

UTILIZING BLUESTEM GRASS IN
FATTENING YOUNG CATTLE FOR MARKET

by

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INTRODUCTION

Grass is the principal feed of most domestic animals in their native state and is the most widely used feed resource in livestock production under present conditions. Cattle are grown and fattened in some parts of the world today on grass alone. In this country however, the better grades of beef cattle are finished on concentrates, usually in the dry lot with hay or silage as the roughage part of the ration. A large proportion of our beef cattle have been and are raised under range conditions where heavy grain feeding is not practicable. They are finished in corn belt feed lots usually in winter, where pasture is of minor importance.

Thus while many experiments have been carried out in dry lot feeding, not much has been accomplished in feeding on pasture, not only because it has not been a common operation in actual practice, but also because experiments in grazing are more difficult to control and carry out accurately. Pastures usually supply cheap feed with little labor and much land is suited to nothing but grass, due to physical features. Largely because it is cheaper than other feeding methods, grazing cattle has become of greater importance than it was at one time in and near to the

grain producing regions. Because of these factors the wider use of grass in beef fattening has been suggested and discussed at intervals for more than a quarter century. Some of the phases of this type of feeding have been studied in a few scattered experiments, some of them having been conducted many years ago. But most of the earlier and even much of the later work is of little practical value in helping to solve the problems of the user of bluestem grass. The most important objection, and the one which makes most of the trials of little value, is the age of the cattle used. In the beginning only the more mature animals were fed. These have already completed their growth and fatten readily on grass. Younger steers tend to grow instead of fatten. This tendency is especially noticeable on grass and becomes one of the most important considerations in grass fattening.

In recent years this problem of utilizing grass in a cattle fattening ration has attracted more attention. Several stations have conducted carefully planned and well conducted experiments to secure information on factors of pasture feeding or factors affecting pasture feeding. Stations other than Kansas that have finished cattle on grass are Missouri, Illinois, Ohio, Nebraska, Colorado, Tennessee, and Kentucky. As a result of this work some

important information has been secured and some definite conclusions can be drawn.

The question of what kind of pasture gives best results has received considerable attention. The Illinois and the Colorado stations have devoted most of their attention to this factor. The Nebraska station has also devoted some time to this point. These stations generally found that cattle fed in a dry lot made the most rapid but sometimes not the most economical gains. The Illinois station found red clover the best pasture to use from the standpoint of gain and market finish. Alfalfa and sweet clover also gave excellent results. Some pasture mixtures have proved very satisfactory at several stations. Bluegrass has been more widely used than any other grass and while it sometimes has not proved the equal of the legume pastures, it has given some very good results. The Ohio station compared feeding in a dry lot with feeding on bluegrass pasture and found that the cattle on bluegrass made more rapid and more economical gains although they were not as well finished from a market standpoint. The Missouri station devoted most attention to the period of time required to finish, the character of the finish produced, and the effect of condition at starting on ultimate finish. This station found that young cattle may

be finished on pasture in about the same length of time required by other methods, and that those starting in good flesh require a proportionally shorter time for fattening. Cattle thin at the beginning made more rapid gains but did not in any case overcome their early handicap in weight or in condition.

Other factors that have received attention from these and other stations are the effect of winter rations on summer gain, the effect of age on summer and winter gains, and the effect of pasture on the quality of the beef produced.

Some of these experiments are in part applicable to Kansas conditions and the results are comparable in many cases to similar work done at this station. But the problem itself is inherently different in Kansas than in other states and requires a different method of approach. Consequently, none of the other work offers a solution for the Kansas problem. The stockman of this section is not so much concerned with the kind of pasture to use, but rather with how to make the best use of bluestem which is all the pasture he usually has. Yet no other station reports any trials in which bluestem grass was used. This grass is different in feed value, habits of growth and in other features than any grass reported as

used in any previous trials. The question here is how to make the best use of the pasture as it is, not whether the pasture should be changed or should be discarded for cultivated crops.

