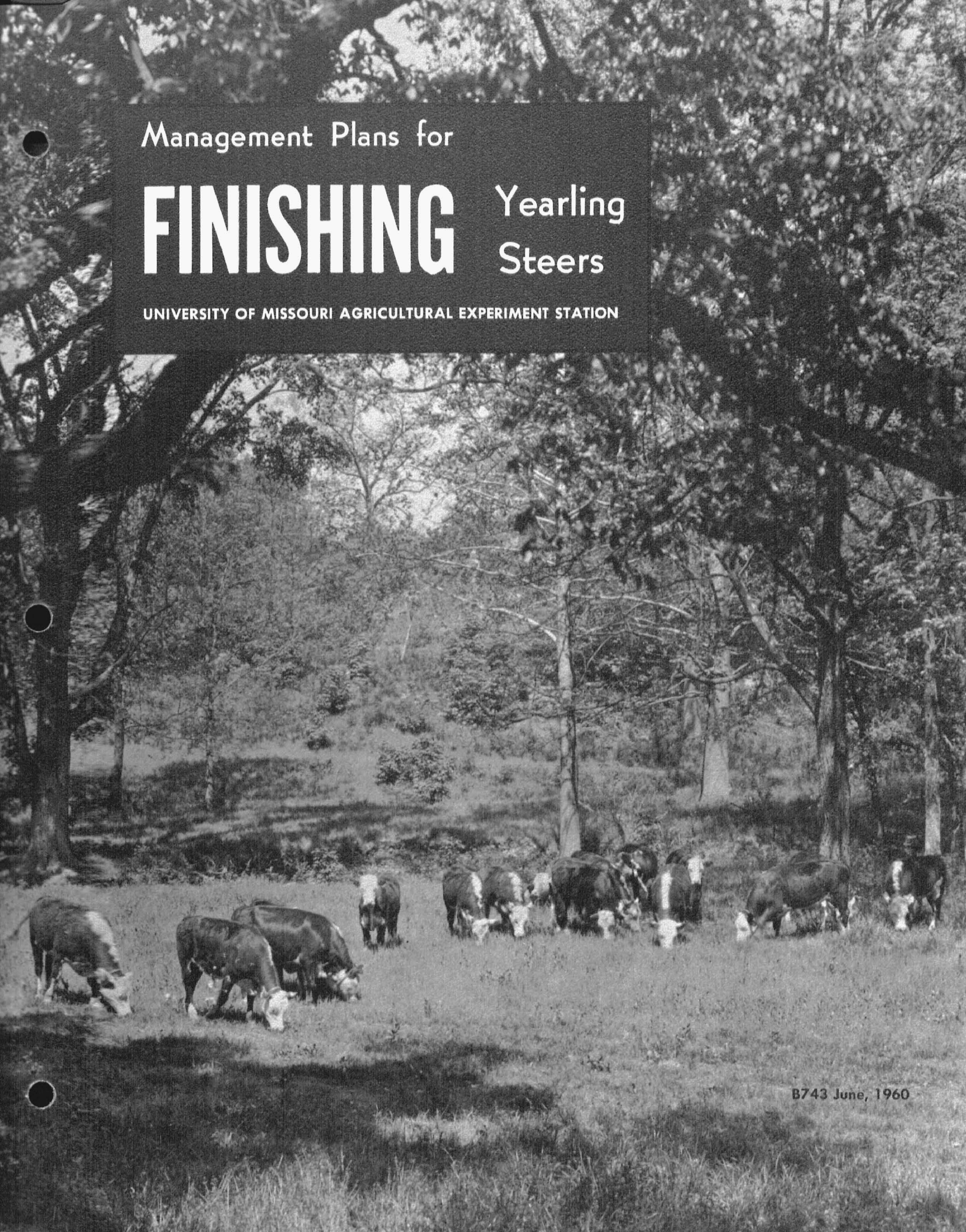


# Management Plans for FINISHING Yearling Steers

UNIVERSITY OF MISSOURI AGRICULTURAL EXPERIMENT STATION

B743 June, 1960

## Management Plans for

# FINISHING YEARLIN

Three systems of producing fat yearling cattle from weanling steer calves have been studied at the University of Missouri:

Plan A: Fatten Immediately.
Plan B: Winter liberally on roughage and then:
(1) full feed on pasture, or
(2) full feed in dry lot, or
(3) combine 1 and 2—feed on pasture for a short period and then finish in dry lot.
Plan C: Winter on roughage, graze for a portion of the pasture season without grain, and then finish by full feeding either in dry lot or on pasture.

Studies with implications for management under these plans are summarized in this bulletin. Results of the studies are grouped under the management plans to which they apply.

The probable marketing date which would result from each of the different methods of finishing yearling steers is extremely important. By following a planned method, cattle feeders can finish yearling steers for a more favorable market.

Charts showing seasonal price trends of different grades of beef cattle are included in this section for reference later as the three feeding plans are reviewed. Figure 1 shows that the top market price for Prime slaughter steers normally comes during November and December; the top for Choice steers comes in September, October, or November.

Good grade slaughter steers sell favorably during July, August, and September. Figure 2 indicates that the price spread between Good and Choice slaughter steers is greatest during October, November, and December.

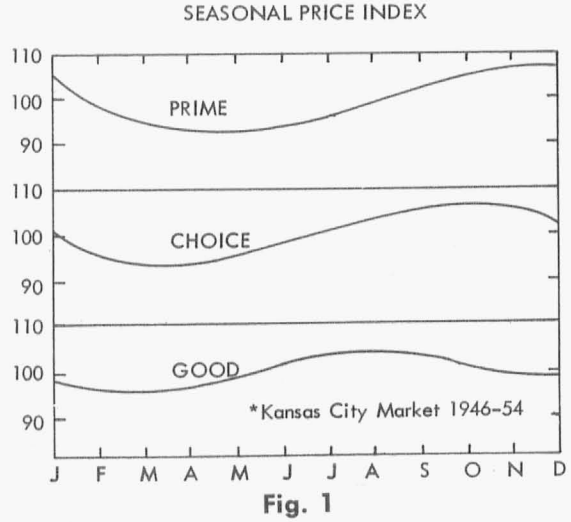



**Fig. 1**

**Cattle Feeding Barn, center of feeding experiments at the University of Missouri for 50 years.**

# G STEERS

*—Albert J. Dyer and James E. Comfort**

SEASONAL SPREAD BETWEEN GOOD AND CHOICE

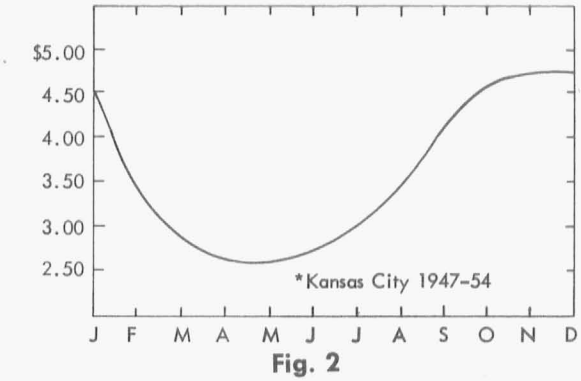



**Fig. 2**

All slaughter grades reported for experiments conducted prior to 1950 have been adjusted to the present USDA grading system.

