Barley for Grazing and Fattening Cattle In Oklahoma

L. S. Pope, O. F. Harper, D. F. Stephens and George Waller

Milo and barley are the two most important feed grains for fattening cattle in Oklahoma. In most years, they supply more than 75% of all the feed grain available for livestock. Most of the milo (grain sorghum) is produced in the western ⅓ of the state, while barley is grown chiefly in the central belt. With barley, there is added advantage from the winter pasture and the relatively cheap gain which can be obtained with stocker calves. This can significantly reduce the cost of a yearling feeder. Rolled barley can be used to supplement cattle on small grain pasture, or to "warm up" cattle before the fattening period.

New and improved varieties of barley, which are more winter hardy and provide better grazing, have been developed at the Oklahoma Station over the past few years. The increase in barley production is reflected in acreage and yield data from the U.S.D.A., as shown in Figures 1 and 2 for Oklahoma during the past 9 years.

Barley vs. Milo for Fattening Steers

New methods of processing (i.e. steam rolling) to increase its bulk, together with its fibrous seed coat, have given barley a further advantage for fattening cattle. The rolled grain not only serves as the chief

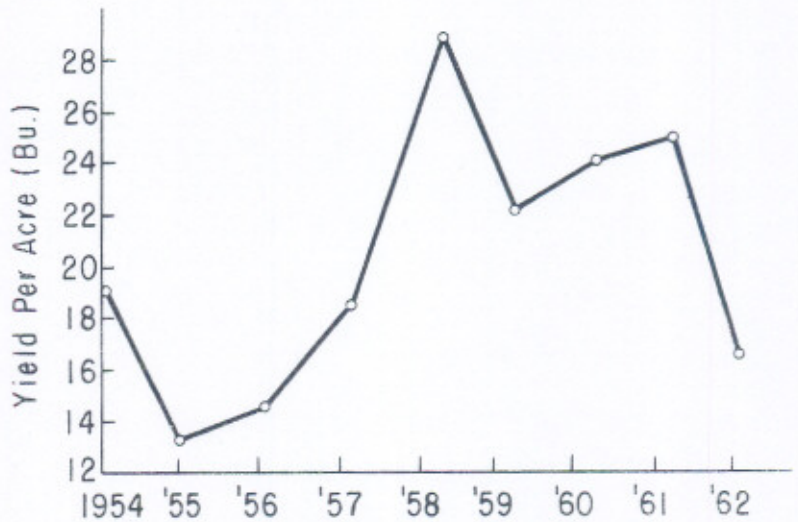

Figure 1. Oklahoma Barley Acreage harvested, 1954-62.

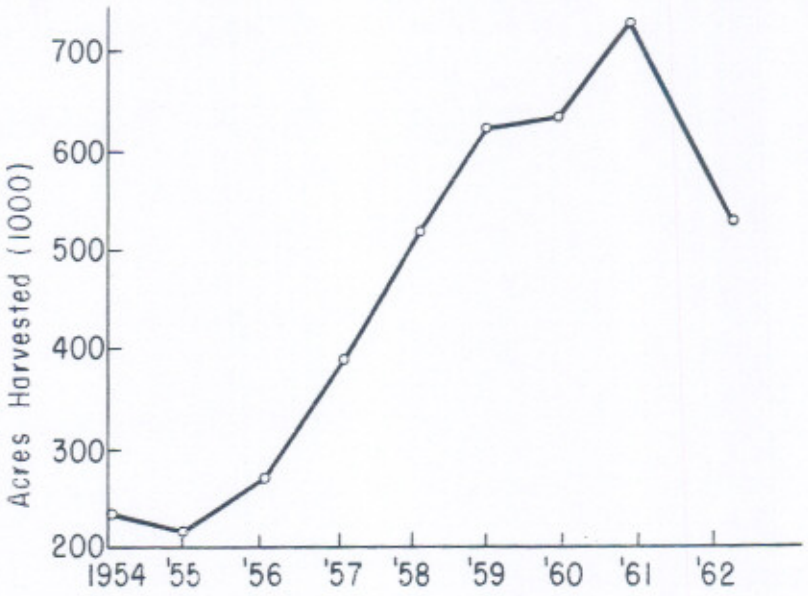

Figure 2. Oklahoma Barley Yield produced, 1954-62.

source of energy for fattening, but also substitutes for much, if not all, of the bulk required. Hence barley may "pencil out" to have a much higher feeding value than shown in past trials when both of these factors are considered.

Experiments at this station and at Arizona have indicated that barley may have more feeding value than grain sorghum for fattening steers, presumably because of the greater availability of starch in the barley kernel. Elsewhere in the report is a comparison of corn, milo and barley when each was fed in ground form, and in rations equalized in fiber and other nutrients. Note the improved efficiency with barley. In recent Arizona tests, it was shown that nearly 25% of the starch in milo passed through fattening cattle vs. only 8% of the barley starch.[1] Results of several feeding trials at Arizona show that barley is superior to milo in terms of feedlot performance and efficiency of gain.

