25th ANNUAL LIVESTOCK RESEARCH ROUNDUP

Dickinson Experiment Station

Dickinson, North Dakota

December 4, 1974

Section I

Reports of
Livestock Research in Progress
at the
Dickinson Experiment Station

Presented by the
Station Staff

at the

25th Annual Livestock Research Roundup

Dickinson Experiment Station
Dickinson, North Dakota

December 4, 1974

ROUNDUP DIGEST

by

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1. **WINTERING REPLACEMENT HEIFER CALVES**
   Replacement heifers can be self fed on a 25% oats, 75% hay ration, and make better gains on less grain and more hay than when hand fed. Hand fed heifers compensated some with faster pasture gains. See Section I, pp 1-3.

2. **USING STRAW IN COW WINTERING RATIONS**
   A ration of half hay and half straw for a 60 day period did not adversely affect calving per cent, calf birth weight or livability. See Section I, pp 4-6.

3. **EARLY AND LATE CASTRATION COMPARED**
   No advantage shown for delayed castration in three years of trials. See Section I, pp 7-8.

4. **VALUE OF VITAMIN INJECTIONS FOR CALVES**
   No benefit shown for injectible vitamins in three years of trial. See Section I, pp 9-10.

5. **PROGENY TEST FOR SIRE CERTIFICATION**
   Progeny testing as outlined by the sire certification program of the North Dakota Beef Cattle Improvement Association qualifies a "Certified Meat Sire." See Section I, pp 11-12.

6. **EARLY CALVING AND LATE CALVING COMPARED**
   Calves born late in February to April were 100 pounds heavier at weaning than May-June calves. If you want an early calving herd, start with the replacement heifers. See Section I, pp 13-15.

7. **BACKGROUNDING STEERS FOR TWO LEVELS OF GAIN**
   Feeding for moderate gain of 1.75 to 2.00 pounds/day was more profitable primarily because moderate gains can be obtained using large amounts of roughage in the ration. See Section I, pp 16-17.

8. **BACKGROUNDING OR FINISHING AS ALTERNATIVES**
   A trial designed to compare the economics of a backgrounding program with a finishing program for the North Dakota calf producer. See Section I, pp 18-19.

9. **SELF FED RATIONS FOR BEEF AND DAIRY STEERS**
   First years' report of a trial to provide information on returns from dairy bred steers and beef steers when fed under the same conditions, and how the two types compare in management required to produce a carcass of equal grade. See Section I, pp 20-21.

10. **IS SUPPLEMENTAL PROTEIN NECESSARY IN FATTENING RATIONS**
    Supplemental protein did not affect rate of gain but affected feed cost/cwt gain. Alfalfa at 5% level was equal to alfalfa at the 25% level. See Section I, pp 22-25.

11. **HEREFORD AND BWF STEERS ON SELF FED RATIONS**
Feedlot performance of Hereford and Angus X Hereford crossbreds on self fed fattening rations, compared over a two year period shows little difference in net profit realized. See Section I, pp 26-27.

12. **HEREFORD AND BWF STEERS IN PASTURE AND FEEDLOT TRIALS**
Herefords gained faster in the feedlot, with BWF gains higher on pasture. See Section I, pp 28-32.

13. **SLOTTED FENCE SHELTER FOR BEEF CATTLE**
The slotted board fence is effective shelter for beef cattle in western North Dakota. See Section I, pp 33-34.

14. **SWINE FEEDING TRIALS**
Crossbred barrows gained faster, but at a higher cost per cwt gain. Barley and triticale produced equal results. See Section I, pp 35-36.

15. **FEEDING LIQUID WHEY IN SWINE FATTENING RATIONS**
Whey can be used satisfactorily in swine fattening rations, and can result in appreciable savings in cost of gain. See Section I, pp 37-38.

16. **ANTIBIOTICS IN SOW RATIONS**
Reported to reduce baby pig losses, the 1974 farrowing showed little difference between treated and untreated groups. See Section I, pp 39-40.

17. **THREE PASTURE GRAZING SYSTEM**
Two hundred days of grazing was provided. The use of biuret as pasture supplement was investigated. See Section II, pp 1-10.

WINTERING REPLACEMENT HEIFER CALVES

Research from the U.S. Range Livestock Station, Miles City, Montana; South Dakota State University's Antelope Range Field Station and this station, indicates that replacement heifer calves should be fed to gain from 1.25 to 1.50 pounds per head per day during their first winter. This rate of gain will promote good, economical growth without causing the heifers to get overly fleshy or fat.

It has also been suggested by Wiltbank and others that about 50% more heifers than needed for replacement purposes be kept so that selection can be based on number actually pregnant.

In this trial, straightbred Hereford heifer calves were wintered from November 1, 1973 to May 1, 1974, a total of 181 days. Two lots of 12 were wintered in lots having a nine foot slotted board fence shelter while another lot of 8 head were held in a lot with a conventional pole barn for weather protection. A total of 32 head were wintered which was about 33% more than needed for replacement purposes. Two lots, one slotted and one with pole barn, were self-fed while one lot with slotted fence was hand fed.

The self-fed ration was prepared by weight through a portable grinder-mixer. All heifers were provided with straw for bedding on a regular interval and had access to automatic water fountains.

Sixteen head were vaccinated for brucellosis November 21, with the balance being vaccinated on January 14.

All heifers were combined and turned on crested wheatgrass pasture on May 1, 1974 and to native pasture on May 22. The heifers were exposed to fertile Angus bulls from May 1 to September 5th, 1974. A pregnancy check of all heifers was performed on October 14th.

Table 1—Performance of 1973-74 replacement heifer calves under two feeding systems

	Hand fed heavy wts.	**Self-fed heavy wts.**	**Self-fed light wts.**
No. head	12	12	8
Days fed	181	181	181
Initial wt., lb.	417	417	344
May 1st. wt., lb.	660	700	661
Winter gain, lb.	243	284	318
Avg. daily gain, lb.	1.34	1.57	1.75

Table 2---Average feed consumption and cost of gain

	Hand fed heavy wts.	Self-fed heavy wts.	Self-fed light wts.
Ration as fed lbs./hd./day:			
Oats	4.98	3.40	3.66
Tame hay	10.13	9.53	10.26
Alfalfa	1.94	0.68	0.73
Di-calcium phosphate	0.15	0.10	0.10
Salt	0.05	0.27	0.29
Total feed consumed/day, lb.	17.25	13.98	15.04
Feed cost/hd.	$79.47	$67.46	$76.26
Feed cost/hd./day	43.91¢	37.27¢	45.78¢
Feed cost/cwt gain	$28.01	$23.78	$22.84

Table 3---Two year average gain, feed consumption and cost of wintering heifers either self-fed or hand fed

	Hand fed			Self-fed		
	1973	**1974**	**Avg.**	**1973**	**1974**	**Avg.**
No. head	12	12	24	12	12	24
Days fed	168	181	174	168	181	174
Initial wt., lb.	410	417	413	408	417	412
Spring wt., lb.	588	660	624	650	700	675
Winter gain, lb.	178	243	211	241	284	262
Avg. daily gain, lb.	1.06	1.34	1.21	1.44	1.57	1.50
Lbs. feed/hd./day	13.1	17.2	15.2	14.8	14.0	14.4
Feed cost/hd.	$33.02	$79.47	$56.24	$34.29	$67.46	$50.87
Feed cost/hd./day	19.6¢	43.9¢	31.8¢	20.4¢	37.3¢	38.8¢
Feed cost/cwt gain	$18.50	$28.01	$23.25	$14.20	$23.78	$18.99

The effects of bangs vaccination at two different weights was monitored. Half the heifers were vaccinated by a local veterinarian with strain 19 Brucella organisms on November 21, while the rest of the heifers were vaccinated on January 14. No serious upsets were observed at either vaccination and weight gains do not appear to have suffered at either age of vaccination as shown in table 4.

Table 4---Effects of brucellosis vaccination on winter gain

	Vaccinated on November 21	Vaccinated on January 14
No. head	16	16
Avg. wt. gain/hd.- (Nov. 1 to Dec. 18), lb.	68	76
Avg. wt. gain/hd.- (Nov. 1 to Feb. 14), lb.	136	1/151
Total wt. gain/hd.- (Nov. 1 to May 1), lb.	221	283

1/ Significant at 5% level.

Table 5---Weight gain on grass May 1 to October 7 (159 days) and percent pregnant

	Hand fed heavy wts.	**Self-fed heavy wts.**	**Self-fed light wts.**
No. head	12	12	8
Initial wt. (May 1), lb.	660	700	661
Final wt. (Oct. 7), lb.	825	848	800
Pasture gain	165	148	139
Avg. daily gain, lb.	1.04	0.93	0.87
No. bred	10	10	7
No. open	2	2	1
Percent open	16.6	16.6	12.5

Summary:

Heifers self-fed a ration of 25% oats and 75% hay plus minerals made gains of 1.57 to 1.75 pounds per head per day. Although the hand fed heifers appeared to make slower winter gains, they compensated for this by making faster summer gains on pasture. There was no difference between the two winter feeding regimes as shown by the percent pregnant in October.

The extra 33% heifers wintered proved adequate to provide the necessary early bred replacement females.

USING STRAW IN COW WINTERING RATIONS

Past research at this station has indicated that small grain straw and adequate supplemental protein can replace up to two-thirds of the hay fed in wintering rations to pregnant beef cows.

This trial compares a 100% hay ration with a 50% hay-50% straw ration for wintering pregnant beef cows with no supplemental protein fed in either rations.

The station's commercial Hereford cow herd is being used in this trial. In 1972, the calves were weaned about November 1, and the cow herd was grazed on good to excellent native range until the end of the month. During this one month period, despite supplemental feeding of protein blocks, the cows lost an average of 47 pounds of weight, with a corresponding loss of body condition. In 1973 the calves were weaned on November 1, and the cow herd was grazed on grain stubble aftermath until the end of the month. Cow weight loss in 1973 averaged 45 pounds per head.

On December 1, the cows were randomly allotted by age into two feeding groups. Group A received a ration of mixed brome and crested wheatgrass hay while Group B was fed a ration of hay and oat straw. A salt-mineral mixture and water were available free choice. During the trial, both groups were held in lots with a slotted board fence for protection from the wind and weather.

On February 1, 1973, one month before the first calves were due, the straw feeding was discontinued. At this time the straw was replaced with hay and supplemental grain feeding (1 pound/head/day of rolled barley) was started.

Cow weight changes, feed consumption and cost of wintering, and calf birth weights and mortality are summarized in tables 6, 7 and 8.

Summary:

It appears that feeding a ration of 50% hay and 50% oat straw for a 60 day feeding period did not adversely affect either calf birth weight or livability when compared to cows fed 100% tame hay. As expected, the young cows wintered on the 50% hay-50% oat straw ration lost the most weight. Normally, this weight loss would not be serious for cows that started the winter feeding period in moderately good condition.