THE PROBLEM

This thesis and the results and conclusions presented are based on an experiment planned and conducted at the Kansas Agricultural Experiment Station for the purpose of securing information which might indicate a method of utilizing Kansas bluestem grass in fattening light weight, well wintered cattle for market.

This bluestem grass section contains several million acres which are for the most part unsuited to cultivated crops but which produces a rich growth of fine bluestem grass. This grass has long been famous for its qualities as a beef producer. Formerly, aged steers were turned on the pastures of this area in the spring and fattened on grass alone.

Handling this type of cattle has become less profitable in recent years. Aged steers are no longer available in sufficient numbers to fill these pastures. Moreover, they usually can not be disposed of advantageously in the fall. The beef from these grass fat cattle does not

possess enough quality and finish to satisfy fully the modern market. Finished on grain they are too heavy for the modern trade and generally do not bring attractive prices. These factors have virtually eliminated the older steers in grazing operations in the bluestem section.

The changing conditions in the economics of production and in market demands have made it necessary to change the method of utilization of bluestem pastures. The changes which have come about brought up problems which suggested the need of this experiment.

This investigation is an attempt to answer at least in part, the question as to what the stockmen of this section can do with their grass to insure a reasonable profit. The modern market demands in the main, beef from good quality, well finished cattle of light weight. Consequently, the stockman is turning to light cattle.

If cattle of this kind can be produced profitably by a combination of grain feeding and grazing on bluestem grass, the problem of profitable pasture utilization in this section will have been partly solved.

Object of the Experiment

The object of this experiment was to determine a more profitable method of utilizing bluestem grass in fattening

well wintered, light weight cattle for market.

Plan of the Experiment

Four lots of ten calves each were used in this experiment. Each of the four lots was fed identically the same ration during the winter. This ration consisted of cane silage ad. lib., 2 pounds of alfalfa hay, 1 pound of cottonseed meal, and approximately 5 pounds of corn per head per day. This phase of the experiment extended over a period of 135 days, beginning December 17, 1929 and ending May 1, 1930. After May 1 each lot was handled differently and as follows:

Lot 1 was full fed in a dry lot on ground shelled corn, cottonseed meal, and alfalfa hay from May 1 to September 28, a period of 150 days.

Lot 2 was full fed on bluestem grass pasture on ground shelled corn and cottonseed meal from May 1 to September 28, a period of 150 days.

Lot 3 was grazed on bluestem grass without other feed from May 1 to July 30, a period of 90 days; then full fed in a dry lot from July 30 to November 7, a period of 100 days, on ground shelled corn, cottonseed meal, and alfalfa.

Lot 4 was grazed on bluestem grass without other feed from May 1 to July 30, a period of 90 days, then full fed on bluestem pasture from July 30 to November 7, a period of 100 days, on ground corn and cottonseed meal.

The plan for winter feeding was to produce a rather high rate of gain but at the same time use a maximum amount of roughage. The winter ration fed was one which has been proven in previous wintering trials at this station to be most efficient and economical for this purpose. By its use calves finish the winter in fleshy condition and with a low feed cost.

The pasture allowance was ample, there being good feed unused in each pasture. Feeding was done twice daily during the winter and in the dry lots. The lots fed on pasture were fed once each day. Salt and water were provided at all times and ample shade was available. Weighing was done on three consecutive days at the beginning and end of the experiment and each 30 days while it was in progress. Beginning June 1 each lot was appraised each month by a representative of a Kansas City commission firm. These appraisals were used in valuing the cattle throughout the trial and as an indication of the progress being made in finishing. Seventy-five cents per cwt. was

subtracted from the actual appraisal to cover shipping and other marketing costs.

It was planned to have the same degree of finish on both lots that were finished in a dry lot, and the same degree of finish on both lots finished on bluestem grass pasture. This was accomplished by feeding both lots that were started on full feed May 1 - Lot 1 full fed in a dry lot and Lot 2 full fed on bluestem grass pasture - for a period of 150 days, and by feeding both lots that were full fed after August 1 - Lot 3 full fed in a dry lot and Lot 4 full fed on bluestem grass pasture - for a period of 100 days.

