

satisfactory on the 1 to 1 ratio; however, there was a tendency toward growth and not enough finish.

4. The ration containing the most roughage required the most feed per 100 pounds gain. There was a tendency for the total feed to decrease as the concentrate was increased in the ration.

5. There were no differences in carcass quality of animals fed 1 to 3 and 1 to 5 ratios as measured by carcass grade, degree of marbling, and dressing percentage. Animals that received the changing ratio graded slightly lower. Carcass values were lowest for the animals on the 1 to 1 ratio. They failed to put on enough finish because of their limited supply of grain.

Table 25
Ratio of Roughage to Concentrate for Fattening Steer Calves.
December 22, 1951, to July 12, 1952—203 days.

Ration (ratio of lbs. alfalfa hay to 1 concen- milo grain)	1 hay to 1 concen- trate	1 hay to 3 concen- trate	1 hay to 5 concen- trate
Number steers per lot	10	10	91
Av. initial wt., lbs.	502	503	505
Av. final wt., lbs.	934	949	933
Av. gain per steer, lbs.	432	446	428
Av. daily gain per steer, lbs.	2.13	2.20	2.10
Av. total feed per head, lbs.:			
Alfalfa hay	2480	1351	1031
Milo grain	2240	2878	2902
Av. daily feed per head, lbs.:			
Alfalfa hay	12.22	6.66	5.08
Milo grain	11.03	14.18	14.30
Av. feed per 100 lbs. gain:			
Alfalfa hay	574	303	241
Milo grain	519	645	678
Av. dressing percent (includes cooler shrink)	58.6	60.0	60.3
Carcass grades:			
Prime		1	
Top choice		6	2
Av. choice	2		5
Low choice	6	1	2
Top good	1	2	
Av. good	1		

1. One died, cause unknown.

Comparison of Corn and Milo Grain in Fattening Ration of Beef Cattle—Summary, 1956.

PROJECT 222

D. Richardson, E. F. Smith, and R. F. Cox

Kansas is surpassed only by Texas in total sorghum acreage and production. A large part of this acreage consists of the type that has a short stalk and is, therefore, suitable for harvesting the grain with a combine. This means that there is a large amount of the grain available for feeding livestock.

This experiment was planned to study the relative value of corn and milo grain in the fattening ration of beef cattle. Rate of gain, feed consumption, economy of gain, dressing percentage, carcass grade, and degree of marbling were used to make comparisons.

Experimental Procedure

Three tests were conducted with Hereford heifers over a period of three years (see Table 26 for time). Twenty heifers were used in each

test. They were divided as equally as possible into lots of 10 animals each on the basis of previous treatment, weight, and conformation.

The ration consisted of chopped hay and coarsely cracked grain mixed and self-fed. Good-quality alfalfa hay was the roughage in each test except test 1 in which equal parts of alfalfa and brome grass hay were used. After starting the animals on feed, grain was increased until they were receiving 1 pound of hay to 3 pounds of grain. Salt and water were available at all times.

The animals were marketed and slaughtered at the end of each test. Dressing percentage, U.S. Government Grade, and degree of marbling were obtained at the packing plant.

Results

A summary of the three tests is given in Table 26. Note that results for each test and an average of the three are given.

Observations

1. Rate of gain varied in individual tests. There appears to be some difference in favor of corn, but it is doubtful that there is any practical difference in rate of gain between the two grains.

2. The average daily consumption of milo grain was greater than corn in all tests. Milo grain seemed to be more palatable and the animals seemed to go on full feed faster with fewer digestive disturbances.

3. Less corn was required per 100 pounds of gain. This indicates that corn is more efficient on a pound-for-pound basis. However, one must not lose sight of economy of gain from the standpoint of cost. At present prices (corn \$1.40 per bu. and milo grain \$2 per 100 lbs.), the gains were more economical with milo grain, even though a greater quantity was needed per pound of gain.

4. There was no difference in dressing percentage.

5. There were no differences in carcass grade or degree of marbling. The statement is sometimes made that carcass grades and marbling are not so good with cattle fed milo grain as with cattle fed corn. The results of this experiment indicate no practical differences.

Table 26
Summary of Three Tests Comparing Corn and Milo Grain in Beef Cattle Fattening Rations.

Test 1—May 14 to August 13, 1953—91 days.

Test 2—May 7 to October 8, 1954—154 days.