Using straw in the ration reduced the cost of wintering about one dollar per cow per month in 1972. With the substantially higher feed costs in 1973 wintering costs were reduced by $2.35 per cow per month.

Straw can be used effectively in cow rations to reduce wintering costs and stretch insufficient feed supplies.

Table 6---Cow weight change – cow wintering trial, 1973-74

	Aug. wt. on hay			Aug. wt. on hay & straw		
	3 yr. old	4-5-6 yr. old	7 yr. & older	3 yr. old	4-5-6 yr. old	7 yr. & older
Pre-trial:						
Nov. 1, 1973	952	1085	1171	971	1107	1179
Nov. 1, 1974	913	1135	1166	914	1098	1192
Dec. 1, 1973	917	1043	1121	924	1054	1126
Dec. 1, 1974	906	1092	1098	890	1044	1116
Wt. change 1/						
1973	-35	-42	-50	-47	-53	-53
1974	-7	-43	-68	-24	-54	-76
Feb. 1, 1973	921	1052	1118	899	1037	1118
Feb. 1, 1974	912	1120	1145	920	1074	1164
Wt. change- Dec. 1-Feb. 1						
1973	+4	+9	-3	-25	-17	-8
1974	+6	+28	+47	+30	+30	+48

1/ Weight loss on native grass pasture in 1973 and on grain stubble aftermath in 1974, prior to starting winter trial.

Table 7---Feed consumption and cost of wintering – cow wintering trial 1973-74

1973 data	**Hay**	**Hay & Straw**
Mixed hay, lb. 2/	69,300	43,350
Oat straw, lb.	--	27,750
Feed/hd./day, lb.	21.4	21.4
Feed cost @- $18/ton, hay - $10/ton, straw		
Per head/day	0.19¢	0.16¢
Per head – entire trial	$11.71	$9.79
1974 data		
Mixed hay, lb.	76,320	37,274
Oat straw, lb.	--	37,274
Feed/hd./day, lb.	21.6	21.4
Feed cost @- $30/ton, hay - $15/ton, straw		
Per head/day	0.32¢	0.24¢
Per head entire trial	$19.08	$14.22

2/ One calf born dead, 2 late calves – no birth weight.

Table 8---Calf birth weights and mortality – cow wintering trial, 1973-74

	Hay			Hay & Straw		
	3 yr. old	**4-5-6 yr. old**	**7 yr. & older**	**3 yr. old**	**4-5-6 yr. old**	**7 yr. & older**
Heifer calves:						
No. head 1973	6	10	10	8	10	9
1974	4	7	7	5	16	4
Birth wt. 1973	61	64	65	53	62	66
1974	61	66	73	61	68	73
Steer calves:						
No. head 1973	2	12	8	5	13	6
1974	7	17	14	7	14	13
Birth wt. 1973	56	66	65	67	68	69
1974	67	72	71	72	73	63
Combined avg. birth wt., lb.						
1973	26 heifers	64		27 heifers	60	
	22 steers	65		24 steers	68	
	1/ all calves	64		2/ all calves	64	
1974	18 heifers	68		25 heifers	67	
	38 steers	71		34 steers	69	
	3/ all calves	70		4/ all calves	68	

1/ One cow died, 2 cows open, 1 cow aborted, 1 calf died.

2/ One calf born dead, 2 late calves – no birth weight.

3/ One cow open, 2 cows died, 1 calf died.

4/ One cow open.

EFFECTS OF EARLY CASTRATION AND LATE CASTRATION OF BULL CALVES COMPARED

Is there any advantage to be gained from fall castration of spring calves? Does fall castration affect weight gains at weaning? How does late castration affect performance in the feedlot? What problems are encountered, and are there any risks involved in fall castration of spring calves?

This trial, begun in the spring of 1972, and continued in 1973 and 1974, was designed to evaluate and compare the effects of early castration, (at 3 to 8 weeks of age), and late castration, (at 6 months of age). Bull calves from the station herd were assigned by age, at random, to either the early or late castration dates. A total of 186 calves have been included in this trial to date.

All calves were operated on using an approved veterinary procedure which minimized blood loss and stressed strict sanitation.

The calves in the late castration group were allowed to remain with their mothers for approximately thirty days following the operation.

In addition to the record of weight gains for both groups from birth to weaning for 1972 through 1974, as summarized in tables 9 and 10, weight gains in the feedlot for the respective treatment groups in 1972 and 1973 are presented in table 11.

Summary:

Delaying castration until the calves are about 6 months old was of no value in improving weight at weaning. Combined data for 1972 through 1974 also shows no advantage for delayed castration.

Feedlot data presented in table 11 shows no difference of significance in gain, dressed weight, dressing per cent, grade or value.

Although no serious problems were encountered at either time of castration, the job is simpler, easier and offers less risk to the calf when performed at an early age.

Table 9--Comparison of effect of spring and fall castration on weight gains of calves in 1974

Castration date	Weight gain May 15-Sept. 26	Weight gain Sept. 27-Oct. 16	Total Avg. gain
June 4 (38 head)	211	22	233
Sept. 26 (36 head)	208	23	231

Table 10--Weight gains of spring castrated and fall castrated calves compared 1972-74

Spring castrated calves:				
Year	**No. head**	**May-Sept.**	**Oct.**	**Total**
1972	32	218	44	256
1973	25	238	41	279
1974	38	211	22	233
Total	95	220	34	253
Fall castrated calves:				
Year	**No. head**	**May-Sept.**	**Oct.**	**Total**
1972	30	219	36	255
1973	25	244	35	279
1974	36	208	23	231
Total	91	222	30	252

Table 11--Gains in the feedlot, carcass data and value of steers castrated early and late in 1972 and 1973

	Feedlot gain	**Dressed weight**	**Dressing per cent**	**Grade**	**Value**
Early castration:					
1972 (20 head)	702	650	59.3	12.0	$412
1973 (20 head)	641	627	59.8	11.8	$385
2-year avg.	672	639	59.5	11.9	$399
Late castration:					
1972 (15 head)	692	650	59.5	12.1	$408
1973 (15 head)	662	640	59.5	11.7	$387
2-year avg.	677	645	59.5	11.9	$398

VALUE OF INJECTING CALVES AT BIRTH WITH VITAMINS A, D_2, AND E

Supplementary vitamin sources are readily available to livestock producers in several forms. These include feed additives, tablets and injectible solutions. This trial was designed to evaluate the effects of a vitamin injection to calves at birth.

In this trial, straight bred calves born at the Dickinson station from February to May were allotted by age to either the treatment group or the untreated control group. Within twenty four hours after birth, every calf in the treatment group was injected intramuscularly with two cubic centimeters of a vitamin A, D_2, and E solution. This solution contained 500,000 I.U. of vitamin A, 75,000 I.U. vitamin D_2 and 50 I.U. of vitamin E per cubic centimeter.

The mothers of these calves were wintered on a high straw plus protein ration in 1971-72. In 1972-73 and 1973-74, half the cows were wintered on a ration of ½ hay and ½ straw. The other half of the cow herd was wintered on an all hay ration. About the first of February each year, each cow received a 5 cc injection of the vitamin combination.

A record of all treatments administered for lung congestion and scours was kept until calves were turned on grass, about the first of May. The calves were weighed and weaned on November 1st.

Tables 12, 13 and 14 summarize the results of this study.

Summary:

The administration of injectible vitamins A, D_2, and E combination to calves from cows adequately fed and supplemented had no apparent influence on either the calves disease resistance or on its subsequent summer gains. However, the use of vitamin injections did require additional handling, labor and expense.

Table 12--Effect of injectible vitamins on weight gains of calves in 1974

	Average weight gains	
	Treatment group	**Untreated group**
Steers	(38 hd.) 294 lbs.	(40 hd.) 296 lbs.
Heifers	(27 hd.) 320	(27 hd.) 298
Average 1/	(65 hd.) 305	(67 hd.) 297

1/ Eight pound weight difference not statistically significant.

Table 13--Effect of injectible vitamins on weight gains of calves 1972-74

	Average weight gains	
	Treatment group	**Untreated group**
1972 Steers	(33 hd.) 305 lbs.	(33 hd.) 304 lbs.
1973 Steers	(29 hd.) 328	(27 hd.) 330
1974 Steers	(38 hd.) 294	(40 hd.) 296
3-year avg.	(100 hd.) 308	(100 hd.) 308
1972 Heifers	(22 hd.) 301 lbs.	(23 hd.) 296 lbs.
1973 Heifers	(32 hd.) 294	(31 hd.) 293
1974 Heifers	(27 hd.) 320	(27 hd.) 298
3-year avg.	(81 hd.) 304	(81 hd.) 296
Combined total	(181 hd.) 306 lbs.	(181 hd.) 303 lbs.

Table 14--Number of calves treated for scours and lung congestion in the trial with injectible vitamins

	With vitamin A	**Without vitamin A**
1972	19	10
1973	6	7
1974	21	20
3-year avg.	15	12

PROGENY TEST FOR SIRE CERTIFICATION

To better evaluate new sire selections and build a more productive cow herd, the Dickinson Experiment Station has begun progeny testing as outlined by the Sire Certification Program of the North Dakota Beef Cattle Improvement Association.

In this first years' test, the calves were sired by a Polled Hereford registered as O.G. Domestic Anxiety 8405, bred by Kubik Polled Hereford Ranch, Manning, North Dakota.

To qualify this bull as a certified meat sire, the progeny under test had to meet USDA quality grade requirements and, weight per day of age, live grade, minimum rib eye and maximum backfat requirements as established by the NDBCIA.

As a result of the test, O.G. Domestic Anxiety 8405 has been rated a "Certified Meat Sire" by the NDBCIA.

Tables 15 and 16 summarize the test results and describe the rations used.

Information about the Sire Certification Program of the NDBCIA may be obtained from Mr. Melvin Kirkeide, Secy., NDBCIA, Department of Animal Science, North Dakota State University, Fargo, North Dakota.

Table 15--Gain and carcass data, progeny test for sire certification – 1974

Weight Nov. 1	Weight June 25	Days fed	Total gain	Average daily gain
454	992	237	538	2.27
Carcass weight	**Dressing per cent**	**Carcass grade**	**Carcass value**	**Net return over feed**
571	57.6	6 good 1 choice	$316.43	$142.33

Table 16--Self-fed rations used in the progeny test for sire certification-1974

	Rations as fed:			
	Weaning to 650 Lbs.		650 Lbs. to finish	
	Lbs./ton	Lbs./hd/day	Lbs./ton	Lbs./hd/day
Oats	900	7.24	500	3.62
Barley	300	2.41	500	3.62
Corn	300	2.41	570	4.12
Alfalfa	450	3.62	350	2.53
Dry molasses	20	0.16	20	0.14
Soymeal	20	0.16	50	0.36
Vitamin A	60 grams	-	60 grams	-
Vitamin D	20 "	-	20 "	-
Di-cal	10	0.08	10	0.07
Trace mineral salt	1/40	0.32	1/40	0.28
Total		16.40		14.74

1/ 40 pounds salt added per ton of feed.