## Plan A: Fatten Immediately

This is a plan used for feeding out steer calves in the winter, offering an enterprise for marketing concentrates during a season when other work is relatively light. Relatively large amounts of concentrates and small amounts of roughages are used. Steers are normally marketed in April or May. This is not a time when Choice steers sell at their peak.

### FULL FEEDING CONCENTRATES

*(Using Thin Calves)*

Choice, weanling, Hereford steer calves shipped directly from the range were used in three tests. See Table 1. The tests were begun on approximately December 1 each year. During the first two to three weeks after delivery or immediately prior to December 1, the calves were fed a ration similar to that which would be used during the feeding trial.

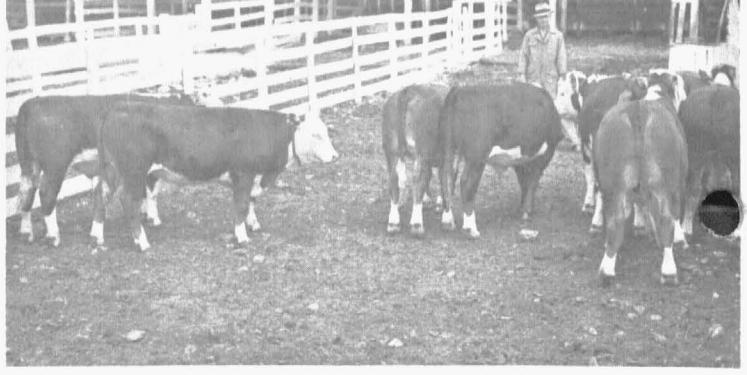
The concentrate mixture consisted of shelled yellow corn and protein supplement mixed together by hand and fed after the silage had been consumed. The hay was put into the bunks after the grain had been eaten.

A total of approximately 28 bushels of corn, 200 pounds protein supplement, 500 pounds legume hay, and 1300 pounds of corn silage was required to fatten 350-pound weanling calves to a weight of 750 pounds. They graded choice on the rail.

Seven bushels of corn and 50 pounds of protein supplement produced 100 pounds of gain; this is an efficient conversion of feed to beef gain. However, these full-fed

**Myron D. Bennett assisted in preparation of the bulletin.*

**One of the groups started as thin calves averaging 346 pounds. Full fed average of 187 days starting around December 1 and sold averaging 752 pounds in April or May. Graded middle Choice.**



**Group started on feed as fleshy calves December 20 averaging 425 pounds. Full fed 168 days and sold in June averaging 800 pounds. Graded high good.**

yearlings were marketed in May and June when prices are normally low for Choice slaughter cattle.

TABLE 1--THIN FEEDER CALVES FATTENED FOR APRIL OR MAY MARKET

| Ration | Shelled Corn<br>Protein Supplement<br>Corn Silage<br>Legume Hay |
|---|---|
| Days on Feed | 187 |
| Avg. Initial Weight (lb.) | 346.0 |
| Avg. Final Weight (lb.) | 752.0 |
| Total Gain (lb.) | 406.0 |
| Avg. Daily Gain (lb.) | 2.2 |
| Avg. Total Feed: | |
| Shelled Corn (lb.) | 1564.0 |
| Shelled Corn (bu.) | 28.0 |
| Protein Supplement (lb.) | 196.0 |
| Legume Hay (lb.) | 496.0 |
| Corn Silage (lb.) | 1327.0 |
| Avg. Daily Ration: | |
| Shelled Corn (lb.) | 8.3 |
| Protein Supplement (lb.) | 1.0 |
| Legume Hay (lb.) | 2.7 |
| Corn Silage (lb.) | 7.1 |
| Feed Consumed per 100 lb. Gain: | |
| Shelled Corn (lb.) | 385.0 |
| Shelled Corn (bu.) | 6.9 |
| Protein Supplement (lb.) | 48.0 |
| Legume Hay (lb.) | 122.0 |
| Corn Silage (lb.) | 327.0 |
| Dressing Percentage | 57.66 |
| Carcass Grade | Middle Choice |

*Average of three trials, 1926, 1927, and 1928

*(Using Fleshy Calves)*

The same full feeding procedure was tried using heavier calves in another test. Eight months old Choice weanling calves averaging 425 pounds were started on feed December 20 and marketed June 6.

Upon arrival at the feed lots, the steers were placed on a grain ration, and with a gradual increase each day, were brought to a full feed within three weeks. The ration consisted of 10 parts shelled yellow corn, 1 part cottonseed meal by weight, legume hay, and corn silage. The 168-day feeding period terminated June 6, 1939.

TABLE 2--FLESHY FEEDER CALVES AS LIGHT WEIGHT YEARLINGS*

| | |
|---|---|
| Days on Feed | 168 |
| Avg. Initial Weight (lb.) | 425.50 |
| Avg. Final Weight (lb.) | 799.37 |
| Total Gain (lb.) | 373.87 |
| Avg. Daily Gain (lb.) | 2.22 |
| Avg. Total Feed: | |
| Shelled Corn (lb.) | 1567.44 |
| Shelled Corn (bu.) | 27.99 |
| Cottonseed cake (lb.) | 156.75 |
| Legume Hay (lb.) | 523.12 |
| Corn Silage (lb.) | 1247.0 |
| Avg. Daily Ration: | |
| Shelled Corn (lb.) | 9.33 |
| Cottonseed cake (lb.) | .93 |
| Legume Hay (lb.) | 3.11 |
| Corn Silage (lb.) | 7.42 |
| Feed Consumed per 100 lb. Gain: | |
| Shelled Corn (lb.) | 419.25 |
| Shelled Corn (bu.) | 7.49 |
| Cottonseed cake (lb.) | 41.93 |
| Legume Hay (lb.) | 139.92 |
| Corn Silage (lb.) | 333.53 |
| Dressing Percentage | 57.83 |
| Carcass Grade | High Good |

*Test period, December 20, 1938, to June 6, 1939

The amount of feed required to finish 425-pound steer calves to a weight of 800 pounds and high Good grade was approximately 28 bushels of corn, 157 pounds of cottonseed cake, 523 pounds of legume hay and 1247 pounds of corn silage. Seven and one-half bushels of corn, 42 pounds of cottonseed cake, 140 pounds of legume hay, and 333 pounds of corn silage produced 100 pounds of beef gain.

