

tional source of protein other than that found in dry bluestem pasture and urea is desirable for calves.

Table 22

Self-Feeding Urea-Molasses and the Feeding of Aureomycin to Steer Calves Wintered on Bluestem Pasture. Compare Lot 12 with 12A and Lot 7 with 15.

Phase 1—Wintering—December 11, 1956, to March 30, 1957—109 days.

| Treatment | No aureo-mycin | Aureo-mycin | Molasses and soy-bean meal | Urea-molasses |
|--------------------------------------|----------------|-------------|----------------------------|---------------|
| Lot number | 12 | 12A | 7 | 15 |
| Number steers per lot | 10 | 10 | 10 | 10 |
| Av. initial wt. per steer, lbs. | 433 | 432 | 435 | 435 |
| Av. final wt. per steer | 514 | 526 | 534 | 447 |
| Av. gain per steer, lbs. | 81 | 94 | 99 | 12 |
| Av. daily gain per steer, lbs. | .74 | .86 | .91 | .11 |
| Av. daily ration per steer, lbs.: | | | | |
| Soybean meal | 1.0 | 1.0 | 1.3 | |
| Ground sorghum grain | 4.6 | 4.6 | | |
| Aureomycin, mgs. | | 45 mgs. | | |
| Molasses, self-fed | | | 4.0 | |
| 10 % urea-molasses, self-fed | | | | 2.6 |
| Dry bluestem pasture | | | | |
| Salt | Free choice | Free choice | Free choice | |
| Av. feed cost per steer,* \$ | 23.21 | 24.03 | 25.89 | 18.37 |

Phase 2—Grazing—March 30 to July 27, 1957—119 days.

| | | | | |
|-------------------------------------|-------|-------|-------|-------|
| Av. gain per steer, lbs. | 211 | 230 | 205 | 247 |
| Av. daily gain per steer, lbs. | 1.77 | 1.93 | 1.72 | 2.08 |
| Av. final wt. per steer, lbs. | 725 | 756 | 739 | 694 |
| Av. feed cost per steer,* \$ | 16.00 | 16.00 | 16.00 | 16.00 |

Summary of Phases 1 and 2—December 11, 1956, to July 27, 1957—228 days.

| | | | | |
|--|-------|-------|-------|-------|
| Av. gain per steer, lbs. | 292 | 324 | 304 | 259 |
| Av. daily gain per steer, lbs. | 1.28 | 1.42 | 1.33 | 1.14 |
| Av. feed cost per 100 lbs. gain, \$.. | 13.42 | 12.35 | 13.78 | 13.27 |
| Av. feed cost per steer,* \$ | 39.21 | 40.03 | 41.89 | 34.37 |

* Winter rations were continued until April 20, 1957, and cost is included through this date. Feed prices for 1956-57 are inside back cover; \$1.00 per steer was charged for salt.

A Comparison of the Amount and Kind of Protein Concentrate for Yearling Steers on Bluestem Pasture, 1957 (Project 253-1).

E. F. Smith, B. A. Koch, F. W. Boren and G. L. Walker

In Circular 349 from this station, it has been reported in a three-year study that 2 pounds of soybean pellets fed per steer daily increased the gain .39 pound per head daily on yearling steers on bluestem pasture in late summer (August, September, and October). Most of this gain increase occurred in September and October. This report is concerned primarily with finding out if the level of supplemental feeding can be profitably lowered and if the kind of protein concentrate has any effect on performance.

Experimental Procedure

Twenty-four head of good to choice quality Hereford yearling steers were used in this test. They had been grazed together on bluestem pasture previous to the test. They were divided into four lots of six steers each in a manner to equalize any differences due to previous winter treatment. The steers had been wintered on grass the previous winter and used in other experimental tests. For this test, they were grazed on bluestem

pasture from August 5, 1957, to October 30, 1957, and received the following protein concentrates in pounds per head daily.

Pasture 1—1.0 pound soybean meal, 44 percent crude protein.
Pasture 2—2.0 pounds soybean meal, 44 percent crude protein.
Pasture 3—1.3 pounds linseed meal, 34 percent crude protein.
Pasture 4—2.6 pounds linseed meal, 34 percent crude protein.
Each pasture covered 60 acres with a good growth of grass.

Observations

By increasing the level of concentrate feeding, the gain was increased in both soybean meal and linseed meal groups. The gain increase occurred in October, with little benefit during August and September. Based on this and previous studies, it appears that in most years no supplemental feed may be necessary in August; approximately 1 pound of protein concentrate would suffice in September, and 2 pounds per head daily in October.