Test 3—May 17 to September 19, 1955—125 days.

	Test number	Grain used	
		Corn	Milo
Number of heifers per lot	1	10	10
	2	10	10
	3	10	10
Av. initial wt. per heifer, lbs.	1	639	639
	2	511	512
	3	702	712
	Av.	617	621
Av. final wt. per heifer, lbs.	1	818	845
	2	860	815
	3	997	987
	Av.	892	882
Av. gain per heifer, lbs.	1	179	206
	2	349	303
	3	295	275
	Av.	274	261
Av. daily gain per heifer, lbs.	1	1.97	2.27
	2	2.27	1.97
	3	2.36	2.20
	Av.	2.20	2.18

Table 26 (Continued).

Av. total feed per head, lbs.:				
Hay	1	663	657	
	2	925	950	
	3	659	734	
	Av.	749	780	
Grain	1	1287	1561	
	2	2108	2183	
	3	1891	2098	
	Av.	1762	1947	
Av. daily feed per head, lbs.:				
Hay	1	6.2	7.2	
	2	6.0	6.2	
	3	5.3	5.9	
	Av.	5.8	6.4	
Grain	1	14.2	17.1	
	2	13.7	14.2	
	3	15.1	16.8	
	Av.	14.3	16.0	
Feed per 100 lbs. gain:				
Hay	1	370	318	
	2	265	313	
	3	223.3	267	
	Av.	286	299	
Grain	1	706	754	
	2	604	720	
	3	641.2	763	
	Av.	650	746	
Av. dressing %				
(includes cooler shrink)	1	58.8	59.4	
	2	61.8	60.9	
	3	60.6	62.0	
	Av.	60.4	60.8	
Carcass grades: ³				
	Test			
	1	2	3	Tot.
Low prime				1
Top choice			2	2
Av. choice	2	4	1	7
Low choice	3	4	3	10
Top good	3	2	3	8
Av. good	2		1	3
Av. grade ¹				12.20
				12.13
Degree of marbling: ³				
	Test			
	1	2	3	Tot.
Slightly abundant				1
Moderate		1	2	3
Modest	3	6	2	11
Small amount	2	1	3	6
Slight amount	1	2	2	5
Traces	4		1	5
Av. degree of marbling ² ..				6.93
				6.97

1. Based on low prime 6, top choice 8, av. choice 10, low choice 12, top good 14, and av. good 16.

2. Based on slightly abundant 4, moderate 5, modest 6, small amount 7, slight amount 8, and traces 9.

3. Obtained through courtesy of L. P. Stream, District Supervisor, U.S.D.A. Grading Service, Kansas City.

Table 28

Summary of Three Tests Comparing Ratio of Roughage to Concentrate for Fattening Heifers.

Test 1—May 14 to August 13, 1953—91 days.

Test 2—May 7 to October 8, 1954—154 days.

Test 3—May 17 to September 19, 1955—125 days.

	Test No.	1 hay to 1 concentrate	1 hay to 3 concentrate	1 hay to 5 concentrate	Changing ratio
Number heifers per lot	1	10	10	10	10
	2	10	10	10	10
	3	9	10	10	10
Av. initial wt. per heifer, lbs.	1	639	639	637	638
	2	518	512	515	518
	3	711	712	703	705
	Av.	623	621	618	620
Av. final wt. per heifer, lbs.	1	806	818	850	800
	2	807	815	845	833
	3	987	987	993	995
	Av.	867	873	896	876
Av. gain per heifer, lbs.	1	167	179	213	162
	2	289	303	330	315
	3	276	275	290	290
	Av.	244	252	278	256
Av. daily gain per heifer, lbs.	1	1.83	1.97	2.34	1.77
	2	1.88	1.97	2.14	2.04
	3	2.21	2.20	2.32	2.32
	Av.	1.97	2.05	2.27	2.04
Av. total feed per head, lbs.:					
Hay: alfalfa-brome ..	1	1045	663	507	698
alfalfa	2	1657	950	771	1158
alfalfa	3	1666	734	523	1019
	Av.	1456	782	600	958
Grain: corn	1	1035	1287	1472	1109
sorghum	2	1588	2183	2348	2002
sorghum	3	1666	2098	2289	2159
	Av.	1430	1856	2036	1757
Av. daily feed per head, lbs.:					
Hay: alfalfa-brome ..	1	11.5	6.2	5.6	7.7
alfalfa	2	10.7	6.2	5.0	7.5
alfalfa	3	13.3	5.9	4.2	8.2
	Av.	11.8	6.1	4.9	7.8
Grain: corn	1	11.4	14.2	16.2	12.2
sorghum	2	10.3	14.2	15.2	13.0
sorghum	3	13.3	16.8	18.3	17.3
	Av.	11.7	15.1	16.9	14.2

Table 28 (Continued).

