

SUPPLEMENTAL FEEDING OF COWS AND CALVES ON LATE FALL PASTURE

D.G. Landblom and J.L. Nelson

Supplemental or "creep" feeding is generally recommended for calves nursing cows that are grazing short or drought stricken pastures, or where extra bloom is desired. Numerous investigations of creep feeding conducted throughout the United States, as summarized by Kirkeide and Johnson (1979); show that an increase in weaning weight of from 30 to 60 pounds can be expected when calves are creep fed from mid-season to weaning.

The extra energy available from creep feeding results in additional gain because the average beef cow does not produce enough milk to promote maximum gains in calves once they reach approximately 150 pounds of body weight. Butson and co-workers (1977) evaluated the lactation performance of beef cows and found that during the grazing period from June to September, daily milk production per cow averages only about 13 pounds, which should satisfy the nutrient requirements for calves weighing 100-150 pounds. Heavier calves, therefore, must obtain the rest of their nutrients from grazing.

Peak milk production among beef cows occurs approximately two months after calving and then starts to decline. In the Northern Great Plains, declining milk production closely parallels declining forage quality, as pastures and rangelands mature.

During seasons when adequate grazing exists, long-term creep feeding has not been recommended by the Dickinson Branch Station because creep feeding minimizes weight differences among calves at weaning, masking the milking ability of cows and making sound selection based on performance all but impossible. Most of the additional gain from creep feeding is deposited as fat, and over-fattening of replacement heifers has been shown to interfere with milking ability and to lower lifetime productivity. Following weaning, non-creep fed calves make compensatory gain and tend to catch up with calves that were creep fed; and, in many years, the ratio between calf selling price and feed costs is unfavorable, resulting in a net loss for creep feeding.

While summer long creep feeding may not be advantageous because of the reasons just cited, research with short-term creep feeding on mature late fall pasture has not been fully investigated.

A request for information on the subject directed to the Current Research Information System data base, which includes projects from 56 state agricultural experiment stations, 30 forestry schools and three USDA-SEA research agencies, revealed no reported information available on this practice under conditions normal to the Northern Great Plains.

At the request of the North Dakota Hereford Association, a two-phase experiment was designed to evaluate either creep feeding calves or supplementation of cows grazing on late fall pastures. The objective in Phase I was to determine the effects of short-term creep feeding on calf gain when compared to the supplemental feeding of cows instead of their calves. Cow and calf gains, times required for adaptation to the creep ration, and overall economics were monitored.

Phase II evaluates the effect of either form of supplementation on late fall pasture with respect to reducing stress on calves at weaning, effect of disease frequency associated with weaning, and effect of creep feeding on adaptation of calves to weaning rations.

In Phase I, 60 uniform Hereford cows and their calves were randomly allotted into three pasture groups of 20 pairs each. The calves in each group consisted of equal numbers of Hereford and Angus X Hereford crossbred bull and heifer calves.

Each experimental group grazed on approximately 40 acres of reseeded native pastures in excellent condition with easy and uniform access to water. All calves were vaccinated for blackleg, malignant edema, hemorrhagic septicemia and enterotoxemia when allotted.

Group One served as the control and received no supplemental feed other than a salt and di-calcium phosphate mineral mixture, which was made available to all groups' free choice.

Group Two was the creep feeding treatment. Calves had access to a wooden creep feeder located within 150 feet of their water source. The creep feed was composed of 60% dry rolled barley, 35% rolled oats and 5% liquid molasses.

Cows in Group Three received a supplemental feeding of 6 pounds ground oats per head on a daily basis. Bunk space was limited so that competition among cows would not allow calves to eat grain.

Advanced pasture maturity common to North Dakota ranges occurs during the period from August to October, and nursing calves grazing these ranges are normally weaned from their mothers near the end of the period. To coincide with weaning and normal pasture deterioration, a 40-day supplementation period prior to weaning was selected.

Gains, Feed Consumption and Economics are summarized in Tables 1 & 2.