Description of the Cattle

The calves used were purchased from the Matador Land and Cattle Company of Matador, Texas. They were at the station long enough before the experiment started to become adjusted to their new surroundings. These calves were of Hereford breeding and graded good to choice when the experiment began. There were no losses and very few sick at any time during the trial. They were divided into lots in the beginning by weight and grade to make the lots as uniform as possible.

Results

The results of this experiment are given in detail in Tables I and II.

Table I - Full feeding on bluestem grass after May 1 versus full feeding in a dry lot after May 1, yearling steers that were wintered well.

Phase I - Wintering - December 17, 1929 to May 1, 1930 - 135 days			
Lot number	:	1	: 2
Age of steers	:	Calves	: Calves
Number of steers per lot	:	10	: 10
Daily winter ration:	:	Pounds	: Pounds
Shelled corn	:	4.81	: 4.81
Cottonseed meal	:	1.00	: 1.00
Cane silage	:	20.15	: 20.15
Alfalfa hay	:	2.01	: 2.01
Initial weight per steer December 17, 1929	:	347.50	: 346.83
Weight May 1, 1930 (135 days)	:	605.50	: 612.50
Gain per steer during winter	:	258.00	: 265.67
Daily gain per steer during winter	:	1.91	: 1.97
Cost per 100 pounds gain	:	\$ 8.39	: \$ 8.14
Cost per steer into experiment @ \$13	:	45.18	: 45.09
Feed cost per steer during winter	:	21.62	: 21.62
Steer cost plus feed cost	:	66.80	: 66.71
Necessary selling price per cwt. to break even	:		:
at end of wintering period	:	11.03	: 10.89
Appraised value per cwt. May 1, 1930 less 75¢	:		:
for shrinkage, shipping, etc.	:	11.25	: 11.25

Phase II - Full feeding - May 1 to September 28, 1930 - 150 days

	1	2
Lot number	(Dry Lot)	(Pasture)
Average daily ration:	Pounds	Pounds
Shelled corn	13.56	12.55
Cottonseed meal	.99	.95
Silage (7.7 pounds per head per day-May 1 - June 3)
Alfalfa hay	3.36
Pasture	ad.lib.
Weight per steer May 1	605.50	612.50
Weight per steer September 28	911.50	895.50
Gain per steer May 1 to September 28	306.00	283.00
Daily gain per steer May 1 to September 28	2.04	1.89
Feed cost per steer May 1 to September 28	\$ 40.44	\$ 41.44
Steer cost plus feed cost December 17 to September 28 - 285 days	107.24	108.15
Appraised value per cwt. September 28, Kansas City basis, less 75¢ to cover shrinkage and shipping expenses	11.75	10.75
Margin per cwt.	-.15	-1.33
Margin per steer	-.14	-11.88
Corn consumed per steer (bushels) during winter	11.60	11.60
Corn consumed per steer (bushels) during full feeding	36.31	33.62
Total corn consumed per steer (bushels) December 17 to September 28 - 285 days	47.91	45.22
Total gain per steer December 17 to September 28- 285 days	Pounds 564.00	Pounds 548.67
Average daily gain per steer - December 17 to September 28 - 285 days	1.98	1.93
Bushels corn per 100 pounds gain	8.49	8.24
Feed cost per cwt. gain December 17 to September 28 - 285 days	11.00	10.79

FEED PRICES: Phase I - December 17 to May 1 - Corn \$.84 per bushel; cottonseed meal \$45 per ton; cane silage \$5 per ton; alfalfa hay \$15 per ton. Phase II - May 1 to September 28 - Corn \$.91 per bushel; cottonseed meal \$40 per ton; silage \$5 per ton; alfalfa hay \$15 per ton; pasture \$8 per head.

Table II - Full feeding on bluestem grass after August 1 versus full feeding in a dry lot after August 1, yearling steers that were wintered well and grazed without other feed from May 1 to August 1.

