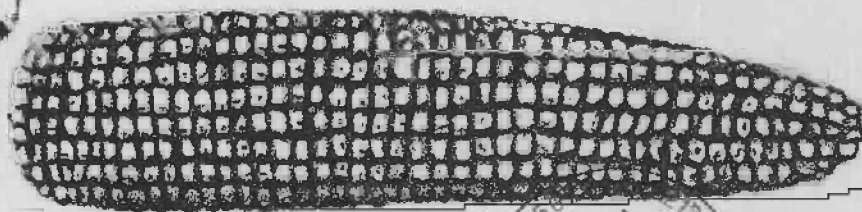
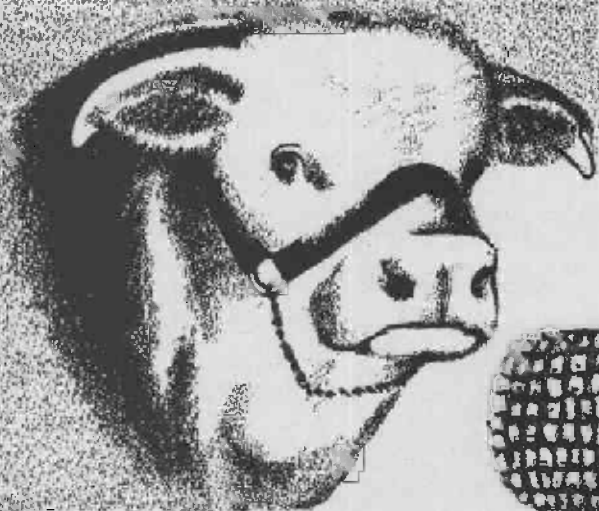


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Malheur Feeders Day



HIGH CONCENTRATE DIETS FOR CATTLE

This report describes the 20th annual series of beef cattle feeding trials carried out at the Malheur Experiment Station. In general these experiments over the years have involved feeds, feed additives and processing methods of interest to cattle feeders. This year's work is concerned with two objectives:

1. Comparison of various levels of grains and dried molasses beet pulp, with an appropriate protein supplement and a minimal amount of hay in so-called "high concentrate" rations for cattle.
2. Comparison of dehydrated peavine silage pellets, produced in Oregon with alfalfa hay in conventional rations for cattle.

This experiment is a continuation and expansion of work commenced in 1960-61 and previously reported (Ore. Agr. Exp. Station Misc. Paper No. 107, March, 1961). This year steam rolled milo was added to the grains tested under high concentrate program conditions, and vitamin A supplementation was followed in all high concentrate-fed lots (1-4). The latter change was made on the basis of very low liver storage of vitamin A in the previous year's test cattle, as determined by chemical analysis. Citric acid was added to the dehydrated peavine silage at time of pelleting in an attempt to improve palatability and increase intake.

In the following pages is a description of the experimental methods, results and observations. At the end of the experiment, the cattle were slaughtered and passed through regular commercial channels. Data were gathered on dressing percentage and carcass quality which form an important part of the overall evaluation of treatments.

Miscellaneous Paper 130

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Malheur Experiment Station, Ontario, Oregon
Oregon State University

• Agricultural Experiment Station
• Corvallis

This report was prepared by E. N. Hoffman, Superintendent, Malheur Experiment Station, Ontario, Oregon; J. E. Oldfield, Professor of Animal Science, and W. H. Kennick, Assistant Professor of Animal Science, Oregon State University.

METHODS AND OBSERVATIONS:

The feed period of 154 days extended from September 26, 1961 to February 26, 1962. Throughout the period mean temperatures averaged below normal with January being 8° below normal. The extreme low of 26° below zero occurred on January 22 and 23. Precipitation of 5.11 inches was about equally divided between snow and rain.

Three weeks were required at the beginning of the trial to get Lots 1, 2, 3 and 4 on the all-grain rations. This transition was accomplished by starting the cattle on long alfalfa-grass hay and dried beet pulp for the first two days; then adding grain at a uniform rate of increase and proportionately decreasing the hay for the next 19 days. The grain components were then adjusted to the proper ratios, the beet pulp having been greater than the 25 per cent level in lots 2, 3 and 4.

Early in the trials some animals were extremely "loose", however this condition was not as severe as the previous year and was only temporary.

Urinary calculi were a major problem. Two animals (one each in lots 2 and 3) were affected after eight weeks on feed. A third case occurred in Lot 5 late in January. All cases were diagnosed before rupture of the bladders and all animals salvaged. Stones were recovered from the urethra tube of all animals.

Following the first two cases salt was added to the grain of lots 1, 2, 3 and 4 at a level of two per cent of the total feed intake. This was expected to increase water consumption. After the Lot 5 case in January salt was added to the rations of Lots 5 and 6 in a similar manner.