Phase II started immediately after weaning, when the calves were allotted to feedlot pens. The calves were separate by sex, but remained in the same pasture groups. Bulls from each treatment were all fed and handled alike to evaluate any carryover effects of late fall pasture supplementation on weaning stress, weight gains, and disease frequency. They were self-fed a complete mixed ration of 20% oats, 70.5% chopped hay, 0.5% di-calcium phosphate, 2% trace mineral salt and 7% molasses.

The heifer calves were used to evaluate two feeding management systems in dry lot after weaning. Heifers from control cows and cows supplemented with oats on pasture were exposed to self-feeders containing a mixed ration of 20% oats, 77.5% chopped hay, 0.5% di-calcium phosphate and 2% salt. Those heifer calves that had been creep fed on pasture were continued on the same creep ration in dry lot. This ration was 60% barley, 35% oats and 5% molasses. In addition, these heifers were also self-fed chopped mixed hay in a separate feeder.

**Table 1. 1981 Average Gain, Feed Consumption and Economics of Cow and Calf
Supplementation on Late Fall Pasture**

	Group I Control Calves	Group II Calves Creep Fed	Group III Calves from Supplemented Cows
Days on trial	53	53	53
Number of pairs	20	20	20
Starting wt., lbs. (Sept. 3, 1981)			
Cows	1054	1125	1106
Calves	378	378	376
Final wt., lbs.			
Cows	1101	1122	1158
Calves	462	467	473
Average Daily Gain, lbs.			
Cows	0.88	-0.06	0.98
Calves	1.58	1.67	1.84
Supplemental feed/hd			
Cows – oats	-	-	288
Calves – creep fed	-	106	-
Feed/hd/day, lbs.			
Cows	-	2.0	5.4
Total feed cost ^{1/}	-	\$99.53	\$264.52
Feed cost/calf	-	\$4.98	\$13.22

^{1/} Average price in 1981 = \$1.15/bu. Oats, \$1.80/bu. Barley, 8.0¢/lb. Molasses, and \$20/ton processing.

Table 2. Summary – Supplemental Feeding on Late Fall Pasture

	Group I Control		Group II Creep		Group III Supplement				
	Cows	Calves	Cows	Calves	Cows	Calves			
ADG – 1978	2.90	2.37	1.52	2.15	1.74	2.15			
1979	-0.08	1.68	-0.17	1.84	0.22	2.07			
1980	3.40	2.31	2.28	2.04	3.19	2.25			
1981	<u>0.88</u>	<u>1.58</u>	<u>-0.06</u>	<u>1.67</u>	<u>0.98</u>	<u>1.84</u>			
Avg.	1.78	1.98	0.89	1.92	1.53	2.08			
Final wt.:									
Oct. 31, 1978 (20 hd)	1140	474	1124	463	1124	478			
Oct. 8, 1979 (20 hd)	1130	440	1138	436	1113	450			
Oct. 27, 1980 (19 hd)	1149	520	(18 hd) 1149	517	1174	520			
Oct. 26, 1981 (20 hd)	<u>1101</u>	<u>462</u>	<u>1122</u>	<u>467</u>	<u>1158</u>	<u>473</u>			
Avg.	1130	474	1133	471	1142	480			
Initial wt.:									
Sept. 21, 1978 (20 hd)	1024	379	1063	377	1054	394			
Aug. 30, 1979 (20 hd)	1133	374	1144	364	1104	370			
Sept. 23, 1980 (19 hd)	1033	441	(18 hd) 1072	447	1066	444			
Sept. 3, 1981 (20 hd)	<u>1054</u>	<u>378</u>	<u>1125</u>	<u>378</u>	<u>1106</u>	<u>376</u>			
Avg.	1061	393	1101	392	1082	396			
Weight gain:									
1978	116	95	61	86	70	84			
1979	-3	66	-6	72	9	80			
1980	116	79	77	70	108	76			
1981	<u>47</u>	<u>84</u>	<u>-3</u>	<u>89</u>	<u>52</u>	<u>97</u>			
Avg.	69	81	32	79	60	84			
Feed/hd, lbs.:			Oats,	Bly,	Molasses	=	Total	Oats	
1978	-		43	78	9	=	130	240	
1979	-		55	118	7	=	180	245	
1980	-		46	79	7	=	131	197	
1981	-		<u>35</u>	<u>71</u>	-	=	<u>106</u>	<u>288</u>	
Avg.	-		45	87	6	=	137	243	
Cost of feed, \$:			Oats,	Bly	Molasses,	Proc.	=	Total	Total
1978	-		24.18	45.79	10.50	13.02	=	93.49	159.00
1979	-		30.82	64.02	9.73	18.00	=	122.56	162.18
1980	-		41.59	79.88	3.91	11.79	=	137.17	221.25
1981	-		<u>25.34</u>	<u>52.98</u>	-	<u>21.20</u>	=	<u>99.53</u>	<u>264.52</u>
Avg.	-		30.48	60.67	6.03	16.00	=	113.19	201.74
Cost/calf, \$:									
1978	-				4.67				7.95
1979	-				6.13				8.11
1980	-				7.62				11.64
1981	-				<u>4.98</u>				<u>13.22</u>
Avg.	-				5.85				10.23
Days on Trial:									
1978		40			40				40
1979		39			39				39
1980		34			34				34
1981		<u>53</u>			<u>53</u>				<u>53</u>
Avg.		42			42				42