## FINISHING MEDIUM GRADE YEARLINGS WITH MAXIMUM USE OF ROUGHAGE

In the two previous experiments we were concerned with full feeding of weanling calves with concentrates.

**Medium grade yearling steers which were full fed corn silage with limited legume hay. They were fed a half grain ration for 150 days to achieve maximum finishing gains from roughage.**

In a third experiment, we studied methods of obtaining greater use of roughage during the fattening phase.

Older steers were purchased—Medium grade yearlings averaging 606 pounds—to get a type of cattle that used roughage more efficiently.

Three trials were run, marketing the steers in May or June after an average feeding period of 151 days.

Providing roughage and a half full feed of grain for the entire period (Lot 1) was compared with feeding nothing but roughage the first part of the feeding period and then full feeding grain and roughage the latter half of the period (Lot 2). Feeds consisted of alfalfa hay and corn silge for roughage and 10 parts shelled yellow corn and 1 part cottonseed cake by weight for the grain mixture.

TABLE 3--BEEF PRODUCTION FROM YEARLINGS WITH MAXIMUM USE OF ROUGHAGE AND MINIMUM AMOUNTS OF GRAIN*

| | Lot 1<br><br>Shelled corn 10<br>Cottonseed cake 1<br>Fed 151 days<br>Limited to 50% of a full feed.<br>Alfalfa hay<br>Corn silage | Lot 2<br><br>Shelled corn 10<br>Cottonseed cake 1<br>Full fed 77 days<br>after feeding on<br>Alfalfa hay and<br>Corn silage for<br>74 days |
|---|---|---|
| Avg. Initial Weight (lb.) | 605.9 | 603.9 |
| Avg. Final Weight (lb.) | 858.5 | 873.8 |
| Total Gain (lb.) | 252.6 | 269.9 |
| Avg. Daily Gain (lb.) | 1.67 | 1.79 |
| Avg. Total Feed: | | |
| Shelled Corn (lb.) | 856.9 | 1085.5 |
| Shelled Corn (bu.) | 15.3 | 19.4 |
| Cottonseed Cake (lb.) | 85.7 | 108.6 |
| Alfalfa Hay (lb.) | 636.1 | 589.7 |
| Corn Silage (lb.) | 3821.8 | 3553.5 |
| Avg. Daily Ration: | | |
| Shelled Corn (lb.) | 5.7 | 14.1** |
| Cottonseed Cake (lb.) | .6 | 1.4** |
| Alfalfa Hay (lb.) | 4.2 | 3.9 |
| Corn Silage (lb.) | 25.3 | 23.5 |
| Feed Consumed per 100 lb. Gain: | | |
| Shelled Corn (lb.) | 339.3 | 402.2 |
| Cottonseed Cake (lb.) | 33.9 | 40.2 |
| Alfalfa Hay (lb.) | 251.9 | 218.5 |
| Corn Silage (lb.) | 1513.2 | 1316.6 |
| Dressing Percentage | 54.7 | 55.7 |
| Carcass Grade | Low Good | Low Good |

*Average of Three Trials, 1936, 1937 & 1938
**Based on 77 days only

Feeding cattle half of a full grain allowance (Lot 1) the entire feeding period conserved corn and protein supplement and increased roughage utilization. Lot 1 steers required 69.3 pounds less concentrate per 100 pounds of gain than Lot 2 steers.

Feeding only roughage the first half of the feeding period and then full feeding grain produced greater total gains on the Lot 2 steers, but they were fed 4 bushels more corn and this may have accounted for the increased gain. They consumed less corn silage and alfalfa hay than Lot 1.

When the cost of concentrates is high in relation to roughage prices, a "half-grain" ration fed for the entire period may be the most desirable of the two feeding methods. If concentrates are relatively low in price, feeding all of the grain as a full feed during the last half of the feeding period may be the best.

Carcasses from both lots graded low Good. The Lot 2 steers had a higher dressing percentage and the ribs from their carcasses contained more fat.

Thus, a modification of Plan A worked well with the lower grades of steers. Medium quality steers full fed on a roughage such as alfalfa hay and corn silage followed by a short feed of corn and protein supplement produced carcasses that graded low Good. Both groups produced economical gains. Six to seven bushels of corn, 30 to 40 pounds of protein supplement, approximately 240 pounds of legume hay and 1400 pounds of corn silage produced 100 pounds of grain.

## CONCLUSIONS ON PLAN A

This beef production system requires relatively large quantities of concentrate, miniumum amounts of roughage, and skill in management.

Plan A can be followed advantageously when feeder prices and feed costs are relatively low compared to slaughter prices at market time. Success depends on investment in feeders, cost of good quality feeds, and market prices in the spring.

Weanling calves produce economical gains under this plan due to growth gains attained along with fattening gains.

This is a quick method of marketing grains—the feeder receives a quick turnover on his cattle investment.

The product is well received at the market, although Choice slaughter steer prices normally are not very favorable in May and June when such steers are marketed.

**Light vs. Heavy Steer Calves:** Light feeder calves averaging 346 pounds required a longer feeding period (187 vs. 168 days) than heavy feeder calves averaging 425 pounds. However, the light calves graded low Choice and the heavy calves, high Good when finished.

Normally, Good to Choice quality weanling calves finished under this system must double their weight to reach a slaughter grade of Good to Choice when marketed. Perhaps the heavy calves also would have graded Choice when marketed if they had been fed for an additional 30 days.

The two groups made very efficient gains. The average amounts of feeds required per hundred pounds of gain were 7 bushels of corn, 45 pounds of protein supplement, 130 pounds of legume hay, and 330 pounds of corn silage.