Feed per 100 lbs. gain:																		
Hay: alfalfa-brome ..				1	630	370	238	431										
alfalfa				2	573	313	234	368										
alfalfa				3	603.4	267	180.3	351.3										
Av.					602	317	217	383										
Grain: corn																		
sorghum				1	623	706	691.3	684.4										
sorghum				2	549	720	711	635										
sorghum				3	603.4	763	789.3	744.3										
Av.					592	730	730	688										
Av. dressing percent																		
(includes cooler																		
shrink)				1	58.3	58.8	60.0	58.0										
				2	59.8	60.9	61.0	60.0										
				3	59.5	62.0	59.6	59.8										
Av.					59.2	60.6	60.2	59.3										
Carcass grades:																		
Test				Test				Test				Test						
1 2 3 Tot.				1 2 3 Tot.				1 2 3 Tot.				1 2 3 Tot.						
Low prime				1	1													
Top choice								2 2				1 1 1 3						
Av. choice				2 2				2 2 2 6				1 3 2 6						
Low choice				3 4	7			3 4 4 11				4 5 1 10						
Top good				2 5 3	10			3 3 2 8				3 1 4 8						
Av. good				4 1	5			2 1				3			1 2 3			
Low good				2 1	3											3		
Top com.				1	1													
Av. grade ¹				13.93			12.27			12.13			13.6					
Degree of marbling:																		
Moderately																		
abundant													1 1					
Slightly abundant				1	1			1 1										
Moderate								1 2 3		1		1						
Modest				2 2		3 4 7		6 1 7										
Small amount				2 1 4	7			5 2		8		1 4 2 7						
Slight amount				3 9 3	15			1 6 2 9		2 1 5 8		3 1 1 5						
Traces				4	4			4		1 2 3		4 1 5						
Av. degree																		
marbling ²				7.62			7.13			6.93			7.53					

1. Based on low prime 6, top choice 8, av. choice 10, low choice 12, top good 14, av. good 16, low good 18, and top commercial 20.

2. Based on moderately abundant 3, slightly abundant 4, moderate 5, modest 6, small amount 7, slight amount 8, and traces 9.

Effect of Previous Treatment upon Fattening Gains of Heifers—Summary.

PROJECT 222

D. Richardson, E. F. Smith, and R. F. Cox

The way that animals are fed and managed before going into the feed lot may influence the rate and efficiency of gain on a fattening ration. This is particularly true with pigs. This experiment was planned to obtain information on the response of heifers on a **fattening** ration after having received different kinds of roughage in their **wintering** rations. The different rations were supplemented to make them similar in protein, total digestible nutrients, vitamins, and minerals.

Experimental Procedure

In each of three wintering tests, 50 Hereford heifer calves were divided into five lots of 10 animals each. They were wintered on the

Table 29
The Influence of Different Roughages Fed in Wintering Rations upon Subsequent Gains on Fattening Rations.

Year	Test No.	Prairie hay (—Av. daily gain—)		Corn cobs (—Av. daily gain—)		Alfalfa hay (—Av. daily gain—)		Atlas silage (Sp. sup.) (—Av. daily gain—)		Atlas silage (Grain & prot.) (—Av. daily gain—)		Winter Av. by test		Fattening Av. by test	
		Winter	Fattening	Winter	Fattening	Winter	Fattening	Winter	Fattening	Winter	Fattening	Winter	Fattening	Winter	Fattening
1953	1	1.60	2.05	1.43	1.68	1.24	2.41	1.69	2.00	1.72	1.95	1.53	2.02		
1954	2	1.27	2.03	1.25	2.12	1.52	2.18	1.73	2.05	1.65	1.92	1.48	2.06		
1955	3	1.50	2.32	1.36	2.52	1.68	2.02	1.89	2.27	1.55	2.27	1.60	2.28		
	Av.	1.46	2.13	1.35	2.11	1.48	2.20	1.77	2.11	1.64	2.05				