**Table 3. 1981 Weaning Gains, Feed Consumption and Economics
For Bull Calves in Phase II**

	Group I Control Calves	Group II Calves Creep Fed	Group III Calves From Supplemented Cows
Total No.	11	11	11
Starting wt., lbs.	474.1	473.8	488.6
Final wt., lbs.	494.5	510.5	518.2
Gain, lbs.	20.4	36.8	29.5
Days Fed	21	21	21
Avg. Daily Gain, lbs.	0.97	1.75	1.40
Feed Summary:			
Feed/hd., lbs.	251.4	304.5	312.7
Feed/hd./day	12.0	14.5	14.9
Economics:			
Feed Cost/cwt, \$	5.10	5.10	5.10
Feed Cost/cwt gain, \$	62.86	42.23	54.08
Feed Cost/hd., \$	12.82	15.54	15.95

Table 4. Weaning Gains and Economics Summary for Bull Calves in Phase II

	1978	1979	1980	1981	Avg.
No. of Calves	10	11	11	11	11
Days Fed	21	23	23	21	22
CONTROL CALVES					
Final wt., lbs.	505	501	558	494	514
Starting wt., lbs.	480	447	542	474	486
Gain, lbs.	25	54	16	20	28
Avg. Daily Gain, lbs.	1.20	2.35	0.69	0.97	1.27
Total Feed/hd., lbs.	302	334	299	251	296
Feed Cost/cwt, \$	2.80	3.10	5.92	5.10	4.23
Feed/hd./day, lbs.	14	14	13	12	13
Feed Cost/cwt gain, \$	33.58	18.85	111.38	62.86	56.67
Feed Cost/hd., \$	8.48	10.36	17.71	12.82	12.34
CREEP FED CALVES					
Final wt., lbs.	551	509	558	511	532
Starting wt., lbs.	506	445	534	474	490
Gain, lbs.	45	64	24	37	42
Avg. Daily Gain, lbs.	2.10	2.80	1.05	1.75	1.92
Total Feed/hd., lbs.	340	394	324	304	340
Feed Cost/cwt, \$	2.56	3.12	5.92	5.10	4.18
Feed/hd./day, lbs.	16	17	14	14.5	15.4
Feed Cost/cwt gain, \$	19.33	19.20	79.75	42.23	40.13
Feed Cost/hd., \$	8.70	12.29	19.22	15.54	13.94
CALVES FROM SUPPLEMENTED COWS					
Final wt., lbs.	534	517	562	518	533
Starting wt., lbs.	504	462	531	487	496
Gain, lbs.	30	55	31	29	37
Avg. Daily Gain, lbs.	1.40	2.39	1.34	1.40	1.68
Total Feed/hd., lbs.	301	380	332	313	332
Feed Cost/cwt, \$	2.78	3.06	5.92	5.10	4.22
Feed/hd./day, lbs.	14	17	15	15	15
Feed Cost/cwt gain, \$	28.02	21.20	63.59	54.08	41.72
Feed Cost/hd., \$	8.39	11.66	19.65	15.95	13.91