**Fattening with Silage and Minimum of Grain:** Medium grade yearling steers fed to low Good grade by using large quantities of good quality silage and minimum amounts of shelled corn may often be a successful winter feeding enterprise. Normally, there is a scarcity of beef of low Good grade during May, which results in a desirable price for steers finished to Standard and low Good Grade.

One objection to the Plan A system is that total marketing costs are much higher than for calves purchased at the same time, but marketed in the fall at heavier weights. Another objection is that lower prices are normally received for choice quality steers in April and May. However, April and May markets are desirable for Standard and low Good steers.

# Plan B: Winter on Roughage, Then Full Feed

When a cattle feeder winters stockers, he must decide which is the most economical method of finishing them for market, i.e. (1) grain feed on pasture; (2) pasture without grain for a short period to be followed by a full feed of grain on pasture, or (3) full feed in dry lot.

The method used in wintering weanling calves has a great effect on their performance on pasture or in dry lot. Calves should be wintered to produce a level of gain that will fit the method of handling during the finishing period. The following experiments emphasize the influence that different methods of wintering have on the systems of finishing yearling steers on pasture or in dry lot.

## EFFECT OF WINTER FEEDING LEVEL ON PASTURE AND FEEDLOT GAINS

Grade Hereford steer calves weighing 400 pounds were purchased in November. During the wintering phase, they were divided into six lots to study methods of wintering weanling calves. (See Table 4). Lots 1, 2,

TABLE 4--EFFECT OF CONDITION ON FEEDING FLESHY VS. THIN YEARLINGS ON BLUEGRASS PASTURE*

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 |
|---|---|---|---|---|---|---|
| | Wintered Liberally | | | Limited Ration During Winter | | |
| | Full Fed 168 Days | 50% Full Ration 56 Days, Full Fed 112 Days | Grazed 56 Days, Full Fed 112 Days | Full Fed 168 Days | 50% Full Ration 56 Days, Full Fed 112 Days | Grazed 56 Days, full Fed 112 Days |
| Days on Feed | 168 | 168 | 168 | 168 | 168 | 168 |
| Avg. Initial Weight (lb.) | 620.5 | 615.0 | 615.6 | 536.5 | 535.7 | 543.7 |
| Avg. Final Weight (lb.) | 975.1 | 928.8 | 943.3 | 930.8 | 904.6 | 866.9 |
| Total Gain (lb.) | 354.6 | 313.8 | 327.7 | 394.3 | 368.9 | 323.2 |
| Avg. Daily Gain (lb.) | 2.11 | 1.86 | 1.95 | 2.35 | 2.20 | 1.93 |
| Avg. Total Feed: | | | | | | |
| Shelled Corn (lb.) | 1969.0 | 1748.8 | 1532.0 | 1987.2 | 1717.9 | 1472.6 |
| Shelled Corn (bu.) | 35.1 | 31.2 | 27.4 | 35.4 | 30.7 | 26.3 |
| Cottonseed Cake (lb.) | 246.1 | 218.5 | 191.5 | 248.4 | 214.7 | 184.1 |
| Clover Hay** | | | | | | |
| Avg. Daily Ration: | | | | | | |
| Shelled Corn (lb.) | 11.7 | 10.4 | 13.7 | 11.8 | 10.2 | 13.1 |
| Cottonseed Cake (lb.) | 1.5 | 1.3 | 1.7 | 1.5 | 1.3 | 1.6 |
| Feed Consumed per 100 lb. Gain: | | | | | | |
| Shelled Corn (lb.) | 555.4 | 557.2 | 467.6 | 504.0 | 465.6 | 455.6 |
| Shelled Corn (bu.) | 9.9 | 9.9 | 8.3 | 9.0 | 8.3 | 8.2 |
| Cottonseed Cake (lb.) | 69.4 | 69.6 | 58.4 | 63.0 | 58.2 | 56.9 |
| Dressing Percentage | 61.3 | 60.1 | 59.7 | 59.2 | 58.9 | 58.3 |
| Carcass Grade | Middle Choice | Low Choice | Low Choice | Low Choice | Low Choice | High Good |

* Average of Two Trials, 1929 and 1930

**Because of extremely dry weather in 1930, during August and September, approximately 2 pounds of red clover hay per steer per day was fed

and 3 were wintered to gain 1.5 pounds per day and the remainder to gain 1 pound per day during a 168-day wintering period.

Steers gaining 1.5 pounds per day were fleshy in the spring, while the steers that gained 1 pound daily were in thin condition. At the end of the winter the fleshy steers, Lots 1, 2, and 3, were divided into three equal lots according to condition, quality, and type. Similarly, the thin steers, Lots 4, 5, and 6, were divided into three equal lots.

All lots were turned on bluegrass pasture during the first week of May. Lots of fleshy steers and lots of thin steers were given the same treatment during the finishing period to determine the effects of wintering on the two groups. The following chart summarizes the results. Note that Lots 1 and 4, 2 and 5, and 3 and 6 were paired off for like treatments during the pasture-feeding period, the only variable being their amounts of fleshing at the start due to the difference in winter handling.

During the first 56 days on bluegrass pasture, the thin yearlings on full feed gained 16 percent faster than the corresponding lot of fleshy steers. On a half feed on pasture, the thin yearlings gained 41 percent faster than the fleshy ones, and the thin yearlings gained 18 percent faster than fleshy ones on pasture alone.

AVERAGE DAILY GAINS DURING FIRST 56 DAYS ON PASTURE

| Fleshy Yearlings | | | Thin Yearlings | | |
|---|---|---|---|---|---|
| Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 |
| 2.05 | 1.42 | 1.16 | 2.39 | 2.01 | 1.38 |

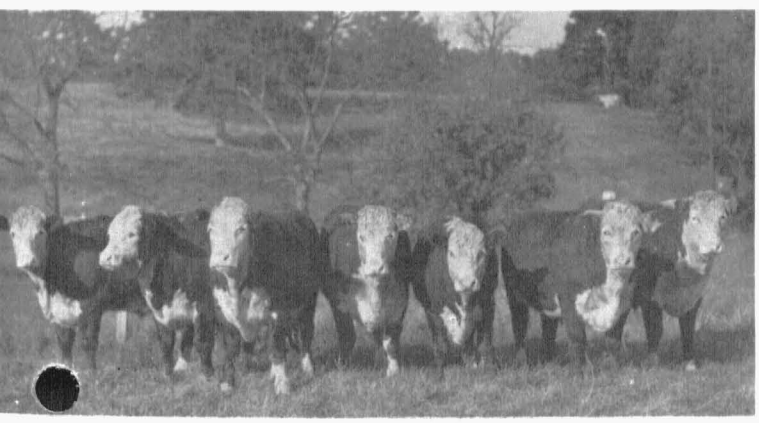
AVERAGE DAILY GAINS DURING LAST 112 DAYS ON PASTURE

| Fleshy Yearlings | | | Thin Yearlings | | |
|---|---|---|---|---|---|
| Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 |
| 2.14 | 2.15 | 2.37 | 2.32 | 2.29 | 2.20 |

