments consisted of two energy levels, 85 and 100 percent of that recommended by the National Research Council on beef cattle nutrition (NRC) for this class of cattle. Supplemental N sources were urea, biuret, and cottonseed meal during the first year with urea discontinued in the second and third years. The daily ration is given in Table 1. Water, salt, and a salt-bonemeal mixture were available at all times.

The cows were moved off range about mid-September each year and were fed rake-bunched meadow hay until starting on the study. The calves were dropped in October and November each year. After calving, the cows received two pounds of barley and one pound of cottonseed meal until the start of the study.

The animals were started on the study on January 8, December 5, and December 8 during the first, second, and third years respectively. The winter program ended about mid-April each year when the cattle were turned on to the range. The cows were weighed at the start of the winter feeding period, when turned on range, and in late July when the calves were weaned. Calves were weighed at birth, at the start of the winter feed period, midway through the winter period, when turned on range, and at weaning time in late July.

The cows were penned daily about 8:00 a.m. and fed their respective supplements, then turned out on the meadows for their daily hay ration. The calves were creep-fed at various levels within each cow treatment and all creep-fed at the same level while on range.

Table 1. Daily rations for cows 1/

Ingredient	Low energy			High energy		
	Amount fed	D.E.	C.P.	Amount fed	D.E.	C.P.
	(lb.)	(kcal.)	(lb.)	(lb.)	(kcal.)	(lb.)
Hay 2/	25.96	28080	2.09	25.96	28080	2.09
CSM	1.5	1927	0.59	0.75	990	0.31
Barley	-----	-----	----	2.51	3900	0.31
Fat	-----	-----	----	0.15	526	----
Total	27.46	30007	2.68	29.37	33496	2.71
Hay	25.96	28080	2.09	25.96	28080	2.09
Biuret	0.20	-----	0.44	0.11	-----	0.22
Barley	1.23	1927	0.15	3.12	4890	0.37
Fat	-----	-----	----	0.15	526	----
Total	27.39	30007	2.68	29.34	33496	2.68
Hay	25.96	28080	2.09	25.96	28080	2.09
Urea 3/	0.18	-----	0.44	0.09	-----	0.22
Barley	1.23	1927	0.15	3.12	4890	0.37
Fat	-----	-----	----	0.15	526	----
Total	27.37	30007	2.68	29.32	33496	2.68

1/ Diets were as nearly isocaloric within energy levels as possible and isonitrogenous for all cows at a level recommended by NRC (1963).

2/ Hay was fed free choice and the figures presented are estimates based on past studies for average hay intake of mature cows.

3/ This ration, containing urea, was only used the first year.

RESULTS AND DISCUSSION

The cows readily consumed their daily grain rations with the exception of the ration containing urea. For this reason, along with toxicity and poor utilization of urea with relatively low energy levels, urea was excluded from the treatments in the last two years.

Average daily gain of calves during the winter or summer period was not significantly effected by energy level during the three-year study, calves from cows receiving the lower level of energy gained 1.46 and those from cows receiving the higher level gained 1.42 pounds per day in the winter period (Table 2). Summer gains were 1.97 and 1.92 pounds per day for the respective treatments with average daily gains from birth to weaning of 1.69 and 1.67 pounds.

Table 2. Calf gain data averaged over three years 1/

Cow treatment	No. of animals	Calf weights Dec.	April	Aug.	Average daily gain Winter	Summer	Total
		(lb.)	(lb.)	(lb.)	(lb.)	(lb.)	(lb.)
High energy	106	127	307	508	1.42	1.92	1.67
Biuret	54	125	302	497	1.41	1.89	1.63
CSM	52	128	312	518	1.43	1.95	1.70
Low energy	108	128	307	514	1.46	1.97	1.69
Biuret	55	128	302	505	1.43	1.93	1.65
CSM	53	128	312	522	1.48	2.00	1.72
Nitrogen sources							
Biuret	109	127	302	501	1.41	1.91	1.64
CSM	108	128	313	519	1.49	1.95	1.71

1/ Only those treatments that were used each year are included.

Nitrogen source in the cow ration did not effect calf gains, with calves on biuret-fed cows gaining 1.64 pounds per day and those from CSM-fed cows gaining 1.71 pounds per day when averaged over the three-year study. Calves from the urea-fed cows, during the first year, had daily gains of 1.63 pounds.

Cow weight changes were not different with respect to energy level or nitrogen source. During the first year of the study cows on each level of energy lost 79 pounds per head during the winter, the high-energy group gained 13 and the low-energy group lost 13 pounds per head in the second winter, and lost 112 and 125 pounds per head, respectively for the high and low energy levels in the third winter. Weather conditions were considerably more severe during the third winter which may account for the higher loss of weight in both groups that winter. Averaged over the three years there was no difference in weight changes of the cows with respect to source of nitrogen in the supplement.

Conception rates were not affected by any of the treatments imposed on the cows. Conception rates over a 60-day breeding season in January and February were 95, 69, and 96% for the first, second, and third year of the study, respectively, for an average of 87%. The low conception rate in the second year can probably be partially attributed to the drouth conditions of that year as conception rate of the spring calving herd on the Station was low also. No other explanation is offered.

Health or disease problems among the calves could not be specifically correlated with any of the treatments imposed on the cows. However, more calves from cows on the higher energy rations required treatment for scours and respiratory diseases than those from cows on low energy. Numbers treated were not large enough to be significant and an attempt to explain this would be purely speculative.

CONCLUSIONS

These data indicate that fall-calving cows can be wintered on 85 percent of NRC requirements without effecting weaning weight of the calf or reproduction of the cow. The average daily gain of calves from cows on the higher level of energy was 1.67 pounds compared to 1.69 for the calves from cows on the lower level. Conception rate, calving percent, calving date, or weaning percent were not affected by the treatments.

Of the criteria measured there were no differences with regard to using either biuret or cottonseed meal as sources of N in the supplement. Urea cannot be recommended as a source of N for cattle with the levels of energy used in these studies primarily due to palatability factors associated with toxicity and utilization.

Results of these studies indicate that the most economical level to winter fall-calving cows is the lower level using either cottonseed meal or biuret depending on cost. It should also be brought out that animals on these studies came off range and went on winter feed in a good thrifty condition. Cattle coming in with a loss of weight and condition will have a greater winter feed requirement to replace this weight and still meet their requirement for conception and milk production.