EARLY CALVING AND LATE CALVING COMPARED

Income from beef cows is in direct proportion to the number (calving percent) and weight of marketable calves at weaning.

Calf weight at weaning is dependent on three primary variables: genetic potential, adequate nutrition and, age at weaning. Early calving is one management tool that allows for older calves at weaning.

Early calving is not traditional in this area, and may require additional feed, labor and housing facilities. Because of the length of gestation in beef cattle, (283 days) special care is required to move a cow's calving interval forward after she drops her first calf. It is important to breed heifers so they will calve at the desired time. We recommend the breeding season for heifers begin three weeks before the cow herd is exposed.

This trial was begun in the spring of 1972 to study the effects of shifting a cow herd from April 1 to March 1 calving.

The station's cow herd was split into two groups, with calving date uniformly distributed between lots. In 1974 one lot was fed a tame hay ration, and the other lot received a ration of half hay and half straw, from December 1 to February 1. After February 1 both lots were fed 23 pounds tame hay until calving. After calving, each cow was fed a ration of 2 pounds barley, 5 pounds tame hay and 40 pounds corn silage per head per day until May 23, when they were turned on grass.

The early calving lot was exposed to fertile bulls in late May, for March calving. The late calving lot was exposed late in June for April calving.

Replacement heifers were wintered to gain 1.25 to 1.50 pounds per head per day, and were exposed to bulls early in May so calving could start about February 10, three weeks before the early calving lot was due to begin.

During the summer all calves were handled in a uniform manner and were weighed and weaned on October 17.

A summary of weather conditions at the station during the 1974 calving season shows that the mean temperature for February was well above average. Both April and May were cool and wet.

Table 17--Temperature and precipitation, 1974 calving season – Dickinson Experiment Station

Month	Degrees Farenheit avg. high	avg. low	Deviation	Inches precipitation
February	33.9	10.3	+8.7	.08
March	37.9	15.4	+1.4	.38
April	55.3	29.7	+ .8	2.82
May	62.7	37.5	-2.7	4.15

Table 18--Average ration and costs February 1 to May 23, 1974

	Early calving lot	Late calving lot
Number of head	70	45
Days fed	112	112
Hay/cow/day, lb.	1587	1948
Barley/cow/day, lb.	107	67
Corn silage/cow/day, lb.	2147	1344
Total feed cost/cow	$42.28	$40.78
Avg. cost/cow/day	0.38¢	0.36¢

Table 19--Calf weights and ages from each breeding herd

	No. calves	Birth wt. lbs.	Weaning wt. lbs.	Age	Avg. daily gain
Early calving herd:					
Heifers	28	67	380	208	1.50
Steers	42	70	357	195	1.47
Late calving herd:					
Heifers	15	68	358	185	1.57
Steers	29	72	366	177	1.66

Table 20--Calf weights arranged by date of birth

	No. Calves	Birth wt. lbs.	Weaning wt. lbs.	Summer gain lbs.	Age	Avg. daily gain
Calves from 2-yr. old heifers born Feb.-March: 1/						
Steers	6	80	442	362	221	1.64
Heifers	10	74	413	326	224	1.45
Avg.	8	77	428	344	223	1.54
Calves from cows born Feb. 22-April 1:						
Steers	26	69	395	326	213	1.50
Heifers	21	67	395	328	217	1.53
Avg.	24	68	395	327	215	1.52
Calves from cows born April-May:						
Steers	30	73	363	290	184	1.57
Heifers	18	68	364	296	186	1.59
Avg.	24	71	364	293	185	1.58
Calves from cows born May-June or later						
Steers	15	69	296	227	145	1.57
Heifers	4	68	288	219	139	1.57
Avg.	10	69	292	223	142	1.57

1/ Crossbred Angus-Hereford.

Summary:

With the addition of the three-year old cows to the early calving lot and a subsequent loss of old cows from both herds we now have twenty five more cows in the early calving herd. Average age at weaning of calves in the early calving herd was 200 days, compared to 180 days in the late calving herd. The actual weaning weight of all calves from the early calving herd was 366 pounds while in the late calving herd it was 363 pounds. However, it should be remembered that the early calving herd includes a large number of young cows.

It appears to date that the best way to change a cow herd's calving date is to start with the replacement heifers.

Table 20 clearly shows the importance of early calves, since the calves actually born from February 22 to April were 31 pounds heavier at weaning than the calves dropped during April and May, and over 100 pounds heavier at weaning than the May-June calves.

It is also worth noting that the calves from the two-year old heifers averaged 414 pounds, about 50 pounds heavier than either the early or late cow herds. Part of this weight advantage is probably due to hybrid vigor since these calves were Angus-Hereford crossbreds.

BACKGROUNDING STEERS FOR TWO LEVELS OF WINTER GAIN

It has been suggested that wintering calves for a moderate gain of 1.75 to 2.00 pounds per day may be more profitable than wintering for gains of 2.25 to 2.50 pounds per day.

This trial, designed to compare moderate with maximum feedlot gains showed that when feed grain prices are high and cattle prices low, feeding for moderate gain was more profitable, primarily because moderate gains can be obtained using a large amount of roughage in the ration, as shown in table 21.

Steers wintered for higher gain were 35-40 pounds heavier, but the selling price was about $1.00 per hundredweight less than for steers on moderate gain, when sold as backgrounded feeders on May 2.

Under the conditions of high feed prices and low cattle prices which prevailed in 1974, backgrounding at both levels resulted in a net loss of about $50.00 per head.

Table 21--Average feed consumption and feed cost/cwt gain

	Higher gain		**Moderate gain**	
Avg. feed consumption:				
Oats, lb.	1095	1097	409	409
Tame hay, lb.	443	443	1145	1146
Alfalfa, lb.	81	81	82	82
Di-cal, lb.	8	8	8	8
Salt, lb.	32	32	33	33
Total, lb.	1659	1661	1677	1678
Feed/hd./day, lb.	16.4	16.5	16.6	16.6
Feed/lb./gain, lb.	8.0	6.6	8.9	8.3
Feed cost/cwt. gain, $	30.63	25.22	23.53	22.04

Table 22--Feeding for two levels of winter gain, January 21 – May 2, 1974

	Higher gain		Moderate gain	
Initial wt., lb.	457	457	456	456
May 2 wt., lb.	665	710	644	658
Winter gain, lb.	208	253	188	202
Days fed	101	101	101	101
Avg. daily gain, lb.	2.06	2.50	1.87	2.00
Initial cost--				
@$58.20/cwt., $	266	266	266	266
Feed cost/hd., $	64	64	44	44
Total cost, $	330	330	310	310
Selling price:				
@$39.75/cwt, $	264	282	--	--
@$40.70/cwt, $	--	--	262	268
Net loss, $	66	48	48	42

BACKGROUNDING OR FINISHING AS FEEDING ALTERNATIVES

The calf producer in this area has three ways to go with his calf crop. He can sell at weaning; wean and background; or, wean, background and finish, depending upon his feed supplies and available labor and facilities.

This trial was designed to compare the economics of a backgrounding program with a finishing program for the North Dakota calf producer.

Steers backgrounded for two levels of gain, as reported in the previous experiment, were finished to slaughter weights in trials beginning January 21 and ending November 5.

Pertinent details for both the backgrounding phase and the finishing phase of this trial are summarized in table 23. Details on feed consumption, feed costs, gains, carcass data and returns for the finishing phase are presented in tables 24 through 26.

Table 23--Summary of backgrounding or finishing as feeding alternatives

	Backgrounding		**Finishing**
	January 21 – May 2		**Jan. 21 – Nov. 5**
	Moderate fed	**Heavier fed**	**Moderate & heavy fed**
Initial weight, lb.	457	457	450
Weight out, lb.	651	688	1069
Gain, lb.	195	213	619
Selling value, $	264.96	273.48	365.54
Initial cost, $	265.97	265.97	262.19
Feed cost $	44.37	63.87	208.74
Net loss, $	45.38	56.36	105.74
Feed consumed/hd.:			
Oats, lb.	409	1096	2228
Barley, lb.	--	--	1050
Tame hay, lb.	1146	443	1869
Alfalfa, lb.	82	81	291
Di-cal, lb.	8	8	29
Salt, lb.	33	32	117

Table 24--Average feed consumption and feed cost/cwt gain, May 2 – November 5, 1974

	Heavier gain lots		Moderate gain lots	
Avg. feed consumption:				
Oats, lb.	1703	1709	1252	1239
Barley, lb.	1431	1441	666	660
Tame hay, lb.	836	840	1316	1308
Alfalfa, lb.	209	210	212	210
Di-cal, lb.	21	21	21	21
Salt, lb.	84	84	85	84
Feed/hd./day, lb.	23	23	19	19
Feed/lb./gain, lb.	9.6	9.9	8.9	9.9
Feed cost/cwt gain, $	38.91	42.70	32.70	36.22
Feed cost/hd., $	173	186	130	129

Table 25--Gains at two feeding levels – finishing phase, May 2 – November 5, 1974

	Heavier gain lots		Moderate gain lots	
Initial wt., lb.	651	677	657	660
Final wt., lb.	1095	1113	1056	1017
Gain, lb.	444	436	399	357
Days fed	187	187	187	187
Avg. daily gain, lb.	2.37	2.33	2.13	1.91

Table 26--Carcass data and returns for two feeding levels – January 21 – November 5, 1974

	Heavier gain lots		Moderate gain lots	
Avg. carcass wt., lb.	652	665	632	599
Avg. carcass grade	3 ch, 2 gd	3 ch, 2 gd	4 ch, 1 gd	3 ch, 2 gd
Dressing %	59.5	59.7	59.8	58.9
Avg. carcass value, $	374.10	382.36	368.82	336.89
Initial cost @ $58.20/cwt.	266	266	266	266
Feed cost/hd., $	237	250	174	173
Total cost, $	503	516	440	439
Net loss, $	129	134	71	102

COMPARISON OF SELF FED RATIONS FOR BEEF AND DAIRY STEERS

This trial, initiated at the request of cattle feeders and the North Dakota Milk Producers Association, was designed to compare dairy bred steers with beef steers. Feeders have reported that under certain conditions rate of gain and feed efficiency is less with dairy bred steers than with beef steers fattened under the same conditions. Information was desired on: returns realized from dairy bred steers and beef steers when fed under the same conditions, and, how the two types of animals compare in the management required to produce a carcass of equal grade.

Beef calves weighing 457 pounds and Holstein calves averaging 470 pounds were allotted to the trial, beginning on January 21. After a warm up period, a self-fed ration of 75% oats, 20% tame hay, 5% alfalfa, di-cal and salt was fed throughout the backgrounding phase. For the finishing phase, grain in the ration was 60% barley and 40% oats.