GAINS OF FLESHY YEARLINGS VS. GAINS OF THIN YEARLINGS FROM THREE PASTURE AND FEEDING SYSTEMS

| | Fleshy Yearlings | | | Thin Yearlings | | |
|---|---|---|---|---|---|---|
| Lot No. and Treatment | Lot 1 Full fed on Pasture from the start | Lot 2 Half fed first 56 days. Full fed rest of time | Lot 3 Grazed first 56 days, then full fed | Lot 4 Full fed on pasture from the start | Lot 5 Half feed first 56 days. Full fed rest of time | Lot 6 Grazed first 56 days, then full fed |
| Daily Gains During First 56 Days | 2.05 lb | 1.42 lb. | 1.16 lb. | 2.39 lb. | 2.01 lb. | 1.38 lb. |
| Daily Gains During Last 112 Days | 2.14 | 2.15 | 2.37 | 2.32 | 2.29 | 2.20 |

**At left are the Lot 1, liberally wintered yearlings described in the tables. Lot 5 yearlings, limited fed in winter, are pictured at right.**



**Though the fleshy yearlings made smaller pasture gains, their total gains were greater because of their bigger winter gains.**

During the last 112 days, the average daily gains were more nearly equal. Therefore, the differences in daily gains for the finishing period developed largely during the first 56 days on pasture. Cattle that were full fed the entire period (Lots 1 and 4) made much more uniform gains than the other lots.

Under identical treatments, thin yearlings gained faster than comparable fleshy yearlings with one exception, Lot 6. Lots 3 and 6 gained at about the same rates during the first 56 days on pasture when they had no grain.

Though fleshy yearlings made smaller total gains on pasture, their total final weight was greater at marketing time in October. In addition, fleshy steers which were full fed grain on pasture (Lot 1) were fat enough to be marketed 30 to 60 days sooner than other lots in these tests.

Thin yearlings produced gains more economically on pasture than fleshy yearlings. Thin yearlings, grazed 56 days on pasture without grain then full fed concentrates during the last 112 days (Lot 6), required less total concentrates per hundred pounds gain than any other lot. However, these cattle yielded less desirable carcasses and steers finished under this method needed additional feeding to grade equal to the other lots.

Full feeding grain during the entire feeding period required more concentrates per hundred pounds gain, but produced larger total gains. Fleshy steers finished under this management reached marketable finish sooner than other lots. Wintering liberally, pasturing without grain the first portion of the finishing period, then full feeding grain favored a desirable marketing weight, desirable carcass grade, and an economical conversion of feed to beef gains. Cattle limited fed during winter and grazed the first 56 days without grain required a longer feeding period than 112 days to finish to Choice grade.

Gains produced by these steers during 1929 and 1930 seem low with our present knowledge of fattening cattle. However, the relationship of gains between lots handled in this manner continues to hold true with present feeding operations.

## SUPPLEMENTS FOR STEERS FED GRAIN ON BLUEGRASS

Bluegrass, one of Missouri's leading permanent pastures, is variable in its protein content—high during the lush growing season, low when it becomes relatively dormant during hot weather. Studies were conducted three years to determine the amount and kind of supplement that would produce the best results during different phases of a feeding period on bluegrass pasture.

Thin Hereford steers of good to choice quality were purchased in the fall. In a corn fodder preparation study, they produced average daily gains of 0.50 to 0.75 pounds per day during the winter period.

During the first week of May, they were turned on bluegrass pasture for the finishing period. The following rations were fed to each lot.

**Lots 1, 2, and 3: Received shelled yellow corn and supplement for 168 days.**

**Lot 1: 8 parts corn and 1 part cottonseed cake by weight.**

**Lot 2: 12 parts corn and 1 part cottonseed cake by weight.**

**Lot 3: 6 parts corn and 1 part mixed supplement by weight.**

**Lots 4, 5, and 6: Received only shelled yellow corn for the first 56 days, and corn and supplement the last 112 days.**

**Lot 4: 8 parts corn and 1 part cottonseed cake by weight.**

**Lot 5: 12 parts corn and 1 part cottonseed cake by weight.**

**Lot 6: 6 parts corn and 1 part mixed supplement by weight.**

The corn fed was yellow No. 2 grade. The cottonseed cake was peasized, prime grade, 43 percent protein. The mixed 16 percent protein supplement contained 30 percent alfalfa meal, 30 percent blackstrap molasses, 20 percent reground oat feed, and 20 percent choice cottonseed meal. Hereafter, this supplement will be referred to as a mixed supplement. The mixed supplement cost the same per ton as cottonseed cake.

Results of these tests are reported in Table 5.

A supplemented ration produced larger daily gains than corn alone the first 56 days; however, the gains made by steers fed corn alone were cheaper.

During the last 112 days, gains were made more slowly and at higher cost; more of the gain made was fat—this requires more feed. During the first 56 days, a large percentage of the total gain was lean.

The two groups (Lots 3 and 6) that received the mixed supplement, produced larger total gains than the groups (Lots 2 and 5) which received 12 parts corn and 1 part cottonseed cake. However, the latter lots produced more economical gains; they consumed approximately 50 percent less protein supplement per hundred pounds gain.

The ration of 12 parts corn and 1 part cottonseed cake produced slightly larger and more economical gains than a ration of 8 parts corn and 1 part cottonseed cake when the cake was fed the entire 168 days. However, among the lots which received the protein supplement only during the last 112 days (Lots 4, 5, and 6) the 8 to 1 ration produced the most economical gains. This was

probably due to the lowered protein content of bluegrass which was in the dormant stage.

There was no significant difference between lots in carcass grades and dressing percentage.

Yearling steers wintered to gain 0.50 to 0.75 pounds per day were in thin condition in the spring. It was necessary to feed an average of more than 40 bushels of corn during the 168 day feeding period to finish cattle to middle Choice grade.