A second steer was removed from Lot 3 late in the trial because of serious digestive problems and the fact that the animal had apparently been injured some time prior to the trial. This condition became progressively worse as the trial continued. There were no other serious health problems. There was no bloat.

Inadequate daily intake of the peavine pellets during the first weeks of the feed trial was a major problem even though the pellets fed this year had been treated with citric acid as a means of improving palatability. Initial daily gains of these animals was extremely low. Once the animals commenced to eat these pellets, intakes of 4-5 pounds daily were achieved. It was difficult to obtain higher intakes.

Beginning and closing weights were recorded after feed and water had been withheld for 12 hours. No other shrink was applied. All cattle were weighed individually.

TABLE 1: RATION COMPOSITION

	<u>Feedstuff</u>	<u>%</u>
Lot 1	Steam Rolled Barley-----	45
	Dried Molasses Beet Pulp--	45
	Protein Supplement-----	10
Lot 2	Dry Rolled Barley-----	45
	Dried Molasses Beet Pulp--	22½
	Ground Ear Corn-----	22½
	Protein Supplement-----	10
Lot 3	Steam Rolled Barley-----	45
	Dried Molasses Beet Pulp--	22½
	Ground Ear Corn-----	22½
	Protein Supplement-----	10
Lot 4	Steam Rolled Milo-----	45
	Dried Molasses Beet Pulp--	22½
	Ground Ear Corn-----	22½
	Protein Supplement-----	10

Long alfalfa hay was fed to lots 1 through 4 during the first three weeks of the feed period as the cattle were changed from a roughage ration to a high concentrate ration.

- Lot 5 Pelleted Dehydrated Peavine Silage
Ground Ear Corn
- Lot 6 Chopped Alfalfa Hay
Ground Ear Corn

A limited quantity of long alfalfa hay was fed to Lot 5 during the first two weeks of the feed period. Salt and steamed bonemeal were fed free-choice to all lots. Salt was also force-fed as described elsewhere in this report. All cattle were implanted with 36 mg. of Stilbestrol at the beginning of the trial.

TABLE 2: FEED COSTS

<u>Feedstuff</u>	<u>Price/Ton</u>
Steam and Dry Rolled Barley	\$52.00
Ground Ear Corn	42.00
Steam Rolled Milo	55.00
Dried Molasses Beet Pulp	39.00
Chopped Alfalfa Hay	24.00
Long Alfalfa Hay	20.00
Protein Supplement	78.00
Pelleted Dehydrated Peavine Silage	30.00

TABLE 3: RESULTS : GROWTH & FEED CONVERSION

	Lot 1	Lot 2*	Lot 3*
<u>Average Weight Data, Lbs.</u>			
Initial Weight	767.0	757.2	765.0
Final Weight	1214.5	1207.7	1256.2
Total Gain	447.5	450.5	491.2
AVERAGE DAILY GAIN, LBS.	2.90	2.92	3.18
<u>Average Daily Feed Consumed, Lbs./Head</u>			
Steam Rolled Barley	9.84		10.09
Dry Rolled Barley		9.87	
Steam Rolled Milo			
Ground Ear Corn		4.93	5.04
Dried Beet Pulp	10.09	5.33	5.44
Protein Supplement	1.98	1.99	2.04
Alfalfa Hay (long)	1.47	1.35	1.25
<u>Average Total Feed Consumed, Lbs./Head</u>			
Steam Rolled Barley	1515.8		1554.3
Dry Rolled Barley		1520.6	
Steam Rolled Milo			
Ground Ear Corn		760.5	777.6
Dried Beet Pulp	1554.6	821.2	837.8
Protein Supplement	305.3	307.3	314.6
Alfalfa Hay	227.2	208.4	192.8
Salt	52.7	53.9	54.0
Bone Meal	1.6	1.8	2.0
<u>Total Feed Cost, \$/Head</u>			
Steam Rolled Barley	\$39.41		\$40.41
Dry Rolled Barley		\$39.54	
Steam Rolled Milo			
Ground Ear Corn		15.97	16.33
Dried Beet Pulp	30.31	16.01	16.34
Protein Supplement Cost	11.91	11.98	12.27
Alfalfa Hay	2.27	2.08	1.93
Salt	.90	.92	.92
Bone Meal	.09	.10	.12
Stilbestrol	.16	.16	.16
FEED COST	85.05	86.76	88.48
FEED COST PER POUND GAIN, DOLLARS	.190	.192	.180

* Single steers removed and slaughtered at end of eight weeks due to urinary calculi in Lots 2 and 3.
A second steer was removed from Lot 3 because of illness and apparent previous injury.
Final data based on nine steers in Lot 2 and eight steers in Lot 3.