Phase I - Wintering - December 17, 1929 to May 1, 1930 - 135 days				
Lot number	:	3	:	4
Age of steers	:	Calves	:	Calves
Number of steers per lot	:	10	:	10
Daily winter ration:	:	Pounds	:	Pounds
Shelled corn	:	4.81	:	4.81
Cottonseed meal	:	1.00	:	1.00
Cane silage	:	20.15	:	20.15
Alfalfa hay	:	2.01	:	2.01
Initial weight per steer December 17, 1929	:	346.67	:	346.67
Weight May 1, 1930 (135 days)	:	603.50	:	605.00
Gain per steer during winter	:	256.83	:	258.33
Daily gain per steer during winter	:	1.90	:	1.91
Cost per 100 pounds gain	:\$	8.41	:\$	8.37
Cost per steer into experiment @ \$13	:	45.07	:	45.07
Feed cost per steer during winter	:	21.62	:	21.62
Steer cost plus feed cost	:	66.69	:	66.69
Necessary selling price per cwt. to break even at: end of wintering period	:	11.05	:	11.02
Appraised value per cwt. May 1, 1930 less 75¢ for shrinkage, shipping, etc.	:	11.25	:	11.25

Phase II - Grazing without grain May 1 to July 30 - 90 days				
	:	Pounds	:	Pounds
Weight to grass as yearlings - May 1	:	603.50	:	605.00
Weight off grass July 30	:	715.50	:	711.50
Gain per steer on grass - 90 days	:	112.00	:	106.50
Daily gain per steer on grass - 90 days	:	1.24	:	1.18
Steer cost including Pasture @ \$8 per head (December 17 to July 30)	:\$	74.69	:\$	74.69
Necessary selling price per cwt. at home to break even July 30	:	10.44	:	10.50

Phase III - Full feeding August 1 to November 7 - 100 days		
	:(Dry Lot)	:(Pasture)
Average daily ration:	Pounds	Pounds
Shelled corn	15.79	15.00
Cottonseed meal	1.00	1.00
Alfalfa hay	5.40
Weight per steer August 1	715.50	711.50
Weight per steer November 7	1007.50	960.75
Gain per steer August 1 to November 7 - 100 days	292.00	249.25
Daily gain per steer August 1 to November 7 - 100 days	2.92	2.49
Feed cost August 1 to November 7 - 100 days	\$ 31.70	\$ 26.37
Steer cost plus feed cost December 17 to November 7 - 325 days	106.39	101.06
Necessary selling price per cwt. at home to break even November 7	10.56	10.52
Appraised value per cwt. November 7, Kansas City basis less 75¢ per cwt. to cover shrinkage and shipping expenses	12.00	11.00
Margin per cwt.	1.44	.48
Margin per steer over feed and marketing costs	+14.51	+4.62
Corn consumed per steer (bushels) during winter	11.60	11.60
Corn consumed per steer (bushels) during full feeding	28.19	26.79
Total corn consumed per steer - 325 days (bushels)	39.79	38.39
Bushels corn required for 100 pounds gain - 325 days	6.02	6.25
Feed cost per 100 pounds gain - December 17 to November 7	\$ 9.28	\$ 9.12
Total gain per steer December 17 to November 7 - 325 days	660.83	614.08
Average daily gain December 17 to November 7	2.03	1.89

FEED PRICES: Phase I - Corn \$.84 per bushel; cottonseed meal \$45 per ton; silage \$5 per ton; alfalfa hay \$15 per ton. Phase II - Pasture \$8 per head. Phase III - Corn \$.91 per bushel; cottonseed meal \$40 per ton; alfalfa hay \$15 per ton.

DISCUSSION OF EXPERIMENT

It will be noted that exactly the same ration was fed each lot during the winter and that the gains were approximately the same for each lot. Since the feed and care was the same in all lots, no significant differences developed during this phase of the experiment, but some interesting features may be noted. The average winter gain by lots was 1.91 to 1.97 pounds per day, which is a very satisfactory gain when the cheapness of the ration is considered. The cost of these gains is perhaps the most attractive feature in the winter phase. Due chiefly to the large amount of cheap roughage fed, the cost of winter gain was held down to the relatively low figure of \$8.14 to \$8.41 per cwt.