When the beef steers reached an average slaughter weight of 1050 to 1100 pounds they were sold on a grade and yield basis along with a random selection of half the dairy bred steers. The remaining half of the dairy bred steers are being continued on feed to determine the feed requirements necessary to get them to high good and low choice grades comparable to the beef steers.

Table 27--Average feed consumption and feed cost/cwt gain for beef bred and and dairy bred steers in the feedlot 1/

	Beef steers	Dairy steers
Avg. feed consumption:		
Oats, lb.	10.0	9.4
Barley, lb.	3.69	4.36
Tame hay, lb.	4.44	4.35
Alfalfa, lb.	0.96	0.95
Di-cal, lb.	0.10	0.09
Salt, lb.	0.38	0.38
Total/head/day, lb.	19.6	19.6
Feed/lb. gain, lb.	9.0	9.4
Feed cost/cwt gain	$36.66	$39.02

1/ Figures represent average feed consumption and should not be considered as fed daily. For example, barley was fed only from May 2 – November 4.

Table 28--Weights, gains and return for beef bred and dairy bred steers in the feedlot, 1974.

	Beef steers	**Dairy steers**
Initial wt., lb.	457	470
Final wt., lb.	1104	1071
Gain, lb.	647	601
Days fed	288	288
Avg. daily gain, lb.	2.25	2.09
Initial cost--		
@ $45.80/cwt., $	--	215
@ $58.20/cwt., $	266	--
Feed cost/hd, $	222	235
Total cost, $	488	450
Avg. carcass wt., lb.	659	623
Avg. carcass grade	6 ch, 4 gd	1 ch, 1 gd, 3 L.gd, 2 std
Dressing %	59.6	57.3
Avg. carcass value	378.23	347.35
Initial cost	266	215
Feed cost/hd, $	222	235
Total cost, $	488	450
Net loss, $	109.77	102.65
Feed prices and feed analysis, 1974		
Ingredient	**Price/unit**	**% Protein**
Alfalfa hay	$40/ton	15.8
Crested wheatgrass	30/ton	12.2
Oat straw	15/ton	6.3
Barley	$2.50/bushel	12.4
Oats	1.40/bushel	11.6
Soybean oilmeal	$186/ton	
Di-cal	$236/ton	
Trace mineral salt	55/ton	
Granulated salt	50/ton	

IS SUPPLEMENTAL PROTEIN NECESSARY FOR FATTENING STEERS ON COMPLETE MIXED RATIONS?

Complete mixed rations which include alfalfa as 5% of the ration have performed well in trials at this station in the past. However, performance on higher levels of alfalfa had not been determined at this station prior to the beginning of these trials in 1973.

There is concern about the problem of bloat, and its relationship to the level of alfalfa in the ration. Some producers have plenty of alfalfa and would like to use as much as is practicable. Others have limited amounts and want to use it to the best possible advantage, in combination with other hay. The value of soybean oilmeal as an additional protein in self-fed rations is also being determined.

Self-fed rations containing no alfalfa, and alfalfa in the amount of 5%, 15% and 25% of the total ration, and a 5% alfalfa ration which included soybean oilmeal as a supplemental protein were fed to steer calves, from an average starting weight of 420 pounds to slaughter weights of about 1050 pounds.

The feeding period in 1973 extended from February 2 until November 19, a total of 308 days. In 1974 the 340 day feeding period was from November 1, 1973 to October 7, 1974.

During the feeding period, oats in the ration was replaced by barley as shown in table 29. The trial summary is presented in tables 30, 31, and 32. Carcass data are summarized in tables 33, 34, and 35.

Table 29---Composition of self-fed rations by weight for the feeding period November 6, 1973 to October 7, 1974 1/

Lot 3 – 5% alfalfa, 20% tame hay **Lot 4 – 15% alfalfa, 10% tame hay** **Lot 5 – 25% alfalfa, no tame hay** **Lot 7 – no alfalfa, 25% tame hay**	
November 6 – November 12	25% oats, 75% hay
November 13 – November 25	50% oats, 50% hay
November 26 – March 20	65% oats, 10% barley, 25% hay
March 21 – April 22	50% oats, 25% barley, 25% hay
April 23 – May 15	40% oats, 35% barley, 25% hay
May 16 – October 7	30% oats, 45% barley, 25% hay
See footnotes at end of table Continued	
Lot 6 – 5% alfalfa, 20% tame hay, 7.4% soybean oilmeal	
Nov. 6 – Nov. 12	25% oats, 75% hay
Nov. 13 – Nov. 25	50% oats, 50% hay
Nov. 26 – Mar. 20	65% oats 25% hay, 2.6% barley, 7.4% SBOM
Mar. 21 – April 22	50% oats, 25% hay, 17.6% barley, 7.4% SBOM
April 23 – May 15	40% oats 25% hay 27.6% barley, 7.4% SBOM
May 16 – Oct. 7	30% oats, 25% hay, 37.6% barley, 7.4% SBOM

1/ All lots received minerals at the rate of 10 pounds di-calcium phosphate and 20 pounds granulated salt, added to 1000 pounds of mixed feed for the first two months, after which the di-calcium phosphate was reduced to 5 pounds.

Table 30--Weights, gains and feed costs in the 1974 trial comparing alfalfa and soybean oilmeal as a protein supplement, fed to Hereford steers

	Self-fed rations including:				
	No alfalfa	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Initial wt., lb.	409	411	409	411	410
Final wt., lb.	1049	1090	1035	1049	1078
Gain/hd., lb.	640	679	626	638	668
Days fed	340	340	340	340	340
Avg. daily gain, lb.	1.88	1.99	1.84	1.87	1.96
Lbs. feed/hd./day	16.5	17.9	17.5	17.6	17.9
Feed cost/100 lbs. gain	$36.75	$38.02	$40.56	$40.58	$40.90
Feed cost/hd./day	0.69¢	0.76¢	0.75¢	0.76¢	0.80¢

Table 31--Two year average weights, gains and feed costs in the trial comparing alfalfa and soybean oilmeal as a protein supplement, fed to Hereford steers

	Self-fed rations including:				
	No alfalfa	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Initial wt., lb.	419	420	419	420	420
Final wt., lb.	1054	1098	1063	1074	1047
Gain/hd., lb.	635	679	644	654	627
Days fed	324	324	324	324	324
Avg. daily gain, lb.	1.97	2.10	2.00	2.02	1.93
Lbs. feed/hd./day	17.1	17.8	19.4	18.1	18.3
Feed cost/100 lbs. gain	$26.90	$27.38	$30.33	$29.09	$34.00
Feed cost/hd./day	0.52¢	0.57¢	0.59¢	0.57¢	0.66¢

Table 32--Average daily consumption in the 1974 trial comparing alfalfa and soybean oilmeal as protein supplements

	Self-fed rations including:				
Ingredients	**No alfalfa**	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Oats, lb.	7.20	7.74	7.60	7.72	7.85
Barley, lb.	4.50	5.02	4.81	4.82	3.62
Soybean oilmeal, lb.	--	--	--	--	1.21
Tame hay, lb.	4.34	3.84	2.14	0.52	3.85
Alfalfa, lb.	--	0.87	2.46	4.11	0.86
Di-cal, lb.	0.10	0.11	0.10	0.10	0.11
Trace mineral salt, lb.	0.32	0.35	0.34	0.34	0.35

Table 33—Carcass data – Hereford steers, 1973 protein supplement trial

	Self-fed rations including:				
	No alfalfa	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Final wt., lb.	1059	1106	1091	1098	1015
Hot carcass wt., lb.	643	671	644	654	610
Dressing %	61	61	59	60	60
Grades - Choice	4	4	4	2	5
Good	3	2	2	5	2
Carcass value, $	373	397	390	391	365
Net profit, $	265	284	257	273	207

Table 34—Carcass data – Hereford steers, 1974 protein supplement trial

	Self-fed rations including:				
	No alfalfa	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Final wt., lb.	1049	1090	1035	1049	1078
Hot carcass wt., lb.	621	643	619	632	648
Dressing %	59	59	60	60	60
Grades - Choice	6	4	6	5	5
Good	1	3	1	2	2
Carcass value, $	383	385	382	385	394
Net profit, $	148	127	128	126	121

Table 35--Carcass data – Hereford steers, protein supplement trial - two year average

	Self-fed rations including:				
	No alfalfa	**5% alfalfa**	**15% alfalfa**	**25% alfalfa**	**Soybean oilmeal**
Final wt., lb.	1054	1098	1063	1074	1047
Hot carcass wt., lb.	632	657	632	643	629
Dressing %	60	60	60	60	60
Grades - Choice	5	4	5	4	5
Good	2	3	2	3	2
Carcass value, $	378	391	386	388	380
Net profit, $	207	206	193	200	164

Summary:

Neither the level of alfalfa in the ration nor the addition of soybean oilmeal protein supplement affected gains significantly. Feed costs were highest for the ration supplemented with soybean oilmeal, but gains were no better with this ration than with rations not supplemented. The lowest net profit for any ration in this comparison was from the ration supplemented with soybean oilmeal.

HEREFORD AND BLACK WHITE FACE STEERS ON SELF-FED FATTENING RATIONS

The feedlot performance of Hereford and Angus x Hereford crossbred steers on self-fed fattening rations has been compared over a two-year period.

The feeding period in 1973 extended from February 2 until November 19, a total of 308 days. In 1974 the 340 day feeding period was from November 1, 1973 to October 7, 1974.

During the feeding period, oats in the ration was replaced by barley as shown in the following table.

Summary:

While the 100 pound difference in gain per head in 1974 in favor of the Hereford steers is statistically significant, no difference is shown in the net profit realized.

Results over the two years of feeding indicate that Herefords and Angus x Hereford crossbreds performed equally well on the self-fed rations used.

Table 36--Composition of self-fed ration by weight for the feeding period November 6, 1973 to October 7, 1974 1/

Ration of 5% alfalfa – 20% tame hay	
November 6 – November 12	25% oats, 75% hay
November 13 – November 25	50% oats, 50% hay
November 26 – March 20	65% oats, 25% hay, 10% barley
March 21 – April 22	50% oats, 25% hay, 25% barley
April 23 – May 15	40% oats, 25% hay, 35% barley
May 16 – October 7	30% oats, 25% hay, 45% barley

1/ All lots received minerals at the rate of 10 pounds di-calcium phosphate and 20 pounds granulated salt, added to 1000 pounds of mixed feed for the first two months, after which the di-calcium phosphate was reduced to 5 pounds.

Average daily consumption of the self-fed ration is shown in table 37.

Table 37--Average daily consumption, self-fed rations – 1974

Ingredient	Hereford	BWF
Oats, lb.	7.74	7.11
Barley, lb.	5.02	4.38
Tame hay, lb.	3.84	3.50
Alfalfa, lb.	0.87	0.78
Di-cal, lb.	0.11	0.10
Trace mineral salt, lb.	0.35	0.31

Weights, gains feed costs and carcass data are summarized in tables 38 and 39.