TABLE 5--A COMPARISON OF SOME PROTEIN SUPPLEMENTS FED ON BLUEGRASS PASTURE*

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 | Lot 6 |
|---|---|---|---|---|---|---|
| | CORN AND SUPPLEMENT 168 DAYS | | | Corn | FIRST 56 DAYS Corn LAST 112 DAYS | Corn |
| | Corn 8 C.S.C. 1 | Corn 12 C.S.C. 1 | Corn 6 Mixed Sup. 1 | Corn 8 C.S.C. 1 | Corn 12 C.S.C. 1 | Corn 6 M.Sup.1 |
| Days on Feed | 168 | 168 | 168 | 168 | 168 | 168 |
| Avg. Initial Weight (lb.) | 503.6 | 503.2 | 499.5 | 492.4 | 503.7 | 504.6 |
| Avg. Final Weight (lb.) | 898.1 | 917.4 | 919.4 | 884.9 | 892.2 | 913.5 |
| Total Gain (lb.) | 394.5 | 414.2 | 419.9 | 392.5 | 388.5 | 408.9 |
| Avg. Daily Gain (lb.) | 2.34 | 2.47 | 2.50 | 2.33 | 2.31 | 2.43 |
| Avg. Total Feed: | | | | | | |
| Corn (lb.) | 2308.5 | 2401.9 | 2373.9 | 2308.5 | 2413.2 | 2370.9 |
| Corn (bu.) | 41.2 | 42.9 | 42.4 | 41.2 | 43.1 | 42.3 |
| Protein Supplement (lb.) | 288.4 | 200.0 | 395.8 | 220.3 | 155.9 | 305.1 |
| Avg. Daily Ration: | | | | | | |
| Corn (lb.) | 13.7 | 14.3 | 14.1 | 13.7 | 14.4 | 14.1 |
| Cottonseed Cake (lb.) | 1.7 | 1.2 | 2.4 | 1.9 | 1.4 | 2.7 |
| Feed Consumed per 100 lb. Gain: | | | | | | |
| Corn (lb.) | 585.2 | 579.9 | 565.3 | 588.1 | 621.1 | 579.9 |
| Cottonseed Cake (lb.) | 73.1 | 48.3 | 94.3 | 56.1 | 40.1 | 74.6 |
| Dressing Percentage | 61.1 | 60.8 | 61.1 | 60.9 | 61.4 | 60.0 |
| Carcass Grade | Mid. Choice | Mid. Choice | Mid. Choice | Mid. Choice | Mid. Choice | Mid. Choice |

*Average of three years of tests, 1931-1933

RESULTS DURING THE FIRST 56 DAYS

| | Lot 1 Corn 8 C.S.C. 1 | Lot 2 Corn 12 C.S.C. 1 | Lot 3 Corn 6 Mixed Sup. 1 | Lot 4 Corn | Lot 5 Corn | Lot 6 Corn |
|---|---|---|---|---|---|---|
| Avg. daily gain. | 2.44 | 2.64 | 2.60 | 2.46 | 2.47 | 2.41 |
| Feed per 100 lb. Gain: | | | | | | |
| Corn (lb.) | 314.8 | 298.6 | 297.8 | 329.5 | 330.0 | 338.7 |
| Corn (bu.) | 5.6 | 5.3 | 5.3 | 5.9 | 5.9 | 6.0 |
| Supplement (lb.) | 39.3 | 24.8 | 49.7 | --- | --- | --- |

RESULTS DURING THE LAST 112 DAYS

| | Corn 8 C.S.C.1 | Corn 12 C.S.C.1 | Corn 6 Mixed Sup. 1 | Corn 8 C.S.C.1 | Corn 12 C.S.C.1 | Corn 6 Mixed Sup. 1 |
|---|---|---|---|---|---|---|
| Avg. daily gain. | 2.30 | 2.38 | 2.45 | 2.33 | 2.23 | 2.44 |
| Feed per 100 lb. Gain: | | | | | | |
| Corn (lb.) | 717.8 | 716.5 | 684.6 | 685.7 | 762.6 | 677.9 |
| Corn (bu.) | 12.8 | 12.8 | 12.2 | 12.2 | 13.6 | 12.1 |
| Supplement (lb.) | 88.0 | 59.7 | 114.3 | 84.8 | 62.8 | 111.9 |

## FINISHING ON PASTURE VS. FINISHING IN DRY LOT

During three successive years comparisons were made of finishing cattle in dry lot and on pasture. Combinations of dry lot and pasture also were studied. The following methods of management were used with fleshy steers in 1933:

Lot 1: Full fed in dry lot 140 days.
Lot 2: Full fed on pasture 49 days: dry lot 97 days.
Lot 3: Full fed on pasture 98 days; dry lot 42 days.
Lot 4: Full fed on pasture 140 days.

Results are in Table 6.

Including pasture in the ration for all or part of the test resulted in faster gains. The efficiency, however, did not follow a set pattern. In one case, Lot 4, pastured the entire time, the efficiency was improved. However, when pasture was used for only part of the time, the efficiency was lessened. This inconsistency is without explanation. There were only small differences in carcass grades between lots. Full feeding cattle on pasture for 49 or 98 days resulted in about the same rate of gain, efficiency, and grade as when cattle were full fed the entire period either on pasture or in dry lot.

Steers pasture-fed 49 days and fed in lot 97 days and steers pasture-fed 140 days produced the highest dressing percentage and graded one-third of a grade higher on the rail than the other two lots.

Good to Choice thin yearlings were used in a similar comparison in the summer of 1934; they had been wintered to gain approximately 1 pound per day from weanling calf age.

There were four lots of cattle and all were full fed 182 days:

Lot 1: Fed 182 days on pasture.
Lot 2: Fed 70 days on pasture and 112 days in dry lot.
Lot 3: Fed 126 days on pasture and 56 days in dry lot.
Lot 4: Fed 182 days on pasture.

Results are in Table 7.

There was not much difference in the rates of gain. Grain feeding on pasture for either 70 or 126 days resulted in a slight increase over feeding in dry lot for the entire period or feeding on pasture the entire period. Similarly, there was little difference in the feed required per hundred pounds of gain. Pasture, of course, reduced the hay requirement.