The initial cost of the calves was \$13.00 per cwt. At the close of the winter period the cost had been reduced to approximately \$11.00 per cwt., making the necessary selling price at this time \$2.00 per cwt. less than the initial cost.

The two lots that were started on full feed at the close of the winter period made satisfactory gains throughout the summer.

The lots that were grazed without grain did not make a heavy gain on grass due to their rather high condition at starting time. This is to be expected since it is well known that gains on grass are dependent in a very large measure on the condition of the animal when starting on grass. Previous trials show however, that a greater final weight and a greater profit can be secured by starting with the fleshy animal and accepting the lower rate of gain on grass. The thinner steer gains fastest on grass but does not overcome the initial disadvantage in condition in time to reach a favorable market. Previous experiments indicate that a gain of approximately 250 pounds per calf during the winter period is necessary for best results. This amount of gain can be produced on a calf with a small amount of grain, roughage being the source of a very large part of the nutrients required in the production of this gain.

Comparison of Results

In this experiment there are a number of comparisons possible after May 1. Each of the four lots is compared to each other lot making six comparisons in all. The different methods involved in finishing the animals at

different times and under different conditions make some of the comparisons rather difficult to follow, but these differences should be kept clearly in mind in arriving at conclusions as to the value of each method. These comparisons will be discussed in detail in the following pages.

A. Full Feeding May 1 to September 28.

Dry Lot versus Pasture.

Lots 1 and 2.

The detailed results of this test are shown in Table I. The concentrate consumption is very nearly the same for these two lots, the dry lot cattle eating a total of only 2.69 bushels more corn per steer during the entire full feeding period. This amounts to approximately one pound per day more per steer. This is a comparatively small amount and should not be considered significant. The variation in corn consumption is more noticeable from the standpoint of time. During the early part of the summer the dry lot fed cattle ate more corn than the pasture fed cattle. Later in the summer however, the pasture fed cattle increased their corn consumption markedly and were well ahead of the dry lot cattle in corn eaten daily during the last two months of the trial. This

was probably due in a large measure at least to the change in the character of the pasture. As the season advanced the grass became somewhat woody and more coarse and stemmy, and consequently less palatable. This caused the steers to depend more on corn as the palatability of the pasture decreased. There is also a possibility that the pasture cattle were less affected by the extreme heat of midsummer as they were in the open with a better opportunity to get full advantage of any cool breeze which might come up.

Some feed was lost in the pasture because of rains. The cattle were fed each morning in an open bunk. They did not usually clean up the feed until late in the day and that part left in the bunk became wet on rainy days and was then refused by the cattle. The wet feed would be weighed back, and while the feed weighed back was not charged to the cattle it is probable they would have eaten somewhat more corn and made slightly greater gains if there had been some means of keeping this feed dry at all times.

The rate of gain and the amount of corn eaten showed a high correlation during the entire summer. Both were greatest in the dry lot during May, June, and July, the latter month marking the turning point.

The pasture lot showed a higher grain consumption and greater daily gain during August and September. The difference in total gain for the period was only 15 pounds in favor of the dry lot. The significant difference was in the character of the finish rather than in the total gain. Throughout the experiment the pasture lot showed less tendency to take on a high degree of fleshing. They showed an inclination to grow rather than fatten during the entire period. At the end they were more rangy and carried less finish. Their coats were noticeably rougher, their appearance being defined as "Green" by the packers. Because of this difference the dry lot cattle were appraised one dollar per hundredweight higher than the pasture fed cattle.

The feed cost was slightly higher for the pasture fed cattle, caused by the fact that the pasture cost was greater than the roughage eaten by the dry lot animals, which was more than enough to offset the heavier grain consumption of the dry lot. Both lots were fed at a loss. The loss for the dry lot cattle was $-\$.14$ per head and for the pasture fed cattle $-\$11.88$ per head. This difference in the return per head was due to the poorer finish and "green" appearance and lower selling price for the cattle full fed on grass.