Similar results are available from a 1960-61 test conducted at the Ft. Reno station. Three lots of yearling steers were fattened on either rolled milo or rolled barley (see Table 1). There was a slight advantage in rate of gain for barley and about 94% less barley was required per cwt. gain. When credit was given to barley for the "roughage" effect it induced in the ration (i.e., 2 lb. cottonseed hulls were necessary in the milo ration to provide equal fiber) it appeared that rolled milo was less than 90% of the value of rolled barley.

[1]Cadena, *et. al.*, Ariz. F. Day Rpt., 1962

Table 1.—Comparison of Steam Rolled Milo vs. Barley in Equal Fiber Rations for Fattening Yearling Steers.[1]

Ration	Rolled Milo, Supplement, 2# C.S. Hulls	Rolled Barley, Supplement
No. steers	27	25
Av. daily gain, 154 days	2.35	2.49
Av. daily grain intake	14.7	14.7
Feed required per cwt. gain, lb.		
Grain	625	590
Supplement	79	75
C.S. Hulls	115	36[2]
Av. carcass yield, %	61.2	60.7
Av. carcass grade score[3]	2.85	3.04
Relative value of milo compared to barley, %		
Based on grain/cwt.—	94.4	
Based on value of grain + roughage replaced—	89.0	

[1] Av. of results from 3 lots fed each ration
[2] Small amount of cottonseed hulls fed first 4 weeks of test
[3] 3 = Top Good, 4 = Low Choice

As with all grains, barley may vary in yield and chemical composition, depending on soil fertility, climate, and variety. This results in considerable variation in nutrient content, as is illustrated by the chemical analysis of 7 samples of feed grade barley used at Ft. Reno during the past 3 years (see Table 2). Of most importance is the variation in crude protein and fiber; the latter being a reflection of plumpness of kernel or test weight. Other studies also indicate a variation in trace mineral content.

Acre Yield of Beef From Barley

What can we expect in terms of "yield of beef per acre" from barley, if we consider both its winter pasture potential and the feedlot gains possible from feeding the grain?

Table 2.—Variation in Chemical Composition of 7 Samples of Barley.

Percent Composition	Low Sample	High Sample	Average
Dry Matter	90.2	93.0	91.4
Ash	2.32	2.68	2.54
Crude Protein	9.94	14.73	11.66
Ether Extract	1.25	2.64	1.78
Crude Fiber	4.38	7.01	5.53
N-Free Extract	67.21	73.62	69.90
Calcium	.03	.12	.07
Phosphorus	.29	.39	.32

Results of winter grazing trials with barley pasture at the Ft. Reno station during the fall and early winter of 1962-63 give some indication of expected performance. Obviously, the amount of winter gain possible with stocker cattle grazing barley will vary widely from year to year depending on weather conditions, and age or condition of the cattle. Barley forage is not the most palatable of our small grains, but intake appears to be satisfactory when grazed in pure stands.

One hundred, weaner, Hereford steer calves were purchased from the Schultz ranch near Shattuck in early October for use later in feeding trials. The calves were allowed to recover from the effects of weaning and were branded for individual identification. In late October, they were placed on 50 acres of excellent barley pasture (Rogers variety) with an adjacent 100-acres of dead grass and milo stubble. A mineral mix of 2 parts salt and one part bone meal was available, free choice. The performance for the 101-day period of winter grazing is shown below:

Number of steers pastured	100
Days on pasture	101
Av. initial weight, lb.	470
Av. final weight, lb.	560
Av. daily gain	0.9
Gain per acre of barley, lb.	120

The gain per acre credited to barley was calculated as ⅔ of the total gain per steer, with the remainder credited to other feed.

It can be seen that grazing barley pasture at the rate of 2 steers per acre (plus additional dry feed) for 101 days resulted in 0.9 lb. gain per head or 120 lb. per acre. Growth of barley pasture in December and January was retarded due to extremely cold weather, hence, the results obtained might be considered below average for good winter pasture and a longer grazing period. Nevertheless, cheap gains on barley pasture reduced the cost of yearling feeders by 4.5¢ per lb., based on an initial cost of 28¢ per lb.