TABLE 3: (CONT'D): RESULTS : GROWTH & FEED CONVERSION

	Lot 4	Lot 5*	Lot 6
<u>Average Weight Data, lbs.</u>			
Initial Weight	762.5	753.3	749.0
Final Weight	1213.0	1116.6	1175.5
Total Gain	450.5	363.3	426.5
AVERAGE DAILY GAIN, LBS.	2.92	2.35	2.76
<u>Average Daily Feed Consumed, Lbs./Head</u>			
Pelleted Peavine Silage		4.50	
Alfalfa Hay (long)	1.56	.36	
Chopped Alfalfa Hay			7.24
Ground Ear Corn	5.17	18.58	18.65
Steam Rolled Milo	10.32		
Dried Beet Pulp	5.55		
Protein Supplement	2.08		
<u>Average Total Feed Consumed, Lbs./Head</u>			
Pelleted Peavine Silage		694.4	
Long Alfalfa Hay		55.7	
Chopped Alfalfa Hay			1116.4
Ground Ear Corn	796.5	2861.7	2873.5
Salt	54.0	30.2	28.2
Bone Meal	2.5	6.0	2.4
Steam Rolled Milo	1590.5		
Dried Beet Pulp	855.1		
Protein Supplement	321.7		
Alfalfa Hay	241.7		
<u>Total Feed Cost, \$/Head</u>			
Pelleted Peavine Silage		\$10.42	
Long Alfalfa Hay		.56	
Chopped Alfalfa Hay			\$13.40
Ground Ear Corn	\$16.73	60.10	60.34
Salt	.92	.51	.48
Bone Meal	.14	.34	.14
Stilbestrol	.16	.16	.16
Steam Rolled Milo	43.74		
Dried Beet Pulp	16.67		
Protein Supplement	12.55		
Alfalfa Hay	2.42		
FEED COST	93.33	72.09	74.52
FEED COST PER POUND GAIN, DOLLARS	.207	.198	.174

* One steer from Lot 5 was removed and slaughtered because of urinary calculi at the end of 128 days.
Final data for lot based on nine steers.

Samples of the feed ingredients used in rations for the various lots were taken during the course of the experiments and analyzed chemically. Results are given in Table 4.

TABLE 4: PROXIMATE ANALYSIS OF EXPERIMENTAL FEEDS

Feedstuff	Dry	Crude	Fat	Crude	Ash	Nitrogen	Calcium	Phosphorus
	Matter	Protein		Fiber		Free		
	%	%	%	%	%	%	%	%
Alfalfa, hay, long	93.62	15.36	*	*	13.21	*	1.006	0.317
Alfalfa, hay, chopped	89.02	10.41	1.06	39.41	7.52	41.60	0.891	0.207
Milo, steam-rolled	86.55	10.25	1.29	2.76	2.03	83.67	0.034	0.178
Ear corn, ground	87.11	11.13	1.55	4.81	1.90	80.61	0.024	0.145
Barley, dry-rolled	88.78	10.21	0.50	6.35	2.96	79.98	0.063	0.194
Barley, steam-rolled	89.67	10.08	0.49	6.78	2.82	79.83	0.066	0.157
Protein, supplement	91.89	30.21	1.42	17.38	9.34	41.65	0.628	0.408

* Analyses not run

Table 5 lists data on live weight gains, feed intake and efficiency of feed conversion. This information is particularly useful in showing the levels of various nutrients actually consumed by the animals on this experiment under the different diet treatments.

TABLE 5: WEIGHT GAINS, FEED INTAKE AND CONVERSION

Lot No.	Ave. Daily Gain	Feed/lb. Gain	Total Dry Feed & Nutrients Eaten/Head/Day			
			Dry Matter	Crude Protein	Calcium	Phosphorus
	lb	lb	lb	lb	gm	gm
1	2.90	8.07	19.22	2.09	17.32	15.32
2	2.92	8.05	19.10	2.09	13.21	16.12
3	3.18	7.51	19.48	2.11	13.05	14.85
4	2.92	8.46	19.87	2.19	13.20	16.19
5	2.35	9.98	20.55	2.33	16.36	18.54
6	2.76	9.39	23.04	2.85	32.78	20.47

It is interesting that the amount of protein eaten is less in these high concentrate rations than in the conventional alfalfa hay and grain ration (Lot 6) yet the gains on the former are superior. This indicates that the animals are not making effective use, growth-wise, of the additional protein supplied by the alfalfa. It is also noteworthy that the calcium levels in the high concentrate rations are very much reduced below that in the conventional legume hay and grain ration, while phosphorus levels are not changed greatly. This altered relationship of calcium to phosphorus may be involved in the urinary calculi incidence.

