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**A Study of Methods  
For the  
Production of Acceptable Heifer Beef**

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# A Study of Methods for the Production of Acceptable Heifer Beef

A. T. Ralston and N. O. Taylor

## SUMMARY

One-hundred twenty heifer calves weighing 373 pounds were finished on five different dietary treatments: 1) standard ration fed ad libitum; 2) pelleted millrun, beet pulp, rolled barley and molasses restricted to a percent of body weight; 3) IBM (linear programmed ration) pelleted concentrate fed ad libitum; 4) a 60% barley, 40% alfalfa pellet fed ad libitum; 5) and the pelleted millrun, beet pulp, rolled barley and molasses limited to 2 pounds for the first 300 pounds of body weight and 2 additional pounds of feed per 50 pound increase of body weight. The IBM (linear programmed ration) ration gave excellent results from an overall profit standpoint, even though the average daily gains were not the greatest. Significantly (5% level) greater gains resulted from the standard ration fed ad libitum with the restriction to a percent of body weight significantly reducing the average daily gain. The cost per pound, and final grade or value of the carcass were also reduced, but the reduction was not statistically significant. The use of zinc bacitracin on one replicate of four treatments increased average daily gain by 4% with a corresponding increase in feed efficiency. Reduction in dressing percent and grade accompanied the increases in gain, indicating this may stimulate growth.

## INTRODUCTION

Many heifer calves produced in the Blue Mountain Area are shipped out of the area and finished elsewhere. Discrimination against heifer feeders has reduced the amount of accurate data pertaining to the production of "acceptable" heifer carcasses. This trial was conducted to stimulate interest in finishing heifers in the area, and to provide accurate data on how this can best be accomplished. The main objectives of the work reported herein are:

1. Study the effectiveness of a linear programmed ration (IBM).
2. Comparison of two levels of restrictive concentrate feeding versus the standard ration fed on an ad libitum basis.
3. Testing the effectiveness of the antibiotic zinc bacitracin.

This experiment was carried out in the Blue Mountain Beef Feeders' Association yards at Milton-Freewater, Oregon.

## Rations

### Pens 1 and 5

Standard concentrate (30% beet pulp, 69% steam rolled barley, 1% salt) ad libitum, 2 pounds of alfalfa hay, peavine silage starting at 20 pounds per day and decreasing to 0 at 179 days, 1 1/2 pounds of OSU supplement.

Pens 2 and 8

30% pelleted millrun, 15% beet pulp, 50% rolled barley, and 5% molasses restricted for 120 days to 1% of body weight; 28 days to 1 1/2% of body weight; and 40 days at 2% of body weight. Peavine silage was fed at a decreasing rate from 20 to 0 pounds, 2 pounds of dehydrated peavine silage pellets and 1 1/2 pounds of OSU supplement.

Pens 3 and 7

IBM pelleted concentrate (70% millrun, 25% milo, 5% molasses) fed ad libitum, and peavine silage fed at a decreasing rate from 20 to 0 pounds as in pens 1 and 5.

Pens 4 and 6

Pellets (60% barley, 40% alfalfa hay) fed ad libitum, peavine silage at a decreasing rate from 20 to 0 pounds as in pens 1 and 5, and 1 1/2 pounds of OSU supplement.

Pens 10 and 11

Ration same as pens 2 and 8, fed at 2 pounds for the first 300 pounds of body weight and increased 2 pounds for each additional 50 pounds of body weight, peavine silage free choice to 650 pounds body weight plus 2 pounds of dehydrated peavine silage pellets.

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OSU Supplement:

	Pounds per ton
Cottonseed Meal (41-43%)	50
Alfalfa meal	50
Urea	65
Peas	760
Limestone	25
Steam bone meal	20
Vitamin A (10,000 IU/gram)	10
Trace mineralized salt	20
Barley	<u>1000</u>

Crude Protein Approx. 30.0%

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## METHODS

One-hundred twenty heifer calves averaging 373 pounds in weight were stratified as to source of cattle and weight and allotted at random to 10 pens. These 10 pens were subjected to 5 different treatments and each treatment replicated. One replication of treatments 1 through 4 was fed 70 mg. of zinc bacitracin per day. This meant that 48 heifers received zinc bacitracin and 48 heifers served as controls. Pens 1, 2, 6, and 7 received the zinc bacitracin and pens 3, 4, 5, and 8 served as a control.

The heifers were weighed periodically and marketed as they appeared to reach the lower end of the choice grade which was reached at about 790 pounds.

## RESULTS AND DISCUSSION

The standard ration fed on an ad libitum basis gave significantly greater gains than all other treatments, whereas the limitation of concentrates by a percentage of body weight resulted in significantly less gain than all other treatments. It is evident from these data that when animals are held back they will not compensate in growth rate rapidly enough to compete with animals fed at a higher level when average daily gain is considered.

The restriction of growth in any way increases the amount of feed needed per pound of gain. If the roughage used to restrict the grain intake is cheap enough, the cost of gain can be reduced--even though it takes more feed per pound of gain. This is borne out in this experiment since the cost per pound of gain is less for the limited groups than those fed either the standard ration or the 60-40 pellets on an ad libitum basis. The cheapest gains--either in pounds of feed or in cost per pound of gain--were made by the heifers receiving the IBM ration.

Caution must be exercised when cost of gain is considered, for this is important only when this advantage does not reduce the selling price of the end product. Heifers restricted in concentrate intake by a percent of their body weight were worth less money at the end of the trial. Heifers on the ad libitum standard ration cost about \$1.50 more to produce 100 pounds of gain, but were worth almost \$2.00 more per hundred weight at time of slaughter.

With this in mind, it is quite apparent that the IBM ration was an excellent ration not only for the amount of feed needed but also the cost of this feed, as well as the value of the finished product as reflected by dressing percent and USDA grade.

