

FINISHING STEERS ON RANGE 1/

R. J. Raleigh, Joe D. Wallace 2/, and H. A. Turner
Squaw Butte Experiment Station, Burns, Oregon 3/

World population increases put a greater demand on beef production and will also put man and beast on a more competitive basis for cereal grains. Cattle feeding, by necessity, may become more dependent upon range and pasture forage, and rangelands may again be looked to as an area for production of slaughter cattle.

Yearling steers on sagebrush-bunchgrass range can be supplemented at a low level to maintain daily gains of about 1.15 kg. from May to mid-August (Wallace et al., 1963, and Raleigh and Wallace, 1965). After August, forage quality has decreased to a level that high levels of supplementation are necessary to maintain this rate of gain. Also, cattle that have received supplemental feed for about 100 days, are carrying a certain amount of finish and should be continued on feed rather than put on pasture. The purpose of this study was to determine if an additional 90 days of supplementation would bring such cattle to a suitable slaughter grade. This would essentially consist of using the range as a roughage source and feedground with the bulk of the feed coming from supplements. These animals should reach a body weight of about 454 kg. at an age young enough to be without excess body fat and still grade sufficiently well to make good beef.

Experimental Procedure

The study was conducted over two years (1965 and 1966) with 20 yearling Hereford steers each year. The average initial weights were 258 and 245 kg., respectively, for 1965 and 1966.

The steers were grazed together on crested wheatgrass from May 18 to August 3 the first year and from May 10 to August 3 the second year. During this time they received a supplement calculated to maintain gains at about 1.15 kg. per day (table 1). Cottonseed meal and rolled barley were used as protein and energy sources, respectively.

On August 3 of the first year the animals were divided into two groups of 10 each. One group was placed in dry lot and the other group remained on crested wheatgrass range. Each group was supplemented at the same rate,

1/ Contribution of W-94 Regional Project on Range Livestock Nutrition.

2/ Present address, Department of Animal Science, Colorado State University.

3/ Jointly operated by the Oregon Agricultural Experiment Station and the Crops Research Division, Agricultural Research Service, USDA.

with those in dry lot receiving meadow hay free choice and those on range having free access to the crested wheatgrass forage. During the second year all the animals were left on range the entire period and supplemented the same as in the previous year. During the finishing period the supplement was increased at a moderate rate to a level of about 1.75% of body weight, the level at which it remained, to the time of slaughter. Supplementation levels for this period are shown in table 1. Salt and a salt-bonemeal mixture were available at all times.

TABLE 1. DAILY SUPPLEMENTATION LEVELS PER HEAD FOR CATTLE FED ON RANGE AND IN DRY LOT.

| Date | Ingredients per head daily | | |
|--------------------|----------------------------|-----------------|----------------------|
| | Barley | Cottonseed meal | Meadow hay <u>a/</u> |
| | kg. | kg. | kg. |
| 5/10-5/31 | .454 | ----- | |
| 6/1-6/7 | .340 | ----- | |
| 6/8-6/14 | .227 | ----- | |
| 6/15-6/21 | .114 | .114 | |
| 6/22-6/28 | .114 | .227 | |
| 6/29-7/5 | .114 | .318 | |
| 7/6-7/12 | .159 | .386 | |
| 7/13-7/19 | .204 | .454 | |
| 7/20-7/26 | .295 | .499 | |
| 7/27-8/3 | .499 | .545 | |
| 8/4-8/11 <u>b/</u> | .908 | .545 | 7.72 |
| 8/12-8/25 | 2.134 | .636 | 6.99 |
| 8/26-9/9 | 3.632 | .636 | 5.99 |
| 9/10-9/22 | 5.039 | .636 | 4.99 |
| 9/23-10/6 | 6.084 | .636 | 4.36 |
| 10/7-10/20 | 7.219 | .636 | 3.63 |
| 10/21-11/8 | 7.581 | .636 | 3.18 |

a/ Meadow hay was fed during the finishing period only in 1965 and only to the group fed in dry lot.

b/ Dates before August 3 were called the growing period while those after that were the finishing period.

The steers were slaughtered on November 1 the first year and on November 9 the second year. Carcass data obtained on all animals were weight, conformation, maturity score, marbling, ribeye area, backfat thickness, dressing percent and USDA grade.

Results and Discussion

Animal gains and feed requirement. Average daily gains are presented in table 2. These were divided into two periods designated as the growing period, when the animals were on a low level of supplementation from early May to the end of July, and as the finishing period when they received higher levels of supplementation during August, September, and October.