Table 5. Four Year Average Gains and Economics for Bull Calves in Phase II

	Control Calves	Creep Calves	Supplement Cows
No. Head	43	43	43
Final wt., lbs.	514	532	533
Starting wt., lbs.	486	490	496
Gain, lbs.	28	42	37
Avg. Days Fed	22	22	22
Avg. Daily Gain, lbs.	1.27	1.92	1.68
Economics:			
Total Feed/hd., lbs.	296	340	332
Feed Cost/cwt, \$	4.23	4.18	4.22
Avg. Feed/day, lbs.	13	15	15
Feed Cost/cwt gain, \$	56.67	40.13	41.72
Feed Cost/hd., \$	12.34	13.94	13.91

Table 6. 1981 Weaning Gains, Feed Consumption and Economics for Heifer Calves Fed Two Ration Types in Phase II

	Group I Control Calves	Group II Calves Creep Fed	Group III Calves From Supplemented Cows
Total No. Heifers	9	9	9
Starting wt., lbs.	446.1	459.4	454.4
Final wt., lbs.	458.9	489.4	462.2
Gain, lbs.	12.8	30.0	7.8
Days Fed	21	21	21
Avg. Daily Gain, lbs.	0.61	1.43	0.37
Feed Summary:			
Feed/hd/lbs.	255	327	230.6
Feed/hd/day	12.1	15.6	11.0
Creep Feed, lbs.	--	9.7	--
Chopped Hay, lbs.	--	5.9	--
Economics:			
Feed Cost/cwt, \$	4.80	4.80	4.80
Feed Cost/cwt gain, \$	95.70	52.33	141.92
Feed Cost/hd, \$	12.25	15.70	11.07

Table 7. Summary – Weaning Gains and Economics for Heifer Calves in Phase II

	1978	1979	1980	1981	Avg.
No. of Heifers	10	9	8	9	9
Days Fed	21	23	23	21	22
CONTROL CALVES					
Final wt., lbs.	489	476	498	459	480
Starting wt., lbs.	468	431	489	446	458
Gain, lbs.	21	45	8.7	13	22
Avg. Daily Gain, lbs.	1.0	1.98	0.38	0.61	1.0
Total Feed/hd., lbs.	299	283	364	255	300
Avg. Feed Cost/cwt, \$	2.54	2.77	5.75	4.80	3.97
Feed/hd./day, lbs.	14	12	15.8	12.1	13.47
Feed Cost/cwt gain, \$	36.14	17.42	240.34	95.70	97.40
Feed Cost/hd., \$	7.61	7.84	20.91	12.25	12.15
CREEP FED CALVES					
Final wt., lbs.	474	484	521	489	492
Starting wt., lbs.	420	423	498	459	450
Gain, lbs.	54	61	23.2	30	42
Avg. Daily Gain, lbs.	2.57	2.69	1.01	1.43	1.91
Total Feed/hd., lbs.	312	298	341	327	320
Avg. Feed Cost/cwt, \$	3.11	3.27	5.21	4.80	4.10
Feed/hd./day, lbs.	15	13	14.8	15.6	14.6
Creep Feed, lbs.	10.2	10.7	12.2	9.7	10.7
Chopped Hay, lbs.	4.8	2.2	2.6	5.9	3.9
Feed Cost/cwt gain, \$	18.10	15.99	91.16	52.33	44.40
Feed Cost/hd., \$	9.71	9.75	21.15	15.70	14.08
CALVES FROM SUPPLEMENTED COWS					
Final wt., lbs.	482	474	522	462	485
Starting wt, lbs.	452	436	506	454	462
Gain, lbs.	30	38	15.6	8	23
Avg. Daily Gain, lbs.	1.42	1.69	0.68	0.37	1.04
Total Feed/hd., lbs.	295	281	398	231	301
Avg. Feed Cost/cwt, \$	2.54	2.78	5.75	4.80	3.97
Feed/hd./day, lbs.	14	12	17.3	11	13.5
Feed Cost/cwt gain, \$	25.12	20.56	146.67	141.92	83.57
Feed Cost/hd., \$	7.50	7.81	22.88	11.07	12.32