It is apparent also that heifers on the ad libitum standard ration were held a little too long to make the most economical gains. This is indicated

by the quantity grade which shows they were considerably fatter than the other cattle.

Although variation in this trial due to source of cattle is not as great as some we have run, variations are still impressive. A difference of 0.41 pounds per day average daily gain existed. Poorer doing cattle also graded lower, which indicates they lacked the genetic potential to handle this type of feed. This was not due to their being too fat at the beginning of the trial.

The use of the antibiotic zinc bacitracin increased the average daily gain by 4% and feed efficiency by 2.6%. The dressing percent, amount of marbling, and U.S.D.A. grade were somewhat reduced. This would indicate a growth stimulus from the zinc bacitracin. These differences were not statistically significant at the 5% level.

The following tables summarize this trial as to ration treatment, source of cattle, and antibiotic fed.

SUMMARY OF PERFORMANCE BY TREATMENT

Pen #	ADG lbs.	FE	Cost/ cwt.	Final Weight	Warm		Dress. %	Conf. Score	Marble Score	Back Fat mm	USDA Grade	Est. KF	Quantity Grade
					Carcass Weight	Weight							
1	2.45	735	\$16.66	853	520	61.0	16.1	16.5	12.1	16.6	3.3	3.7	
5	2.26	762	17.20	810	504	62.2	14.9	16.7	11.4	16.3	3.3	3.6	
Av.	2.36	749	16.93	832	512	61.6	15.5	16.6	11.8	16.5	3.3	3.7	
2	2.07	733	14.88	777	461	59.3	14.5	13.5	9.7	14.9	2.9	3.1	
8	2.02	804	15.95	773	478	61.8	15.0	12.7	8.8	15.4	3.0	2.8	
Av.	2.05	769	15.42	775	440	60.6	14.8	13.1	9.3	15.2	3.0	3.0	
3	2.15	727	15.67	764	461	60.4	15.1	14.8	11.4	16.0	2.7	3.2	
7	2.06	744	15.38	775	475	61.2	15.6	13.1	9.3	15.3	3.0	3.0	
Av.	2.11	736	15.33	770	468	60.8	15.4	14.0	10.4	15.7	2.9	3.1	
4	2.14	765	17.59	784	476	60.6	14.9	13.9	9.0	15.5	2.9	3.0	
6	2.18	766	17.67	789	477	60.4	15.0	13.6	9.7	15.3	2.9	3.0	
Av.	2.16	766	17.63	787	477	60.5	15.0	13.8	9.4	15.4	2.9	3.0	
10	2.16	756	15.46	798	477	59.8	15.1	13.1	9.4	15.4	3.0	2.9	
11	2.09	764	16.30	773	471	60.9	15.3	14.6	10.4	16.0	3.1	2.9	
Av.	2.13	760	15.88	786	474	60.3	15.2	13.9	9.9	15.7	3.1	2.9	

Code to conformation and USDA Grade: Average Choice - 17, Average Good - 14

Code to Marbling Score: Slight - 9, Small - 12, Modest - 15. Quantity grade is percent of carcass weight in boneless, closely trimmed retail cuts from round, loin, rib, and chuck.  
 2.0 = 53.1%; 3.0 = 50.8%; 4.0 = 48.5%

SUMMARY OF PERFORMANCE BY BREEDER

Breeder #	ADG lbs.	Dress. %	Conf. Score	Marble Score	Back Fat mm	USDA Grade	Est. KF	Quantity Grade
1-61	2.38	60.9	15.1	14.5	10.4	15.5	2.9	3.2
201-205	2.08	61.9	14.8	15.0	11.0	15.4	3.2	3.7
210-220	2.24	58.1	14.5	9.8	8.5	14.0	2.8	2.7
301-320	2.15	61.9	15.8	15.2	10.6	16.4	3.2	3.3
401-405	2.10	61.7	15.5	14.8	8.8	16.0	2.9	3.0
501-509	1.87	58.8	14.7	12.7	9.1	15.1	2.7	2.8
601-610	2.15	61.0	15.5	16.8	9.8	16.4	3.4	3.0
Av.	2.25	60.8	15.1	14.3	10.0	15.6	3.0	3.2



SUMMARY OF ZINC BACITRACIN

Milton-Freewater

Pen	Initial Weight	Final Weight	ADG lbs.	FE	Cost/ cwt.	Dress. %	Conf. Score	Marble Score	Back Fat mm	USDA Grade	Quantity Grade	
Zn	1	372	881	2.61	735	\$16.66	61.0	16.1	16.5	12.1	16.6	3.7
	2	372	805	2.17	733	14.88	59.3	14.5	13.5	9.7	14.9	3.1
	7	373	803	2.22	744	15.38	61.2	15.6	13.1	9.3	15.3	3.0
	6	373	829	2.34	766	17.67	60.4	15.0	13.6	9.7	15.3	3.0
	Av.	373	830	2.34	745	16.14	60.5	15.3	14.2	10.2	15.5	3.2
	5	373	841	2.41	762	17.20	62.2	14.9	16.7	11.4	16.3	3.6
With-	8	372	808	2.12	804	15.95	61.8	15.0	12.7	8.8	15.4	2.8
out	3	373	803	2.20	727	15.67	60.4	15.1	14.8	11.4	16.0	3.2
Zn	4	373	817	2.28	765	17.59	60.6	14.9	13.9	9.0	15.5	3.0
		373	817	2.25	765	16.60	61.3	15.0	14.5	10.2	15.8	3.2

4% increase in average daily gain  
 2.6% improvement in feed efficiency

Compare lots 1 - 5  
 2 - 8  
 7 - 3  
 6 - 4

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