Feedlot Performance From Barley

From the results of 5 feeding trials conducted at the Ft. Reno station during the past three years, we can gain some idea of what might be expected in terms of the value of barley for fattening cattle. In all trials, an "all-barley and supplement" type feeding program was employed. Table 3 summarizes the overall results of 5 experiments, which were designed to test different supplements to barley rations. Age of cattle, average initial and final weights, days on feed, barley required per cwt. gain and the quality of carcass produced are shown. While there was considerable variation between different groups of experimental cattle, it appears that about 6.5 lb. of steam rolled barley was necessary to produce a lb. of gain—plus additional supplement and a small amount of roughage during the first 30-40 days while the cattle are being started on feed.

Table 3.—Summary of 5 Barley Feeding Trials at Ft. Reno, 1960-63[1]

Age of cattle	Fall Calves			Yearlings	
Trial number	1*	3[2]	5	2[2]	4
No. steers/experiment	36	40	48	36	40
Av. days on feed	199	206	205	146	164
Av. weight, lb.					
Initial	523	573	516	690	633
Final	997	996	997	1082	1052
Total gain	474	423	481	392	419
Av. daily gain, lb.	2.38	2.05	2.35	2.69	2.37
Barley intake/cwt./day, lb.	2.1	1.9	1.8	1.9	1.8
Feed required/cwt. gain, lb.					
Barley	655	668	579	625	646
Supplement	87	96	103	76	86
C.S. Hulls[3]	59	67	28	48	58
Carcass data:					
Av. yield, %	60.9	63.2	60.5	61.4	62.4
Grade score[4]	3.2	3.1	3.7	3.6	3.3

[1] Trials 1, 3 and 5 were fall and winter feeding tests; trials 2 and 4 were conducted in spring and summer.

[2] Implanted with 24 mg. stilbestrol at the start of the experiment.

[3] Small quantity of C.S. hulls used in starting cattle on feed.

[4] Carcass grade score based on 3= Top Good; 4= Low Choice. Yield based on final Ft. Reno shrunk weight and hot carcass weight less 2%.

If we value the gains at 22¢ per lb. (current market for Good-to-Choice slaughter cattle) and consider the total gain from pasture as well as that which might result from feeding 25 bu./acre barley in the fattening phase, it can be calculated that barley would yield about 305 lb. of weight gain per acre, at a value of $67.10. Yields in excess of 40 bu./acre have been obtained at Ft. Reno. On this basis, we can calculate 415 lb. or $91.30 return per acre. Depending on the market, it may be possible to obtain more financial return from grazing and feeding barley than selling a cash crop of grain. The above results are believed to be conservative in terms of winter gain and yields for many areas.

They do not, however, take into account the variation in pasture than can be expected, nor the time, labor, capital and risk involved in feeding cattle, as well as the market fluctuations, cost of preparation, and small amount of supplement and roughage required to effectively use barley, all which should be considered.

Success with "all-barley" type rations depends on many factors. Close attention is necessary. Cattle should be self-fed and the roughage reduced from 50% to zero over 3-4 weeks. Considerable scouring and looseness may occur as the last portion of roughage is withdrawn. Barley should be well crimped to increase its bulk. A well-balanced supplement is the key to success with barley feeding — especially the trace mineral picture. Considerable stiffness and founder may occur among barley-fed cattle. In the above experiments involving 200 cattle, 6%

of the steers were foundered and 3.5% were observed to be somewhat stiff. However, many "stiff" cattle continue to gain, and will grade satisfactorily upon slaughter. Generally, barley-fed cattle have been firm and well covered with outside fat, but with less marbling than desired.

Summary

Increased interest has developed in barley for winter grazing and fattening cattle on the grain. Much of the future for barley depends on the wheat program now under consideration, and barley is less winter hardy than wheat and subject to more freeze out. However, it appears to have promise in many areas where winter pasture can be combined with a feedlot program in the production of finished beef. Yields per acre in terms of weight gain from winter grazing and later fattening program appear to be the neighborhood of 300-400 lb., depending on the growth of winter pasture and yield of barley. Additional items such as labor, supplement, risk and investment should be considered.

The Influence of Slaughter Weight and Limited Feed Intake During Finishing Carcass Merit in Swine

J. C. Hillier, Marvin Heeney and Melvin Bradley

It is well established that carcass traits in swine are high to moderately high in heritability. That economically important carcass traits can be changed significantly through selection, over a period of several years, if modern selection practices are followed and modern aids to selection employed to the fullest. Changes are being made in the direction of both younger and leaner pork and such changes are taking place at an increasing rate, particularly where the producer has the desire to market a superior product. However, a visit to any packer's cooler will reveal that there is a need for a very rapid change in market hogs in the direction of less backfat and increased muscling.

While genetic progress is being made toward a more desirable lean to fat ratio there are forces working against the full expression of this genetic improvement. These forces include more rapid gains as produced by the greater use of rations that are more nearly correct from a nutritional standpoint, less exercise and more nearly ideal temperature conditions as found in modern confinement housing, and the use of feed additives which tend to promote health and thus more