Table 38--Weights, gains and feed costs in the trial comparing Hereford and black white face steers on a self-fed fattening ration

	1974 Trial		1973 Trial		2-Year Avg.	
	Hereford	BWF	Hereford	BWF	Hereford	BWF
Initial wt., lb	411	424	428	428	420	426
Final wt., lb.	1090	1003	1106	1042	1098	1023
Gain/hd., lb.	679	579	678	614	679	597
Days fed	340	340	308	308	324	324
Avg. daily gain, lb.	1.99	1.70	2.20	1.99	2.10	1.85
Lbs. feed/hd./day	17.9	16.2	18.4	19.3	17.8	17.8
Feed cost/100 lbs. gain	$38.02	$40.14	$16.74	$19.41	$27.38	$29.78
Feed cost/hd.,/day	0.76	0.68	0.37	0.39	0.57	0.54

Table 39--Carcass data – Hereford vs. black white face on self-fed fattening rations

	1974 Trial		1973 Trial		2-Year Avg.	
	Hereford	BWF	Hereford	BWF	Hereford	BWF
Final wt., lb.	1090	1003	1106	1043	1098	1023
Hot carcass wt., lb.	643	595	671	629	657	612
Dressing %	59	59	61	60	60	60
Grades - Choice	4	5	4	4	-	-
Good	3	2	2	2	-	-
Carcass value, $	385	362	397	374	391	368
Net profit, $	127	130	284	255	206	193

COMPARISON OF BWF AND HEREFORD STEER CALVES UNDER GROWING CONDITIONS

This trial is a phase of a comparison of crossbred Angus-Hereford (BWF) steers with Hereford steers under both pasture and feedlot conditions.

In this trial, steer calves were wintered to gain approximately 1.5 pounds per day on a limited grain-high roughage growing ration. In this trial, two lots of 13 steers each of BWF and Hereford type were wintered for 152 days, from November 30 to May 1, 1974. During this time, each calf was fed a ration of 3 pounds of oats, 2 pounds alfalfa hay, 0.2 pound mineral mix and tame hay free choice. The calves were weighed monthly and feed consumption per lot was recorded.

Summary:

During this wintering phase, the Hereford steers were more efficient than the BWF steers requiring $4.69 less feed per one hundred pounds gain.

The Hereford steers gained 28 pounds more per head than the BWF, the difference being statistically significant at the 95 percent probability level.

Twelve steers from each group were pastured together and will be finished in dry lot following the summer grazing period.

Table 40--Results of the 1974 winter growing period with BWF and Hereford steers

	BWF	Hereford
Number of head	13	1/ 12
Initial weight, lb.- (Nov. 30, 1973)	366	375
Final weight, lb.- (May 1, 1974)	547	583
Average steer gain, lb.	180	208
Difference, lb.		+28
Days fed	152	152
Average daily gain, lb.	1.18	1.37

1/ One steer removed because of lameness.

Table 41--Ration fed, feed consumption and cost per hundredweight gain

	BWF Lbs./hd. per day	Hereford Lbs./hd. per day
Ration as fed:		
Oats	3.0	3.0
Alfalfa hay	2.0	2.0
Tame hay	9.8	9.8
Mineral mix	0.2	0.2
Total feed consumed	15.0	15.0
Lbs. feed/lb. gain	12.6	10.8
Ration cost:		
Per head	$51.20	$49.89
Per 100 lb. gain	28.39	23.70

Feed costs in this ration figured at:

$0.0438 for oats
0.02 for alfalfa
0.015 for tame hay
0.0955 for mineral mix

CROSSBREDS VS. STRAIGHTBREDS

With the current interest in crossbreeding a trial was started in 1972 to compare Hereford and Angus X Hereford (BWF) steers under uniform conditions in western North Dakota. The steers reported in this trial were pastured for six months and then finished in dry lot for five months.

The steers were wintered under uniform conditions (see previous article) and started on trial at an initial weight of approximately 600 pounds. Twelve steers of each breed (Hereford or BWF) were randomly allotted by weight into pasture groups. During the pasture phase (Phase I) the steers started grazing in late April or early May on crested wheatgrass. About the end of June or early July they grazed on native pastures. The steers were then moved to Russian wildrye pastures. Grazing on the Russian wildrye pastures ran from about September 1 to November 1.

In Phase 2, the steers were fed in dry lot for about 5 months. The steers were fed in straight Hereford or BWF groups in order to measure feed efficiency. At the finish of the dry lot period (steers averaged 1050-1100 pounds) carcass information was gathered on all steers.

Discussion:

The three year's data would indicate that approximately 190 days of grazing were obtained using the three pasture types. Average daily gain on pasture averaged about 1.35 pounds per head per day for the grazing period.

In dry lot, the steers were hand fed in 1972 using oats, barley, hay and silage. In 1973, the steers were self fed a high grain ration (see table 43).

Table 42 shows the three year steer gains on pasture.

Table 43 shows the average ration fed in dry lot in 1973.

Table 44 shows the results of dry lot feeding, over-all carcass quality and value returned in 1973.

Table 45 shows the two year average results of dry lot feeding.

Summary:

After three years of grazing, we see that the crossbred steers gained faster averaging 16.3 pounds more gain per head than the Herefords.

Two years results in dry lot show most of the crossbred advantage in higher grading carcasses, and therefore higher carcass values. The average dollar advantage for crossbreds was about $25 per head.

Table 42--Yearling steer gains on pasture, 1972-1974

Pasture grazed	Grazing period	Hereford	BWF
Crested wheatgrass:			
1972 (56 days)	May 12 – July 7	109.5	133.5
1973 (56 days)	April 26 – June 21	82.5	84.2
1974 (55 days)	May 1 – June 25	90.0	84.1
3-Yr. avg.		94.0	100.6
Native pasture:			
1972 (56 days)	July 7 – Sept. 1	43.5	41.5
1973 (63 days)	June 21 – Aug. 23	110.8	104.2
1974 (71 days)	June 25 – Sept. 4	107.5	130.0
3-Yr. avg.		87.3	91.9
Russian wildrye			
1972 (56 days)	Sept. 1 – Oct. 27	84.5	81.0
1973 (71 days)	Aug. 23 – Nov. 2	62.5	77.9
1974 (70 days)	Sept. 4 – Nov. 13	36.4	39.7
3-Yr. avg.		61.1	66.2
Combined average:			
1972 (168 days)	May 12 – Oct. 27	237.5	256.0
1973 (190 days)	April 26 – Nov. 2	255.8	266.2
1974 (196 days)	May 1 – Nov. 13	233.9	253.8
3-Yr. avg.		242.4	258.7
Average daily gain		1.31	1.40

Table 43--Ration fed in dry lot

	Hereford	BFW
Number of head	12	12
55% barley, lb.	13,414	14,233
35% oats, lb.	8,609	9,139
10% alfalfa hay, lb.	2,358	2,508
Tame hay, lb. 1/	11,600	11,600
Di-cal, lb.	182	189
Salt, lb.	525	559
Total feed cost + grinding	$1,459.61	$1,535.53

1/ Tame hay fed while steers were warmed up on feed.

Table 44--Steer gains in dry lot, 1973

	Hereford	BWF
Number of head	12	12
Initial weight, lb.	793.3	833.8
Final weight, lb.	1072.5	1112.1
Average gain, lb.	279.2	278.3
Days fed	130	130
Average daily gain, lb.	2.15	2.14
Hot carcass weight, lb.	605.4	629.7
Dressing percent	56.4	56.6
Grade:		
Choice = $68.00	4	5
Good = $64.00	8	7
Average carcass value	$395.68	$413.72
Average feed cost/animal	121.63	127.96
Value over feed	274.05	285.76
Feed cost/cwt. gain	43.57	45.97
Advantage of crossbreds per head = $11.71		

Table 45--Steer gains in dry lot, 2-year average 1972-1973

	Hereford	BWF
Number of head	22	22
Initial weight, lb.	820.2	842.6
Final weight, lb.	1073.8	1102.0
Average gain, lb.	253.6	259.4
Days fed	133	133
Average daily gain, lb.	1.90	1.95
Hot carcass weight, lb.	606.6	635.3
Dressing percent	56.5	57.7
Grade:		
Choice = $70.75	6	14
Good = $67.00	16	8
Average carcass value	$412.67	$441.28
Average feed cost/animal	89.09	92.32
Value over feed	323.58	348.95
Feed cost/cwt. gain	34.18	34.77
Advantage of crossbreds per head = $25.38		

THE SLOTTED FENCE SHELTER FOR BEEF CATTLE

The slotted board fence is an effective shelter for beef cattle in western North Dakota, proven by nine years of use at the Dickinson Experiment Station.

The idea as well as the design for the shelter in use at the station was borrowed from a prototype windbreak at the University of Saskatchewan livestock feedlot at Saskatoon, Saskatchewan, Canada.

Beginning in 1965, the slotted fence was used here in feedlot trials which compared its effectiveness with solid board fence and pole shed shelters. Five years' results showed no marked differences between these types of shelter as measured by rate of gain, efficiency of feed conversion or health of the cattle.

Since 1969, the slotted fence has also been used successfully at Dickinson as winter shelter for the beef breeding herd. During the five years this type of shelter has been used for the breeding herd, satisfactory weight gains have been maintained, calving percentages have been very good and general herd health has been satisfactory.