Table 6 includes data on the live animals taken at the end of the experiment, and on the carcass taken at slaughter. In arriving at carcass grade scores, the following code numbers have been applied:

1. Conformation and USDA grade:

	Low	Average	High
Choice	16	17	18
Good	13	14	15
Standard	10	11	12
Moderate	17	18	19
Modest	14	15	16
Small	11	12	13
Slight	8	9	10

2. Marbling score:

TABLE 6: CARCASS DATA

Lot	Steer No.	Ave. Daily Gain, lb	Live Grade	Warm Carcass Wt lb	Dressing %	Conformation Score	Marbling Score	U.S.D.A. Grade	Backfat Thickness mm.
1	176	2.95	16	798	59.1	15	12	15	12
	179	3.21	13	770	57.5	16	10	14	16
	197	3.27	16	780	59.6	16	10	14	14
	201	2.82	15	678	58.2	15	10	14	11
	35	2.24*	16	664	58.3	16	14	16	13
	248	3.50**	17	842	60.1	17	12	15	22
	249	2.88	16	754	60.4	16	11	14	21
	251	2.88	16	690	57.9	18	14	16	20
	290	2.62	17	712	59.1	16	11	15	13
	310	2.62	16	688	58.8	16	10	14	10
AVERAGE		2.90	16	738	58.9	16	11	15	15
2	178	2.62	16	724	59.2	17	11	14	20
	203	3.44**	17	806	59.5	17	11	14	12
	207	3.01	17	810	60.0	17	10	14	19
	212	2.43	17	690	58.9	17	10	14	9
	254	2.75	15	666	57.7	16	9	13	6
	100	3.27	16	750	58.7	16	11	14	18
	299	2.40*	15	682	58.1	15	10	14	9
	307	3.01	16	684	58.0	16	10	13	8
	317	3.34	16	782	59.3	16	11	14	16
	AVERAGE		2.92	16	733	58.8	16	10	14

**Fastest gaining animal

* Slowest gaining animal

TABLE 6: CARCASS DATA (CONTINUED)

Lot	Steer No.	Ave. Daily Gain, lb	Live Grade	Warm Carcass Wt., lb	Dressing %	Conformation Score	Marbling Score	U.S.D.A. Grade	Backfat Thickness mm.
3	94	3.14	16	800	59.5	17	11	14	12
	230	3.40	17	842	60.1	16	11	14	24
	252	3.24	16	780	59.4	16	14	16	17
	273	3.47**	16	800	59.0	17	16	17	18
	276	2.82*	17	736	61.5	17	14	16	15
	297	2.98	15	722	57.4	17	11	14	23
	338	2.95	16	672	58.5	16	10	14	16
	344	3.47**	16	794	59.2	17	13	15	19
	AVERAGE	3.18	16	768	59.3	17	13	15	18
	4	95	2.82	16	754	59.2	17	12	15
99	2.62	16	672	57.0	15	11	14	13	
183	2.88	17	740	61.4	18	12	15	24	
202	2.95	15	706	57.3	15	8	13	7	
232	3.18	16	842	59.8	16	14	16	14	
246	2.72	15	646	56.5	16	11	13	9	
92	3.57**	17	830	60.5	17	11	14	28	
306	2.79	16	750	60.2	17	11	15	11	
312	3.21	15	782	58.6	16	14	16	14	
320	2.37*	16	654	58.7	16	11	14	14	
AVERAGE	2.91	16	738	58.9	16	11	14	14	
5	90	1.98*	16	660	59.8	15	9	14	7
242	2.72**	15	702	57.7	16	11	11	14	11
250	2.20	16	646	57.8	16	11	11	14	15
283	2.62	16	698	56.9	16	8	13	13	12
287	2.43	15	676	58.8	16	10	10	15	14
288	2.40	16	706	58.3	17	11	11	14	7
296	2.40	16	702	58.2	16	13	13	15	9
328	2.11	14	608	56.2	14	10	10	14	9
345	2.33	15	602	57.5	15	11	11	14	9
AVERAGE	2.35	15	667	57.9	16	10	10	14	12
6	189	3.34**	16	790	59.1	16	10	14	12
194	2.43*	15	664	56.5	15	12	12	15	12
213	2.59	16	714	58.7	17	13	13	15	19
220	2.82	16	760	58.5	16	9	9	14	11
239	2.98	17	704	56.7	17	9	9	14	16
291	2.66	16	712	58.8	16	9	9	13	18
321	2.95	16	676	57.8	15	10	10	14	14
330	2.69	15	654	56.6	16	6	6	12	9
331	2.46	15	628	56.4	15	8	8	13	8
336	2.72	16	714	59.5	16	11	11	14	15
AVERAGE	2.76	16	702	57.8	16	10	10	14	13

** Fastest gaining animal

* Slowest gaining animal