B. Deferred Full Feeding - 100 Days After August 1.

Dry Lot versus Pasture.

Lots 3 and 4.

This phase is a comparison of two lots wintered well, grazed without grain to August 1 and full fed 100 days - Lot 3 in a dry lot and Lot 4 on pasture. The results of this comparison are shown in Table II. As in the previous comparison (Table I), the difference in the feed consumed was not great enough to be significant but the difference in gain was greater in the dry lot by .43 of a pound per steer daily. This additional gain at the premium commanded by the dry lot steers made a rather important difference.

The dry lot steers were more highly finished, appeared less rangy, had a much smoother and sleeker hair coat, and a more pleasing appearance in general. The dry lot steers were noticeably more quiet and easy to handle than the lot fed in the open pasture. The factors mentioned above were principally responsible for the one dollar per cwt. margin given the dry lot cattle on appraisal by the commission men.

Table II shows that the dry lot cattle made the fastest gain and required less grain per 100 pounds

gain, and yet the necessary margin for the dry lot cattle was higher. This difference may be accounted for by the fact that the dry lot cattle were charged with a full season on pasture, the last 100 days of which they were in a dry lot being charged with a hay ration also. This hay charge made the cost per 100 pounds of gain slightly greater. This however, was much more than offset by the increased selling price. While the difference in cost was insignificant, the one dollar per cwt. margin received for the dry lot cattle made their net return per cwt. \$1.44 as compared to \$.48 for the pasture lot. This illustrates very effectively that sometimes the cheaper gains may be less profitable in the end and since net profit is the ultimate end of feeding operations, it is much more important than a low absolute cost of gain.

C. Full Feeding versus Deferred Full Feeding.

Dry Lot.

Lots 1 and 3.

This comparison shows some very interesting features. The cattle in Lot 1 were fed 150 days and reached a rather high degree of finish. They would have been acceptable as killers at the end of 60 days on feed. However, under any ordinary conditions cattle of the

weight and quality of these should be more highly finished before being marketed.

These cattle made absolutely no use of pasture and this system of management could not be included in a plan to use pasture for fattening. It will however, serve as a basis of comparison for the lots fed on bluestem grass with dry lot feeding.

The cattle in Lot 3 were carried 40 days longer than the cattle in Lot 1 because of the fact that while the cattle in Lot 1 were started on full feed May 1, the cattle in Lot 3 were not started on full feed until August 1. In this test grazing from May 1 to August 1 and then full feeding for 100 days produced approximately the same degree of finish and 96.83 pounds more gain than was produced on the cattle in Lot 1 full fed 150 days beginning May 1.

Lot 3 required only 6.02 bushels corn per 100 pounds gain for the entire period of the experiment, while Lot 1 required 8.49 bushels. This shows the greater use of pasture grass in producing gain. The good growth of Lot 3 on grass left this group in the very best condition to make efficient use of grain in fattening and contributed to the rapidity and economy of the gains of Lot 3 on feed. The economy of this method of management compared to

ordinary dry lot feeding is well illustrated by the margin of \$1.44 per cwt. for Lot 3 compared to -\$.02 per cwt. for Lot 1.

D. Full Feeding versus Deferred Full Feeding.

Pasture.

Lots 2 and 4.

These two lots represent the maximum use of pasture under the systems of management outlined. Both lots were on pasture throughout the entire season, Lot 2 on full feed and pasture 150 days after May 1, and Lot 4 for 100 days after August 1. This test is analagous to the previous comparison of the two dry lot groups. Each lot carried about the same degree of finish when marketed but Lot 4 cattle weighed 65 pounds more per head than Lot 2 cattle.

Lot 4 fed all season required 8.24 bushels of corn per 100 pounds gain against 6.25 bushels for Lot 2 - deferred fed - a difference of 1.99 bushels. The greater amount of corn required by this lot made a great difference in the cost of gain and in the margin per cwt. The margin was -\$1.33 per cwt. for Lot 2 compared to \$.48 for Lot 4, or a total difference of \$16.50 per steer.