Table 8. Four Year Average Weaning Gains and Economics for Heifer Calves in Phase II

	Control Calves	Creep Calves	Supplemented Cows
No. Head	36	35	36
Avg. final wt., lbs.	480	492	485
Avg. starting wt., lbs.	458	450	462
Gain, lbs.	22	42	23
Avg. Days Fed	22	22	22
Avg. Daily Gain, lbs.	1.0	1.91	1.04
Economics:			
Total Feed/hd., lbs.	300	320	301
Feed Cost/cwt, \$	3.97	4.10	3.97
Avg. Feed/hd./day	13.47	14.6	13.5
Creep Feed, lbs.	--	10.7	--
Chopped Hay, lbs.	--	3.9	--
Feed Cost/cwt gain, \$	97.40	44.40	83.57
Feed Cost/hd., \$	12.15	14.08	12.32

Summary:

In Phase I, the pasture phase, the four year average calf gains were not very different. The calves nursing cows receiving six pounds of supplemental grain tended to make the best pasture gains, followed by the control calves and then those calves exposed to the creep feeder. Gains of both cows and calves were better in 1978 and 1980 than in either 1979 or 1981. During all four years, the control pastures have supported better than expected cow and calf gains. Cows receiving supplement gained weight in all four years the trial has been conducted.

Short term creep feeding prior to weaning allowed the calves to make the transition to feedlot conditions with little stress and continued good gains.

Results to date indicate that during years of good grass production, net returns from supplementing cows or creep feeding calves would be negligible. The control calves have gained as much or more than calves nursing cows receiving a grain supplement or calves that had access to a creep feeder during the forty day trial period. However, the carry over effect on calves following weaning makes short-term creep feeding on fall pasture very desirable.

Upon weaning, which was the beginning of Phase II; the calves were separated by sex into two post-weaning trials. Bull calves were used to evaluate the effects of supplementation, while the heifer calves were used to evaluate two types of weaning rations following late fall supplementation. In both post-weaning experiments bull and heifer calves that had been creep fed on pasture gained the fastest and were the most efficient. Feed consumption in the feedlot after weaning averaged 15 pounds per day for creep fed calves and for calves that had nursed supplemented cows and 13 pounds for the control calves.

Heifer calves used to evaluate two types of weaning rations were fed either a high energy creep ration or a high roughage complete mixed ration. Heifers from the control and supplemented cow groups were self-fed the high roughage/low energy ration, and those heifers that had been creep fed on pasture received the same high energy creep ration free choice in drylot.

Using the same creep feeder and high energy creep ration fed under pasture conditions resulted in significantly faster gains, greater feed consumption and easier acclimation to the feedlot environment. In twenty-two days the creep fed calves gained 20 pounds more than the control calves.

Caution should be used when putting fresh weaned calves on a high energy ration such as the one used in this experiment. This ration is not recommended for calves that have not been exposed to the creep ration while nursing their dams on pasture. It is also recommended that any calves that are to be creep fed should be vaccinated for blackleg, malignant edema, hemorrhagic septicemia and enterotoxemia.

It is important to note that high energy rations, typical of the creep ration used in this study, should only be fed during a short pre-conditioning period following weaning when fed to heifers of replacement potential. Longer feeding periods may result in undesirable fat deposits in the udder, which can adversely affect future milking ability.

Calfhood weaning diseases were very minimal in all of the treatments, and no advantage was measured for any of the treatments in terms of disease management.