The differences in gain between the animals fed linseed meal and soybean meal were minor.

Table 23

A Comparison of the Amount and Kind of Protein Concentrate for Yearling Steers on Bluestem Pasture in Late Summer.

August 5 to October 30, 1957—86 days.

| Pasture number | 1 | 2 | 3 | 4 |
|--------------------------------------|------|------|------|------|
| Number steers per pasture | 6 | 6 | 6 | 6 |
| Av. initial wt. per steer, lbs. | 731 | 725 | 731 | 740 |
| Av. final wt. per steer, lbs. | 863 | 894 | 867 | 896 |
| Av. gain per steer, lbs. | 132 | 169 | 136 | 156 |
| Av. daily gain per steer, lbs. | 1.53 | 1.97 | 1.58 | 1.81 |
| Av. daily ration per steer, lbs.: | | | | |
| Soybean meal | 1.0 | 2.0 | | |
| Linseed oil meal | | | 1.3 | 2.6 |
| Av. gain per steer by periods: | | | | |
| August 5 to September 3 | 50.0 | 51.0 | 62.0 | 69.0 |
| September 3 to October 5 | 78.0 | 72.0 | 53.0 | 53.0 |
| October 5 to October 30 | 4.0 | 46.0 | 21.0 | 34.0 |
| Av. total gain | 132 | 169 | 136 | 156 |

A Comparison of Alfalfa and Alfalfa Plus Grain for Wintering Heifer Calves on Bluestem Pasture, 1956-57 (Project 253-2).

E. F. Smith, B. A. Koch and F. W. Boren

This is the second trial of this comparison. The first one was reported in Circular 349 from this station. The objective is to obtain information on the optimum level of alfalfa hay for heifers being wintered on bluestem pasture.

Experimental Procedure

Twenty-two head of good quality Hereford heifer calves purchased from the Harris Ranch at Melrose, New Mexico, were used in the test. They were divided on the basis of weight into two lots of 11 heifers each and wintered on bluestem pasture with the following treatments:

Pasture 8—Fed 4 pounds of alfalfa hay and 2.5 pounds of corn per head daily.

Pasture 13—Fed 8 pounds of alfalfa hay per head daily.

The 2.5 pounds of corn fed to pasture 8 furnished approximately the same amount of total digestible nutrients as the additional 4 pounds of alfalfa hay fed to pasture 13.

Plenty of grass was available in both pastures. The heifers had free access to salt.

Observations

The 2.5 pounds of corn and 4 pounds of alfalfa hay fed per heifer daily in pasture 8 produced .41 pound more gain per heifer daily than the 8

pounds of alfalfa hay fed to pasture 13. This would indicate that the protein and vitamin A requirements are amply met when 4 pounds of alfalfa hay and 2.5 pounds of corn are fed per heifer daily on winter bluestem pasture.

The increased gain resulting from the replacement of a part of the alfalfa with corn indicates some value of the grain beyond the total digestible nutrient value. This could be accounted for by the higher energy value of the grain.

The heifers were grazed together during the summer with no supplemental feed. By July 23, the close of the summer phase, the difference in gain had been reduced to .10 pound per head daily, still in favor of the heifers fed alfalfa and grain.

This is the same trend observed in the previous trial.

Table 24

A Comparison of Alfalfa and Alfalfa Plus Grain for Wintering Heifer Calves on Bluestem Pasture.

Wintering—December 11, 1956, to March 30, 1957—109 days.

| | | |
|---------------------------------------|-------|-------|
| Pasture number | 8 | 13 |
| Number of heifers | 11 | 11 |
| Av. initial wt. per heifer, lbs. | 473 | 469 |
| Av. gain per heifer, lbs. | 81 | 36 |
| Av. daily gain per heifer, lbs. | .74 | .33 |
| Av. daily ration per heifer, lbs.: | | |
| Alfalfa hay | 4.0 | 8.0 |
| Ground shelled corn | 2.5 | |
| Bluestem pasture | | |
| Av. feed cost per heifer,* \$ | 18.30 | 15.50 |

Grazing—March 30, 1957, to July 23, 1957—115 days.

| | | |
|---------------------------------------|-------|-------|
| Av. initial wt. per heifer, lbs. | 554 | 505 |
| Av. gain per heifer, lbs. | 176 | 200 |
| Av. daily gain per heifer, lbs. | 1.53 | 1.74 |
| Av. feed cost per heifer, \$ | 16.00 | 16.00 |

Summary—December 11, 1956, to July 23, 1957—224 days.

| | | |
|---------------------------------------|-------|-------|
| Av. initial wt. per heifer, lbs. | 473 | 469 |
| Av. final wt. per heifer, lbs. | 730 | 705 |
| Av. gain per heifer, lbs. | 257 | 236 |
| Av. daily gain per heifer, lbs. | 1.15 | 1.05 |
| Av. feed cost per heifer, \$ | 34.30 | 31.50 |
| Av. feed cost per 100 lbs. gain | 13.35 | 13.35 |

* The supplements were continued until April 20. This figure includes their cost to that date. Feed prices may be found on inside back cover.