Table 46--Cow weights during the winter period 1969-1974

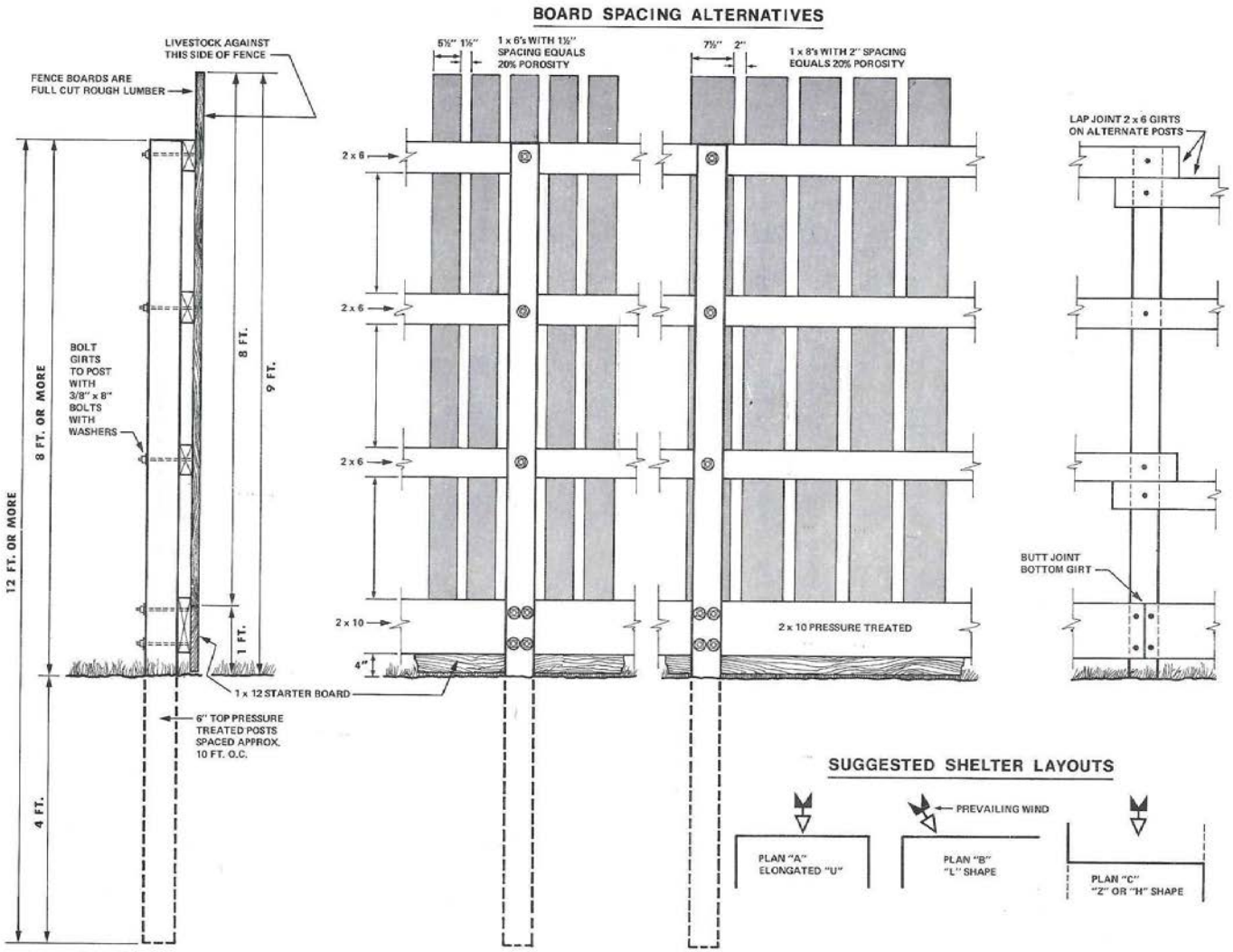
Year	Weight on:				Difference
1969-70	Nov. 26	1072	Mar. 19	1110	+38
1970-71	Nov. 30	1082	Mar. 17	1123	+41
1971-72	Dec. 3	1079	Mar. 15	998	-81
1972-73	Dec. 1	1046	Feb. 28	1107	+61
1973-74	Dec. 3	1052	Jan. 31	1086	+34

Table 47--Per cent calf crop, 1969-1974

Year	Cows	Calves	Per cent calf crop
1969-70	81	77	95
1970-71	85	83	98
1971-72	91	90	99 (Two sets twins)
1972-73	105	101	96 (One set twins)
1973-74	119	115	96

Two controlling factors in fence design are; per cent slot area to total fence area; and, slot width. Designs which utilize board widths of 6 to 8 inches are recommended because the best combinations of porosity and slot width can be provided with lumber of these dimensions.

Suggested construction detail is shown on the following page.


BOARD SPACING ALTERNATIVES
LIVESTOCK AGAINST THIS SIDE OF FENCE
FENCE BOARDS ARE FULL CUT ROUGH LUMBER
BOLT GIRTS TO POST WITH 3/8" x 8" BOLTS WITH WASHERS
12 FT. OR MORE
8 FT. OR MORE
4 FT.
8 FT.
9 FT.
1 FT.
1 x 12 STARTER BOARD
6" TOP PRESSURE TREATED POSTS SPACED APPROX. 10 FT. O.C.
5½" 1½"
1 x 6's WITH 1½" SPACING EQUALS 20% POROSITY
7½" 2"
1 x 8's WITH 2" SPACING EQUALS 20% POROSITY
2 x 6
2 x 6
2 x 6
2 x 10
4"
2 x 10 PRESSURE TREATED
LAP JOINT 2 x 6 GIRTS ON ALTERNATE POSTS
BUTT JOINT BOTTOM GIRT
SUGGESTED SHELTER LAYOUTS
PREVAILING WIND
PLAN "A" ELONGATED "U"
PLAN "B" "L" SHAPE
PLAN "C" "Z" OR "H" SHAPE

SWINE FEEDING TRIALS
WINTER 1973-74

Swine fattening rations in which triticale or barley as the major grain ingredient were used in these trials. Both natural protein (soybean oilmeal) and the amino acids (lysine and methionine) were also tested as suitable ration supplements.

Hogs started on trial at an initial weight between 30 and 40 pounds, and were fed for a period of 122 days depending upon sex and ration. All rations were processed in a portable grinder-mixer and self-fed in meal form. The pigs used in the trial were farrowed during August and September, 1973. All pigs were wormed with dichlorvos at the beginning of the trial. Both crossbred and purebred pigs were uniformly distributed within lots.

The ration ingredients, costs and calculated protein levels are shown in table 48. Weights, gains and feed costs are summarized in tables 49 to 51.

Table 48--Rations as fed – winter hog trials, 1974

Ingredients:	Ration 1 Barley & SBOM	Ration 2 Triticale & SBOM	Ration 3 Triticale & Lysine-Methionine	Ration 4 Triticale-Barley & SBOM
Barley, lb.	679	--	--	200
Triticale, lb.	--	679	772	679
Oats, lb.	200	200	200	--
Soymeal, lb.	100	100	--	100
Lyamine, 50%, lb.	--	--	5	--
Methionine, 99%, lb.	--	--	1.5	--
Minerals & vitamins 1/	21	21	21	21
Crude protein, %	14.7	16.3	13.1	16.5
Cost/100 lb. feed, $	5.51	5.51	5.55	5.67

1/ Includes: 10 lb. limestone, 5 lb. di-calcium phosphate, 5 lb. trace mineral salt, 1 lb. vitamin B complex, 30 gms. vitamin A, 14 gms. vitamin D_3 and 180 gms. zinc sulphate per 1000 lbs. feed.

Table 49--Weights, gains and feed costs – swine feeding trials, winter 1973-74

	Ration 1	Ration 2	Ration 3	Ration 4
Initial wt., lb.	30	30	31	32
Final wt., lb.	188	197	191	198
Gain, lb.	158	167	160	166
Days fed	122	122	122	122
Avg. daily gain, lb.	1.30	1.37	1.31	1.36
Feed/hd/day, lb.	4.97	5.26	5.31	4.63
Feed/lb. gain, lb.	3.82	3.84	4.04	3.40
Cost/100 lb. gain, $	21.07	21.21	22.57	19.32

Table 50--Comparison of crossbred vs. purebred barrows fed the 14.7% barley + soybean oilmeal ration

	Yorkshire	Duroc X Yorkshire
Initial wt., lb.	39	39
Final wt., lb.	199	211
Gain, lb.	160	172
Days fed	122	122
Avg. daily gain, lb.	1.31	1.41
Feed/hd/day, lb.	5.19	6.01
Feed/lb. gain, lb.	3.96	4.26
Cost/100 lb. gain, $	21.81	23.46

Table 51--Comparison of barley and triticale for swine growing-fattening rations, 2-year average

	Barley		Triticale	
	Barrows	Gilts	Barrows	Gilts
Initial wt., lb.	41.2	42.8	41.6	42.0
Final wt., lb.	203	219	207	213
Gain, lb.	162	176	165	171
Days fed	121	135	121	135
Avg. daily gain, lb.	1.34	1.30	1.36	1.26
Feed/cwt gain, lb.	415	465	411	448
Cost/cwt gain, $	18.22	20.24	18.12	19.32

Summary:

The 1974 trials show that clean, ergot free triticale will substitute, pound for pound, for barley in growing-finishing rations for pigs. Although triticale contains about 16% crude protein, triticale rations supplemented with soybean oilmeal performed slightly better than those supplemented with the amino acids, lysine and methionine.

Crossbred barrows gained about a tenth of a pound faster than the purebred barrows. However, they consumed about 0.8 pound more feed per day, and required 0.3 pound more feed per pound of gain than did the purebred barrows. This amounted to an increase of $1.65 in the cost per hundredweight gain for the crossbreds.

Two years' data comparing triticale and barley show the two grains to produce about equal results in growing-finishing rations for pigs.

FEEDING LIQUID WHEY IN SWINE FATTENING RATIONS

The disposal of liquid whey, a by-product of cheese manufacture at North Dakota cheese plants, has been a problem. Its resistance to decomposition in sewage systems has made it necessary to find other means of disposal. Its use as a fertilizer is of limited value. However, it can be used in swine feeding to provide necessary protein.

This trial was designed to investigate the use of liquid whey as a supplement in swine fattening rations. In this experiment, whey, soybean oilmeal and lysine are compared, as supplements to a basic barley and oats fattening ration. Pigs of two starting weights were used, and were fed in concrete dry lot, and on winter wheat pasture. The pigs were started on whey gradually, and did not develop any scouring.

Liquid whey was self-fed using nipple type waterers. The whey fed pigs received no extra water after the first month, their entire liquid intake coming from the whey. The whey was furnished daily by the Dickinson Cheese Company, stored in fiber glass tanks at the station for twenty four hours, and fed in sour form. The whey was furnished at no cost, but in rations computations, a charge of ½ cent per gallon was made to cover cost of hauling and handling.

Although the utilization of whey was impossible to measure accurately because of waste in feeding, it amounted to approximately 2.55 gallons per pig per day. This is in agreement with figures for liquid consumption as presented by the National Research Council.

Table 52 shows ration composition and costs. Table 53 summarizes weights, gains and feed costs for dry lot trials over the past two years. Table 54 shows results under pasture conditions.

Summary:

Barley-oats rations supplemented with whey were equal to rations supplemented with either soybean oilmeal or amino acides lysine and methionine. The whey fed pigs were more efficient and had a lower cost of gain than either the soybean oilmeal or the amino acid fed pigs. The whey fed pigs required approximately 100 pounds less dry feed per 100 pounds gain than the other rations. This amounted to a savings of about $4/100 pounds gain over the amino acid fed pigs and $5/100 pounds gain over the soybean oilmeal fed pigs.

It appears from this trial that whey can be utilized very satisfactorily in a swine feeding program if: the source of whey is adequate and dependable; the pigs weigh at least 35 pounds; and, proper liquid feeding devices (stainless steel or PVC plastic) are utilized to minimize contamination, fly and odor problems.

Table 52--Rations as fed, summer hog trials – 1974

	Ration Supplement		
Ingredient	**SBOM**	**Lysine**	**Whey**
Oats, lb.	200	231	236
Barley, lb.	676	739	740
Soymeal, lb.	100	--	--
Lyamine, lb.	--	6	--
Minerals, vitamins 1/	24	24	24
Price/ton, $	111	109	102

1/ Includes: Limestone 9 lb., di-cal 9 lb., trace mineral salt 5 lb., vitamin B complex 1 lb., 30 gms. vitamin A, 14 gms. vitamin D_3 and 180 gms. zinc sulphate per 1000 pounds feed.