TABLE 6--FULL FEEDING ON BLUEGRASS PASTURE VS. FULL FEEDING IN DRY LOT

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
|---|---|---|---|---|
| Method of Handling | Dry Lot 140 Days | Pasture 49 Days--Dry Lot 91 Days | Pasture 98 Days--Dry Lot 42 Days | Pasture 140 Days |
| Ration | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay* | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay** | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part |
| Days on Feed | 140 | 140 | 140 | 140 |
| Avg. Initial Weight (lb.) | 715.8 | 714.4 | 706.5 | 706.5 |
| Avg. Final Weight (lb.) | 975.1 | 1005.7 | 985.7 | 1011.7 |
| Total Gain (lb.) | 259.30 | 291.30 | 279.20 | 305.20 |
| Avg. Daily Gain (lb.) | 1.85 | 2.08 | 1.99 | 2.18 |
| Avg. Total Feed: | | | | |
| Corn (lb.) | 1880.74 | 2281.99 | 2231.6 | 2164.43 |
| Corn (bu.) | 33.58 | 40.74 | 39.85 | 38.65 |
| Cottonseed Cake (lb.) | 188.07 | 228.19 | 223.16 | 216.44 |
| Alfalfa Hay (lb.) | 310.00 | 153.50 | 78.75 | |
| Avg. Daily Ration: | | | | |
| Corn (lb.) | 13.43 | 16.30 | 15.94 | 15.46 |
| Cottonseed Cake (lb.) | 1.34 | 1.63 | 1.59 | 1.55 |
| Alfalfa Hay (lb.) | 2.21 | 1.69 | 1.88 | |
| Feed Consumed per 100 lb. Gain | | | | |
| Corn (lb.) | 725.31 | 783.38 | 799.28 | 709.18 |
| Cottonseed Cake (lb.) | 72.53 | 78.34 | 79.93 | 70.92 |
| Alfalfa Hay (lb.) | 119.55 | 52.70 | 28.21 | |
| Dressing Percentage | 60.5 | 62.2 | 60.3 | 61.5 |
| Carcass Grade | Low Choice | Choice | Low Choice | Choice |

* 91 days only. Pasture remainder of period (49 days).
**42 days only. Pasture remainder of period (98 days).
Test period: May 29 to October 16, 1933.

TABLE 7--FULL FEEDING ON BLUEGRASS PASTURE VS. FULL FEEDING IN DRY LOT

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
|---|---|---|---|---|
| Method of Handling | Dry Lot 182 Days | Pasture 70 Days--Dry Lot 112 Days | Pasture 126 Days--Dry Lot 56 Days | Pasture 182 Days |
| Ration | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay* | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay** | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part |
| Days on Feed | 182 | 182 | 182 | 182 |
| Avg. Initial Weight (lb.) | 537.2 | 537.0 | 537.0 | 537.0 |
| Avg. Final Weight (lb.) | 958.6 | 978.0 | 968.2 | 937.6 |
| Total Gain (lb.) | 421.4 | 441.0 | 431.2 | 400.6 |
| Avg. Daily Gain (lb.) | 2.32 | 2.42 | 2.37 | 2.2 |
| Avg. Total Feed: | | | | |
| Corn (lb.) | 2340.9 | 2426.2 | 2320.0 | 2232.2 |
| Corn (bu.) | 41.8 | 43.3 | 41.4 | 39.9 |
| Cottonseed Cake (lb.) | 234.0 | 242.6 | 231.9 | 223.2 |
| Alfalfa Hay (lb.) | 965.3 | 433.4 | 163.0 | |
| Avg. Daily Ration: | | | | |
| Corn (lb.) | 12.9 | 13.3 | 12.7 | 12.3 |
| Cottonseed Cake (lb.) | 1.3 | 1.3 | 1.3 | 1.2 |
| Alfalfa Hay (lb.) | 5.3 | 3.9 | 2.9 | |
| Feed Consumed per 100 lb. Gain: | | | | |
| Corn (lb.) | 555.5 | 550.0 | 538.0 | 557.2 |
| Cottonseed Cake (lb.) | 55.5 | 55.1 | 53.8 | 55.7 |
| Alfalfa Hay (lb.) | 229.0 | 98.3 | 37.8 | |
| Dressing Percentage | Carcass data not available. | | | |
| Carcass Grade | | | | |

* 112 days only. Pasture remainder of period (70 days).
** 56 days only. Pasture remainder of period (126 days).

Test period: May 11 to November 8, 1934

**Left, Lot 1 steers (Table 7), full fed in dry lot. Right, Lot 4 steers, full fed on bluegrass pasture. Little difference was noted between feeding in dry lot and on pasture in feed efficiency or rate of gain.**

Thin, Good to Choice yearlings that had been wintered to gain approximately 1 pound per day from weanling calf age were used again in 1935 trials.

Four lots of steers were fed for a period of 182 days:

Lot 1: Fed 182 days in dry lot.
Lot 2: Fed 84 days on pasture and 98 days in dry lot.
Lot 3: Fed 140 days on pasture and 42 days in dry lot.
Lot 4: Fed 182 days on pasture.

Results are in Table 8.

The rate of gain was in direct proportion to the time spent in dry lot; or in other words, the daily gain was increased as the dry lot feeding period increased. Steers fed entirely in dry lot produced the largest daily gains, but the feed efficiency was lowest for this group of cattle.

Combination of pasture feeding and dry lot feeding required less concentrates to produce 100 pounds of gain. Lot 3, pastured 126 days and dry lot fed 56 days, produced 100 pounds of gain on less concentrates than any other lot.

Steers fed entirely on pasture gained slower than the other groups. They produced gains more economically than steers fed entirely in dry lot. This, however, does not take into account the charge that might be made legitimately for pasture nor the lower carcass grade attained at the end of the test.