TABLE 2. AVERAGE DAILY GAIN, SUPPLEMENTAL INTAKE AND COSTS OF SUPPLEMENTING STEERS ON RANGE TO A SLAUGHTER GRADE.

| Item | Group (1965) | | 1966 |
|--------------------------------|--------------|-------|-------|
| | Dry lot | Range | Range |
| <u>Growing period a/</u> | | | |
| Number of animals | 20 | | 20 |
| Number of days | 78 | | 86 |
| Daily gain, kg. | 1.24 | | 1.24 |
| Daily barley fed, kg. | .28 | | .28 |
| Daily cottonseed meal fed, kg. | .23 | | .23 |
| Daily feed cost, \$ <u>b/</u> | .048 | | .048 |
| Cost per kg. gain, \$ | .040 | | .040 |
| <u>Finishing period a/</u> | | | |
| Number of animals | 10 | 10 | 20 |
| Number of days | 89 | 89 | 96 |
| Daily gain, kg. | 1.16 | 1.05 | 0.96 |
| Daily barley fed, kg. | 4.91 | 4.91 | 4.71 |
| Daily cottonseed meal fed, kg. | .64 | .64 | .64 |
| Daily hay fed, kg. | 5.41 | ----- | ----- |
| Daily feed cost, \$ | .452 | .343 | .332 |
| Cost per kg. gain, \$ | .389 | .327 | .345 |
| <u>Total period</u> | | | |
| Daily gain, kg. | 1.20 | 1.13 | 1.08 |
| Daily feed cost, \$ | .263 | .205 | .198 |
| Cost per kg. gain, \$ | .22 | .18 | .18 |

a/ The interval from the beginning of the trial in May to August 3 each year was called the growing period while the finishing period was from August 3 to slaughter time in early November. In 1965 all steers ran together during the growing period but were split with one half being lot-fed and the other half range-fed during the finishing period. In 1966 all steers ran together for the entire trial.

b/ Cost includes range feed @ \$.30 per A.U.M., barley @ \$.055 per kg., cottonseed meal @ \$.099 per kg., and hay @ \$.022 per kg.

The average daily gain during the growing period was 1.24 kg. in each year. During the finishing period in 1965 the steers fed in dry lot gained significantly more ($P < .05$) with a gain of 1.16 kg. per day than those fed on range with a gain of 1.04 kg. per day. All the steers were fed on range in 1966 and gained an average of 0.96 kg. per day during the finishing period. Range feed was short, as a result of drouth, and the steers had to be moved to several pastures to keep them on feed and it is believed that this influenced rate of gain.

Average daily feed intake, other than forage intake which was not measured, cost of supplemental feed and cost per kg. of gain are presented in table 3. Market prices were used for supplement costs and charge per AUM of range was based on grazing fees for public land. Daily cost of the supplements during the growing period was 4.8 cents per head for each year, giving a cost per kg. of gain of 4.0 cents which included a charge for range feed of

30 cents per AUM. During the finishing period in 1965 the cost for steers fed in dry lot was 45.2 cents per day with the cost per kg. of gain at 38.9 cents while with those fed on range the cost was 34.3 cents per day with the cost per kg. of gain at 32.8 cents. Cost per kg. of gain for both the growing and the finishing period was 22 and 18 cents, respectively for those fed in dry lot and on range, respectively. In 1966 when all the steers were fed on range the cost per day was 33.2 cents with a cost per kg. of gain at 34.5 cents. Cost per kg. of gain for the entire season was 18 cents in 1966.

TABLE 3. AVERAGE CARCASS VALUES

| Item | Groups (1965) | | 1966 |
|----------------------------------------------|---------------|-------|-------|
| | Dry lot | Range | Range |
| Carcass weight, kg. | 256 | 247 | 242 |
| Conformation score <u>a/</u> | 16.5 | 16.2 | 16.0 |
| Maturity rating | A- | A- | A- |
| Marbling score | 8.4 | 10.6 | 7.7 |
| Rib eye/100 kg. carcass wt., cm ² | 31.7 | 33.5 | 30.9 |
| Backfat, cm | .68 | .64 | .56 |
| Dressing percent | 57.0 | 56.8 | 56.2 |
| Final carcass grade <u>a/</u> | 13.8 | 14.7 | 13.2 |
| Number of carcasses grading: | | | |
| Choice | 2 | 4 | 0 |
| Good | 7 | 6 | 20 |
| Standard | 1 | 0 | 0 |

a/ Good equal to numerical score of 13-15 and choice equal to 16-18.