Table 53--Weights, gain and feed cost in dry lot trials at two starting weights, 2-year average

	Ration Supplement					
	SBOM		**Lysine**		**Whey**	
Initial wt., lb.	36	50	36	50	35	50
Final wt., lb.	197	220	189	215	192	208
Gain, lb.	161	170	153	165	157	158
Days fed	126	119	126	119	126	119
Avg. daily gain, lb.	1.28	1.43	1.21	1.39	1.24	1.32
Feed/cwt gain, lb.	406	395	411	403	291	301
Feed cost/cwt gain, $	18.87	18.44	17.99	17.36	13.16	13.32

Table 54--Weights, gain and feed costs in pasture trials at two starting weights - 1974

	Ration Supplement			
	Whey	**Lysine**	**Whey**	**SBOM**
Initial wt., lb.	34	34	47	47
Final wt., lb.	209	224	236	217
Gain	175	190	189	170
Days fed	138	138	138	117
Avg. daily gain, lb.	1.26	1.38	1.37	1.45
Feed/cwt gain, lb.	353	437	347	401
Feed cost/cwt gain, $	$20.40	$23.84	$20.00	$22.21

INCLUDING ANTIBIOTICS IN SOW RATIONS TO REDUCE BABY PIG LOSSES

Many baby pigs die before weaning from scours, miscellaneous infections and starvation caused by a sow failing to milk. Feeding high levels of antibiotics two weeks before and for three weeks after farrowing is reported to reduce baby pig losses, improve milk production in the sow and increase number of pigs weaned.

In August 1974, 24 bred sows and gilts were divided into nearly equal groups based on breed and expected farrowing dates. They were moved into the farrowing barn about 5 days prior to farrowing and assigned to either medicated or non-medicated feed. In 1974, the antibiotic (containing 15 gms./lb. of oxytetracycline and 10 gms./lb. neomycin) was top dressed on the sows ration at the rate of 27 grams per sow per day. This rate of medication was continued to the medicated group until three weeks after farrowing.

Table 55 shows the three rations as fed in 1974. The gestation ration was fed until the sows went into the farrowing barn. The early-lactation ration was fed until the pigs were moved out of the farrowing barn at about seven days of age. The lactation ration was then fed until weaning.

Table 55-1974 Sow gestation and lactation rations

	Gestation ration	**Early Lactation ration**	**Lactation ration**
Alfalfa hay, lb.	300	--	--
Barley, lb.	--	--	676
Oats, lb.	672	970	175
Soymeal, lb.	--	--	125
Limestone, lb.	10	10	9
Di-calcium phosphate, lb.	10	10	9
Trace mineral salt, lb.	7.5	7.5	5
Vitamin B complex, lb.	1	1	1
Vitamin A, gram	75	75	30
Vitamin D_3, gram	14	14	14

Table 56--Results of trials with the use of neomycin – oxytetracycline in sow rations

	Treated		Check	
	1973	**1974**	**1973**	**1974**
Number of litters	12	12	1/ 11	12
Crossbred	8	6	2	5
Straightbred	4	6	9	7
Number living at birth	129	134	131	126
Avg. birth wt., lb.	2.60	2.70	2.45	2.65
Number living at weaning	113	111	81	88
Avg. weaning wt., lb.	28.2	28.2	29.9	28.2
Avg. age at weaning, days	51	48	56	51
Avg. daily gain, birth to weaning, lb.	0.50	0.55	0.52	0.52
Per cent alive at weaning	88	79	62	79
Sows requiring additional medication	5	4	3	3

1/ One sow not included because she farrowed unattended in a portable house and lost most of her pigs.

Summary:

The 1974 farrowing showed very little difference between the control or medicated groups with 79% of pigs born alive weaned in both groups. The two year average shows about 13% more pigs weaned from the medicated sows than from the control sows. The cost of medication in 1974 averaged about $1.82 per sow.

Section II

Reports of

Range and Pasture Management Research

at the

Dickinson Experiment Station

Presented by

Dr. Warren C. Whitman, Botanist

at the

25th Annual Livestock Research Roundup

Dickinson Experiment Station
Dickinson, North Dakota

December 4, 1974

THREE-PASTURE SYSTEM GRAZING TRIAL

The grazing trial using crested wheatgrass for spring and early summer grazing, native grass in mid and late summer, and Russian wildrye for fall grazing was continued for the third year in the 1974 season. The trial compares fertilized crested wheatgrass and fertilized native grass with unfertilized pastures of the same kinds. The Russian wildrye pastures used in the trial have all been fertilized each year. The fertilized crested wheatgrass and native grass pastures have been given annual applications of 50 lbs N per acre, while the Russian wildrye pastures received 75 lbs N in 1972, 150 lbs N in 1973, and 50 lbs N – 30 lbs P_20_5 in 1974.

The grazing plan for the 1974 season is shown in Table 1. This year 12 yearling steers were used on each pasture, just as in the 1973 season. Two of the 8-acre Russian wildrye pastures were grazed from early September to early October, while the remaining two pastures were grazed in October and early November.

Forage production and grazing utilization of the forage on the pastures for the 1974 season are shown in Table 2. Forage production on the crested wheatgrass pastures in the 1974 season was slightly higher than in 1973, averaging about 19% greater on the unfertilized pastures and about 16% greater on the fertilized pastures. Since approximately the same amount of forage was consumed by the grazing animals in both seasons, overall utilization was somewhat less this year than in 1973. The utilization of 46% on the unfertilized crested and 58% on the fertilized pasture was lower than would normally be desirable, and considerable amounts of forage were left on the ground at the end of the grazing period. The grazing period on the crested wheatgrass pastures extended from May 1 to June 25, a total of 55 days.

The production on the native grass pastures was appreciably higher in the 1974 season than in the 1973 season, averaging about 30% higher on the unfertilized pasture and 55% higher on the fertilized pasture. Final utilization values on these pastures were 44% and 42%, respectively, quite similar to utilization values in the 1973 season. The grazing period on the native grass pastures was from June 25 to Sept. 4, a total of 71 days.

Production on the Russian wildrye pastures was about the same in the 1974 season as in the 1973 season. Utilization on the first two 8-acre pastures grazed was quite heavy, averaging 75% on one and 90% on the other with approximately the same total pounds of forage being consumed off each pasture. Overall consumption of forage was not quite as great on these pastures this year as in the 1973 season. The steers grazed the first two Russian wildrye pastures (pastures 3 and 4) from Sept. 4 to Oct. 11, a period of 37 days. The steers were moved to the remaining two wildrye pastures on Oct. 11 and were still grazing there at the time this report was prepared.

The performance of the steers on the pastures is shown in the data of Table 3. As in the 1973 season, half of the steers in each lot were black whitefaces and half were Herefords. Gains per acre on the crested wheatgrass pastures were slightly better in 1974 than in the 1973 season, averaging 71.3 lbs on the unfertilized pastures. Daily gains per head were also slightly better than last year. In all three years of the trial the daily gains per head have been a little bit better on the unfertilized crested wheatgrass than on the fertilized pasture. In the 1974 season daily gains per head average 1.72 lbs on straight crested and 1.44 lbs on the fertilized crested wheatgrass.

The steers were moved from the crested wheatgrass pastures to the native grass pastures on June 25 in order to begin grazing the native grass before it became too mature. The gains of the steers on native grass this year were about the same as last year, averaging 1.53 lbs/head/day on the unfertilized native and 1.82 lbs/head/day on the fertilized native grass. In the 1973 season the steers also made better daily gains on the fertilized native grass than on the unfertilized. Gains per acre this year were somewhat better than last year, averaging 72.2 lbs on unfertilized native and 129.1 lbs/acre on fertilized native. These gains were 7% better than last year on the unfertilized pasture and 15% better than on the fertilized pasture. The steers were on the native grass pastures from June 25 to Sept. 4, a period of 71 days. Utilization on both pastures was less than 45%.

The steers went into the first set of Russian wildrye pastures on Sept. 4 and grazed on these pastures until Oct. 11. They were then moved to the second set of pastures where they continued to graze until about the middle of November (still on the pasture at the time this report was prepared). They were weighed on the second set of pastures on Oct. 25. The weights and gains of the steers on both sets of pastures are given in Table 3. On the Russian wildrye pastures the animals were segregated according to whether they had been receiving Kedlor supplement. The group receiving Kedlor was placed in pasture 3 and was transferred to pasture 2 after the Oct. 11 weighing.

The gains of the steers on both pastures averaged 1.32 lbs/head/day for the first 37 days on the Russian wildrye pastures, with those on pasture 3 averaging 1.38 lbs/head/day while those on pasture 4 averaged 1.25 lbs. After transfer to the second set of pastures daily gains decreased, with the decrease being especially marked in the steers in pasture 2. The grass being grazed by the steers during the early part of the period on the Russian wildrye pastures contained considerable green material, estimated to be as much as 50%. There was less green material in the forage as the grazing period continued, and this year there was very little regrowth of the grass after grazing. Gains on pasture 2 between Oct. 11 and Oct. 25 averaged only 0.74 lbs/head/day, while gains on pasture 1 averaged 1.19 lbs/head/day. Gains per acre on the second set of pastures appear low in Table 3, but at the time of the last reported weighing on Oct. 25, over half the grazable forage still remained unused in these pastures. Gains per acre should be appreciably higher by the end of the grazing period (approximately Nov. 15).

As previously mentioned, each of the two lots of animals grazed on the experimental pastures consisted of 6 Hereford and 6 black whiteface steers. The data of Table 4 show the average daily gains per head of the Herefords and the black whitefaces on the different sets of pastures throughout the 163-day grazing period from May 1 to Oct. 11. The figures given for the animals on the Russian wildrye pastures are derived from the weights of the animals that were on unfertilized or fertilized pastures prior to the time that they came on to the Russian wildrye pastures. While there are some inconsistencies in the data, the seasonlong average daily gains for the Herefords and the crosses seem to show little overall difference on the same treatment. The animals on the fertilized pastures show slightly lower daily gains than do the animals coming from the unfertilized pastures. The average daily gain for the season on the fertilized pastures was 1.51 lbs, while the average daily gain for the animals from the unfertilized pastures was 1.62 lbs per head. The results of the 1974 season paralleled the results obtained in 1973 season in that on the seasonlong basis there seemed to be very little difference between the daily gains of the black whitefaces and the Herefords.

Half of each lot of steers was fed Kedlor (biuret) while the animals were on native grass. When the animals were moved from the native grass to the Russian wildrye pastures, all the steers that had been fed Kedlor were put in one lot and continued to receive the supplement, and all those that had not received the supplement were placed in the other lot. Kedlor blocks were made available to the steers to see whether this supplement would compensate for the loss of quality in the forage as it matured. The summary of the daily gains per head of the supplemented and non-supplemented steers is given in Table. 5.