These data show plainly that it is more practical in the case of yearlings that have been well wintered

to defer full feeding until August 1 rather than to start full feeding May 1 if such yearlings are to be full fed on grass.

E. Full Feeding in A Dry Lot versus Deferred
Full Feeding on Pasture.

Lot 1 and 4.

The comparison of these two lots represents the two extremes in the use of grass in fattening operations, Lot 1 eating no grass, while Lot 2 was on grass the entire summer and autumn, being full fed corn the last 100 days. The principal differences were the earlier finish of Lot 1, and their relatively high concentrate requirements - 8.37 bushels of corn per 100 pounds gain compared to 6.25 bushels per 100 pounds for Lot 4. The final weight per steer was somewhat greater in Lot 4. This greater weight however, was due to the more excessive growth of the grass fed cattle. The dry lot cattle carried more finish and met with greater favor in the eyes of the packers. The appraised values show a higher price for Lot 1. Yet, due to the much cheaper gains, Lot 4 produced a net profit while Lot 1 was fed at a loss. This is an example of producing gains at a cost too great to prove profitable while the cheaper gains are profitable,

and the cheapness of the gain was largely due to the larger amount of grass and the lesser amount of grain consumed.

F. Full Feeding on Pasture versus Deferred

Full Feeding in A Dry Lot.

Lots 2 and 3.

These two lots represent the two methods that many feeders are most interested in. Both utilize the grass rather fully. Lot 2 was on pasture during the entire full feeding phase while Lot 3 was fed in a dry lot 100 days, or the whole of the full feeding period for this lot. Lot 2 required 8.24 bushels of corn per 100 pounds gain compared to 6.02 bushels per 100 pounds gain for Lot 3. This made the cost of gains greater. The dry lot feeding period gave Lot 3 the typical dry lot appearance and they sold at near the market top. The long grain feeding period was not enough to overcome the packers discrimination against Lot 2 and they were appraised at a lower figure than Lot 3. Lot 2 was in rather high condition and had overcome the rangy appearance, but their coats were of the typical grass color and texture described as "green" by the buyers. On the basis of margin above cost these two lots represented the extremes for the experiment, the difference in value being \$26.39

per head. Lot 2 returned a margin over steer and feed cost of $-\$1.33$ per cwt., or $-\$11.88$ per steer, this being the poorest showing of any lot in the experiment from a financial standpoint. Lot 3 returned a margin over steer and feed cost of $\$1.44$ per cwt., or $\$14.51$ per steer, the greatest net profit of any lot in the experiment.

This extreme of $\$26.39$ per head in returns as a result of different methods of feeding emphasizes the necessity of giving thoughtful study to the matter of the adaptability of different methods of feeding to a given set of conditions.

CONCLUSIONS

While the results of this experiment are not to be considered as final it is believed that certain conclusions can be drawn as regards fattening beef on bluestem pasture. Other points are mere indications and may be proved or disproved by further experiment. The following are some of the points of greatest significance shown by this experiment.

1. Young cattle can be finished at a suitable weight and finish for the market on bluestem grass by using the proper methods of management.

2. Early summer feeding either in a dry lot or on pasture increases the corn required for 100 pounds gain and makes the cost of gain more expensive without a corresponding increase in weight per steer or price per pound.

3. Deferred feeding results in a maximum use of grass and produces a finished beef at lower cost.

4. The longer feeding period improves the finish but materially increases the cost of gain and decreases the net profit in the case of yearlings that have been well wintered.

5. Dry lot feeding seems more profitable for the full feeding due to the probable greater gains and to the market preference for the dry lot cattle.

6. Early fed cattle may be finished early in the summer and make suitable killers after 60 to 90 days on full feed when well wintered previous to starting on feed.

7. Bluestem grass pasture can be utilized most profitably in fattening young cattle for market by wintering calves well, grazing without other feed until August 1, and then full feeding in a dry lot 100 days.

8. The management systems outlined offer possibilities of disposing of young cattle advantageously as fleshy feeders in the spring, stockers or feeders from grass in

the summer, as handy weight killers during the late summer, or as well finished beef in the fall.

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