Carcass data. The steers were slaughtered at a commercial packing plant and graded by a USDA grader. Carcass data are presented in table 3. There was essentially no difference in carcass grades between those steers fed in dry lot and those fed on range. Of the steers fed in dry lot two graded choice, seven graded good, and one graded standard while there were four choice and six good carcasses in those fed on range. There were no significant differences in conformation score, maturity rating, ribeye area, dressing percent, backfat, or marbling score between dry lot and range fed steers. However, marbling score was somewhat higher for those steers finished on range. In 1966, when all steers were fed on range, all the carcasses graded good.

From the standpoint of consumer preference it would seem that the cattle in this study reached an acceptable, if not a preferable grade. Brady (1957) reported on studies in consumer preference in which it was found that the public prefers beef of USDA good grade and would buy more of it, as compared to choice and prime grades, if it were available. Kidwell *et al.* (1959) found that tenderness and flavor of muscle and fat was not associated with carcass score and concluded that carcass grade does not have a great deal of influence on taste and acceptance of meat. Kennick *et al.* (1965) reported no significant difference in flavor characteristics, when evaluating carcasses of straight- and cross-bred cattle, due to differences in carcass grade and marbling.

All the steers in the present study were in the "A" maturity rating with an average 0.63 cm of backfat. Within this age group, even with limited marbling, the average carcass grade was high-good. Yield of major cuts was high due to limited backfat. These steers were sold on a grade and yield basis resulting in a one cent spread between each grade of choice, good, and standard.

Summary and Conclusions

Yearling steers were supplemented on range over a six-month grazing period, in each of two years, to determine if slaughter grades could be economically obtained. Levels of supplementation were based on quality of forage during the grazing season and the amount of nutrients needed by the animal for a gain of 1.15 kg. per head daily.

Supplemental N was provided from cottonseed meal and supplemental energy from rolled barley with adjustments made weekly to compensate for nutrient loss and a decrease in voluntary intake of the forage by the animal as the forage matured.

The steers were supplemented together on range during the first three months and divided during the last three months of the first year to compare range-fed with lot-fed animals.

Average daily gain for all animals for both years was 1.05 kg. The cattle fed in dry lot for the last 90 days gained significantly more than the range-fed animals but cost per unit of gain was significantly lower in the range-fed group.

There were no significant differences in carcass grades or other measures of carcass quality. All carcasses, but one, graded USDA good, or above.

This study indicates that it is possible to feed cattle on range to produce a desirable type of carcass at an economical level, and that this can be done more economically than with the type of dry lot feeding used in this study. However, further study is needed to compare range feeding to other feedlot methods such as all grain rations or free choice grain with limited roughage. As rate of gain increases cost per unit of gain usually decreases and cattle of this type are capable of gaining in excess of 1.5 kg. per day on high grain rations.

Other factors that need to be considered are labor costs of the two systems, quality of cattle and the density or carrying capacity of the range. The cattle in this study grazed crested wheatgrass range with a carrying capacity of about one hectare per A.U.M. If we have range with a carrying capacity reduced to more than 2-3 hectares per A.U.M. it is likely that distance of travel for cattle fed at these rates may have an adverse affect on rate of gain.

Literature Cited

Brady, D. E. 1957. Consumer preference. *J. Animal Sci.* 16:233.

- Kennick, W. H., Joe D. Wallace, R.J. Raleigh, and Lois A. Sather. 1965. A comparison of carcass and meat characteristics of Hereford and Hereford X Charolais cross steers. Proc. Wes. Sec. Am. Soc. Animal Sci. 16:VIII.
- Kidwell, J. F., J. E. Hunter, P. R. Ternam, J. E. Harper, C. E. Shelby, and R. T. Clark. 1959. Relation of production factors to conformation scores and body measurements, association among production factors and the relation of carcass grade and fatness to consumer preferences in yearling steers. J. Animal Sci. 18:894.
- Raleigh, R. J. and Joe D. Wallace. 1965. Research in beef cattle nutrition and management. Oregon Agr. Exp. Sta. Sp. Rpt. 189, p 1-7.
- Wallace, Joe D., Farris Hubbert, Jr., and R. J. Raleigh. 1963. The response of yearling cattle on crested wheatgrass pasture to energy, protein, and sodium supplementation. J. Range Mgmt. 16:1.