While the results of the Kedlor feeding were not as clear-cut in the 1974 season as they were in the 1973 season, there does seem to have been some effect of Kedlor feeding in the second part of the native grass grazing period. During the period of July 23 to Sept. 4 steers receiving Kedlor on unfertilized native grass averaged 2.13 lbs gain/head/day, while those not getting the supplement averaged 1.64 lbs/day. On the fertilized native grass during this same period the steers with Kedlor showed average daily gains of 2.10 lbs/head, while those without Kedlor had an average gain of 1.82 lbs/head/day.

Contradictory results were obtained with Kedlor feeding on the Russian wildrye pastures with some benefit indicated during the period of Sept. 26 to Oct. 11, and some possible detrimental effects appearing during the period from Oct. 11 to 25. During this latter period it was observed that the steers with Kedlor were consuming excessive amounts of supplement, while not making as good gains as the steers not receiving the supplement. As in the 1973 season is became apparent that the supplemented steers might be experiencing some kind of nutritional imbalance, though perhaps not as severe as that which occurred on the Russian wildrye pastures in the 1973 season.

A summary of the 1974 results with the 3-pasture grazing system shows that the 12 yearling steers on the fertilized pastures each gained an average of 257 lbs during the 163-day grazing period extending from May 1 to Oct. 11. During this period each steer consumed an average of about 55% of the forage produced on 2.3 acres. This represents an overall average beef production of 111.7 lbs/acre. The steers grazing the combination of unfertilized crested wheatgrass and native grass with fertilized Russian wildrye gained an average of 252 lbs each during the same period, utilizing about 50% of the forage produced on 3.5 acres. The overall production of beef on these pastures was thus 72 lbs/acre.

Table 6 gives a summary of the 3-year results of the trial. The 3-pasture system with fertilizer on all pastures has produced an average of a little over 100 lbs of beef per acre, while the system with only the Russian wildrye pastures fertilized has produced an average of about 67 lbs of beef per acre over the 3-year period of the trial. The present unfavorable economic situation puts the use of fertilizer in the system below a profitable level despite the obvious increase in beef production per acre. The system itself seems quite well-adapted to the conditions existing in the westriver area, although many grazing management problems remain to be worked out.

Table 1. Proposed grazing plan for the three-pasture trial using 12 yearling steers per pasture for the 1974 season.

Pasture	Grazing period	Pasture size-acres	Stocking rate-acres per steer per month
Crested wheatgrass	May-June	16	0.7
Crested wheatgrass + 50 lbs N	May-June	8	0.3
Native grass	July-Aug.	18	0.7
Native grass + 50 lbs N	July-Aug.	12	0.5
#3 Russian wildrye (fertilized)	Sept.	8	0.3
#4 Russian wildrye (fertilized)	Sept.	8	0.3
#1 Russian wildrye (fertilized)	Oct.	8	0.3
#2 Russian wildrye (fertilized)	Oct.	8	0.3

Table 2. Forage production and utilization during grazing periods on crested wheatgrass, native grass, and Russian wildrye pastures – 1974 season.

Pasture	Pasture size-acres	Period grazed	Days in period	Forage produced-lbs/acre	Forage utilized-lbs/acre	Forage left on ground-lbs/acre	% utilization
Crested wheatgrass	16	5/1 – 6/25	55	1950	905	1045	46
Crested + 50 lbs N	8	5/1 – 6/25	55	2365	1366	999	58
Native grass	18	6/25 – 9/4	71	3079	1346	1723	44
Native + 50 lbs N	12	6/25 – 9/4	71	5270	2205	3065	42
Russian wildrye (3) (fertilized)	8	9/4 – 10/11	37	1739	1304	435	75
Russian wildrye (4) (fertilized)	8	9/4 – 10/11	37	1542	1388	154	90

Table 3. Pasture systems grazing trial. Weights and gains of yearling steers on crested wheatgrass, native grass and Russian wildrye pastures – 1974 season.

Pasture	Period grazed	Days in period	No. of steers	Avg. initial wt/steer lbs.	Avg. final wt/steer lbs.	Gain per head-lbs.	Avg. daily gain per head-lbs.	Avg. gain per acre-lbs.
Crested wheatgrass	5/1 – 6/25	55	12	567.5	662.5	95.0	1.72	71.3
Crested + 50 lbs N	5/1 – 6/25	55	12	567.5	646.7	79.2	1.44	118.8
Native grass	6/25 – 9/4	71	12	662.5	770.8	108.3	1.53	72.2
Native + 50 lbs N	6/25 – 9/4	71	12	646.7	775.8	129.1	1.82	129.1
#3 Russian wildrye + 50 N & 30 P_20_5	9/4 – 10/11	37	12	774.1	825.0	50.9	1.38	76.4 1/
#4 Russian wildrye + 50 N & 30 P_20_5	9/4 – 10/11	37	12	772.5	818.8	46.3	1.25	69.5
#2 Russian wildrye + 50 N & 30 P_20_5	10/11 – 10/25	14	12	825.0	835.4	10.4	0.74	15.6 1/
#1 Russian wildrye + 50 N & 30 P_20_5	10/11 – 10/25	14	12	818.8	835.4	16.6	1.19	24.9

1/ Steers in this pasture all receiving Kedlor

Table 4. Average daily gains (lbs.) of Herefords and Black Whiteface[1/] steers on unfertilized and fertilized pastures during the 163-day grazing period in the 1974 season.

		Crested wheatgrass		Native grass		Russian wildrye[2/]		Avg. for 163 days
Pasture treatment	**Steers**	**5/1 – 5/29 28 days**	**5/29 – 6/25 27 days**	**6/25 – 7/23 28 days**	**7/23 – 9/4 43 days**	**9/4 – 9/26 22 days**	**9/26 – 10/11 15 days**	
Unfertilized	Herefords	2.05	1.36	0.59	2.43	2.65	0.33	1.61
	Black WF	1.70	1.79	1.34	1.74	1.55	1.55	1.63
	AVG.	1.89	1.58	0.97	2.09	2.10	0.94	1.62
Fertilized	Herefords	1.57	1.54	1.65	1.51	1.29	0.61	1.57
	Black WF	1.04	1.60	1.58	2.40	0.80	1.22	1.44
	AVG.	1.31	1.57	1.62	1.96	1.05	0.92	1.51

1/ Each lot of 12 steers consisted of 6 Herefords and 6 Angus x Hereford steers.

2/ Both sets of Russian wildrye pastures were fertilized. The gain per head figures represent the weights of the animals distributed as they were on the crested wheatgrass and the native grass pastures.

Table 5. Daily gains per head (lbs.) of steers with and without Kedlor supplement on native grass and Russian wildrye pastures in the 1974 season.

		Native grass		Russian wildrye		
Pasture treatment	**Supplement treatment**	**6/25 – 7/23 (28 days)**	**7/23 – 9/4 (43 days)**	**9/4 - 9/26 (22 days)**	**9/26 – 10/11 (15 days)**	**10/11 – 10/25 (14 days)**
Unfertilized	With Kedlor	0.59	2.13	---	---	---
	W/o Kedlor	1.34	1.64	---	---	---
Fertilized	With Kedlor	1.37	2.10	1.54	1.14	0.74
	W/o Kedlor	1.85	1.82	1.61	0.72	1.19

Table 6. Three-year average weights and gains of yearling steers on crested wheatgrass, native grass, and Russian wildrye pastures, 1972-1974.

Pasture	**Pasture size-acres**	**Avg. no. days grazed**	**No. of steers**	**Avg. initial wt/steer-lbs.**	**Avg. final wt/steer-lbs.**	**Avg. gain per head-lbs.**	**Avg. daily gain per head-lbs.**	**Avg. gain per acre-lbs.**
Crested wheatgrass	16	56	12	572.8	677.1	104.3	1.87	73.0
Crested + 50 lbs N	8	56	12	575.4	665.7	90.3	1.62	125.6
Native grass	18	63	12	677.2	761.4	84.2	1.30	54.5
Native + 50 lbs N	12	63	12	665.7	760.7	95.0	1.46	92.6
#1 Russian wildrye (fertilized)	8	35	12	757.9	810.3	52.4	1.54	74.7
#2 Russian wildrye (fertilized)	8	35	12	764.2	806.8	42.6	1.41	58.6

MORE ON USE OF FEED GRADE BIURET TO SUPPLEMENT NATIVE RANGE AND RUSSIAN WILDRYE FALL PASTURE

In western North Dakota a sizeable number of yearling steers and heifers, 15 to 17 months of age, are pastured on native range from June to October. These animals are expected to gain from 1.50 to 1.75 pounds per head per day during this period. However, past work at this station indicates that by mid-July the protein, carotene and phosphorous levels of most range grasses are on a rapid decline. By the first of August these levels may deteriorate below the minimum requirements for a 660 pound steer to gain 1.6 pounds per day, as presented by the National Research Council on Beef Cattle Nutrition.

As mentioned in the previous report, the trial designed to measure the effect of supplemental feeding of feed grade biuret on both summer range and Russian wildrye fall pasture was continued for the second year.

Results of the 1974 trial are summarized in tables 7 and 8, and show that feed grade biuret can be used on native range in late summer and early fall and improve gains by helping to compensate for loss of forage quality.

However, this does not seem to hold throughout the late fall grazing period on Russian wildrye, with only minor benefit indicated the first month of the late fall period. During the second half of the late fall period, two snow storms occurred which depressed gains, even though there was ample forage available.

Table 7--Using feed grade biuret to supplement native range, 1974

	Biuret Lots		**Control Lots**	
	BFW	**Hereford**	**BWF**	**Hereford**
Avg. weight, lb.--				
July 23	669	698	684	712
Sept. 4	769	779	763	783
43 day gain/hd.	100	81	78	71
Combined gain	91		75	
Avg. daily gain/hd./day	2.11		1.73	
Biuret/hd./day, lb.	0.29			
Cost of biuret:				
Per lb.	18.8¢			
Per head	$2.33			
Per cwt added gain	$14.31			

Table 8--Using feed grade biuret to supplement Russian wildrye, 1974

	Biuret Lots		Control Lots	
	BWF	**Hereford**	**BWF**	**Hereford**
Avg. weight, lb.:				
Sept. 4	769	779	763	783
Oct. 11	816	834	809	828
37 day gain/hd.	47	55	46	45
Nov. 13	805	823	800	812
33 day loss/hd.	11	11	9	16
Total gain, lb.	36	44	37	29
Combined gain:				
Total avg./lb.	40		33	
Avg. daily gain/lb.	0.57		0.48	
Biuret/hd./day/lb.	0.45			
Cost of biuret:				
Per lb.	18.8¢			
Per head	$5.94			
Per cwt added gain	$48.50			