The Value of Trace Minerals in a Fattening Ration, 1957 (Project 258-2).

R. R. Oltjen, E. F. Smith and R. F. Cox

This is the fourth in a series of experiments conducted to determine the value of trace minerals in a typical fattening ration. Three previous experiments, similar to this one, were reported in Kansas Agr. Exp. Sta. Cir. 297, 308 and 335.

Chemical analyses of feeds commonly used in cattle rations in this area show there is no deficiency in any of the trace minerals: cobalt, copper, iodine, iron, manganese and zinc. It is possible the minerals may not be adequately balanced or available to the animal at all times. The objective of this test is to determine if trace minerals, when fed at a commonly used level, will influence rate of gain and feed efficiency.

Experimental Procedure

Twenty head of good quality Hereford heifers, 10 head to a lot, were used in this test. They were part of a shipment of cattle from Melrose,

New Mexico. The heifers were wintered and summer grazed on bluestem pasture and allotted in such a way as to equalize any differences in prior treatment. The full-feeding period started on July 24 and continued until the heifers graded good to choice. The grain was self-fed and hay was fed in amounts readily consumed.

Both lots were handled identically except that one lot received trace minerals during the dry-lot fattening phase. The trace minerals were fed as a trace mineral premix and added to the soybean oil meal to furnish the following amounts in milligrams per head daily: cobalt 1.25; copper 3.65; iodine 1.97; iron 46.13; manganese 56.3; and zinc 3.42.

Observations

The addition of trace minerals to lot 2 increased the gain .37 of a pound daily over lot 1 fed no trace minerals. Lot 2 ate slightly more grain and utilized it more efficiently. Selling price per hundredweight and dressing percentage were the same in both cases, while carcass data varied only a small amount.

Table 25

The Value of Trace Minerals in a Fattening Ration.

July 24, 1957, to November 5, 1957—104 days.

| Lot number | 1 | 2 |
|--|---------------------------|---|
| Number of heifers per lot | 10 | 10 |
| | Self-fed grain in dry-lot | Self-fed grain in dry-lot plus trace minerals |
| Management | | |
| Av. initial wt. per heifer, lbs. | 716 | 717 |
| Av. final wt. per heifer, lbs. | 977 | 1016 |
| Av. gain per heifer, lbs. | 261 | 299 |
| Av. daily gain per heifer, lbs. | 2.51 | 2.88 |
| Daily ration per heifer, lbs.: | | |
| Soybean oil meal | 1.49 | 1.47 |
| Corn | 16.61 | 17.43 |
| Prairie hay | 3.60 | 3.51 |
| Salt | .02 | .02 |
| Ground limestone | .09 | .09 |
| Trace minerals | | yes |
| Feed per cwt. gain, lbs.: | | |
| Soybean oil meal | 59.3 | 51.2 |
| Corn | 661.9 | 606.4 |
| Prairie hay | 143.3 | 122.2 |
| Ground limestone | 3.6 | 3.0 |
| Salt | 1.0 | 1.0 |
| Cost of feed per cwt. gain, \$ | 22.75 | 20.64 |
| Total feed cost | 59.38 | 61.71 |
| Selling price per cwt. at market | 23.25 | 23.25 |
| Dressing percent | 59.6 | 59.6 |
| Carcass grades, USDA: | | |
| Choice | .. | 1 |
| Low choice | 4 | 4 |
| High good | 3 | 3 |
| Good | 2 | 1 |
| Low good | 1 | 1 |
| Av. thickness of finish ¹ | 4.4 | 3.8 |
| Av. degree of marbling ² | 6.6 | 6.5 |
| Av. size of rib eye ³ | 3.9 | 3.7 |
| Av. degree of firmness ⁴ | 3.1 | 3.1 |

1. Scores for thickness of finish: moderate 3; modest 4; slightly thin 5.
2. Scores for degree of marbling: moderate 5; modest 6; small amount 7.
3. Scores for size of rib eye: large 2; moderately large 3; modestly large 4.
4. Scores for degree of firmness: firm 2; moderately firm 3; modestly firm 4.