The results obtained from these experiments indicate considerable variation from year to year. In 1933, steers fed on pasture gained faster than steers fed in dry lot, in 1934 the results obtained from all lots were similar, and in 1935 the length of feeding in dry lot increased gains proportionately. Seasonal variation could have been an influence. The dry year of 1934 stopped growth of bluegrass, thus making pasture conditions

TABLE 8--FULL FEEDING ON BLUEGRASS PASTURE VS. FULL FEEDING IN DRY LOT

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
|---|---|---|---|---|
| Method of Handling | Dry Lot 182 Days | Pasture 84 Days--Dry Lot 98 Days | Pasture 140 Days--Dry Lot 42 Days | Pasture 182 Days |
| | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay* | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part Alfalfa Hay** | No. 2 Corn (Yellow) 10 Parts Cottonseed Cake 1 Part |
| Days on Feed | 182 | 182 | 182 | 182 |
| Avg. Initial Weight (lb.) | 481.85 | 479.91 | 479.91 | 479.91 |
| Avg. Final Weight (lb.) | 930.0 | 899.83 | 885.0 | 868.17 |
| Total Gain (lb.) | 448.15 | 419.92 | 405.09 | 388.26 |
| Avg. Daily Gain (lb.) | 2.46 | 2.30 | 2.23 | 2.13 |
| Avg. Total Feed: | | | | |
| Corn (lb.) | 2770.05 | 2512.80 | 2337.43 | 2304.81 |
| Corn (bu.) | 49.4 | 44.9 | 41.7 | 41.16 |
| Cottonseed Cake (lb.) | 277.70 | 251.28 | 233.75 | 230.48 |
| Alfalfa Hay (lb.) | 604.05 | 317.68 | 136.5 | |
| Avg. Daily Ration: | | | | |
| Corn (lb.) | 15.22 | 13.81 | 12.84 | 12.66 |
| Cottonseed Cake (lb.) | 1.53 | 1.38 | 1.28 | 1.26 |
| Alfalfa Hay (lb.) | 3.3 | 3.24 | 3.25 | |
| Feed Consumed per 100 lb. Gain: | | | | |
| Corn (lb.) | 618.10 | 598.39 | 577.01 | 593.57 |
| Cottonseed Cake (lb.) | 61.96 | 59.84 | 57.7 | 59.35 |
| Alfalfa Hay (lb.) | 134.88 | 75.65 | 33.70 | |
| Dressing Percentage | 60.0 | 58.8 | 59.6 | 59.4 |
| Carcass Grade | High Choice | High Choice | Choice | Choice |

* 98 days only. Pasture remainder of period (84 days).
**42 days only. Pasture remainder of period (140 days).
Test period: April 29 to October 28, 1935

similar to dry lot conditions. In 1933 and 1935, adequate rainfall may have maintained a higher protein content in bluegrass, thus producing larger gains or gains similar to dry lot feeding. Therefore, the amount of pasture utilized may have influenced the amount of grain consumed and thus affected the rate of gain.

Generally, cattle fed in dry lot gained faster and required more concentrates per unit of gain than cattle fed on bluegrass pasture. Steers fed on pasture produced smaller gains but made more economical use of concentrates. The tendency toward lower carcass grades and the pasture charge were not considered when comparing economy of gains. Charges should be considered under present prices and local conditions.

Condition at the beginning of the finishing period influenced the length of the feeding period. Fleshy steers in the first experiment were marketed at the end of 140 days. Thin steers in the other two experiments required 182 days to reach marketable finish within the same grade.

## GROWING AND FINISHING CHOICE GRADE FEEDERS

The production of fat steers using maximum amounts of good quality roughages and pasture and minimum amounts of grain was studied. Steers gained 0.75 pounds per day during the winter period on a liberal allowance of poor quality corn silage and legume hay.

During the finishing period in dry lot the ration consisted of 10 parts shelled yellow corn and 1 part cottonseed meal by weight plus legume hay.

Data are reported in Table 9.

TABLE 9--GROWTH AND FINISHING OF CHOICE GRADE FEEDERS APRIL 27, 1939 TO SEPTEMBER 4, 1939

| | |
|---|---|
| Days on Feed | 130 |
| Avg. Initial Weight (lb.) | 524.0 |
| Avg. Final Weight (lb.) | 856.79 |
| Total Gain (lb.) | 332.79 |
| Avg. Daily Gain (lb.) | 2.56 |
| Avg. Total Feed: | |
| Shelled Corn (lb.) | 1612.24 |
| Shelled Corn (bu.) | 28.79 |
| Cottonseed Cake (lb.) | 161.17 |
| Legume Hay (lb.) | 897.0 |
| Avg. Daily Ration: | |
| Shelled Corn (lb.) | 12.40 |
| Cottonseed Cake (lb.) | 1.24 |
| Legume Hay (lb.) | 6.90 |
| Feed Consumed per 100 lb. Gain: | |
| Shelled Corn (lb.) | 484.46 |
| Shelled Corn (bu.) | 8.65 |
| Cottonseed Cake (lb.) | 48.43 |
| Legume Hay (lb.) | 269.54 |
| Dressing Percentage | 59.36 |
| Carcass Grade | Middle Choice |

A total of 29 bushels of corn, 161 pounds cottonseed meal, and 897 pounds legume hay produced carcasses that graded middle choice. Also, this group required only 8½ bushels of corn, 48 pounds of cottonseed meal and 270 pounds of legume hay to produce 100 pounds gain; this is efficient conversion of feed to beef gain.

In the 130 day feeding period, these steers averaged 2.56 pounds per day. The fact that these steers were in thin condition at the start likely contributed in part to the good gains.

## CONCLUSION FROM STUDIES ON PLAN B

Finishing choice yearling steers under this system requires a planned method of management from weanling calf age until marketing.

Plan B reduced cost of gains through use of roughage during the winter and pasture in the finishing period.

The method of wintering affects subsequent gains. Steers wintered to gain 1 pound per head daily produced greater gains on pasture and slightly greater gains in the finishing period than steers wintered to gain 1.5 pounds daily. However, steers wintered to gain 1.5 pounds per head daily produced greater total gains from weanling calf age until marketing time.

Steers liberally wintered may be fed on pasture, in dry lot, or a combination of these two for desirable gains, market weight, and grade. Whether to feed on pasture or in dry lot is largely dependent on the season, availability of pasture and possibly the cost of concentrates.

# Plan C: Winter on Roughage--Graze--Full Feed

In some areas cattle feeders use large quantities of roughage in winter to cheapen the gains made prior to the finishing period. Frequently, after wintering, cattle are pastured without grain until July 1. Then they are full fed grain; they may be full fed either on pasture or in dry lot or full fed on pasture for a time after July 1, and then full fed in dry lot. Irrespective of the method followed the objective is to produce choice cattle ready to sell in October or November.

A discussion follows of experiments in which full feeding in dry lot was compared with full feeding on pasture and with a combination of the two.

Studies have been made in two general areas in a search for the best methods under this management plan: (1) full feeding in dry lot vs. full feeding on pasture and (2) use of hexestrol.

## TRIALS ON LESPEDEZA PASTURE

Prior to the finishing period, two lots of weanling calves (1 and 2) were wintered liberally to gain almost 1.5 pounds per day (average). The ration consisted of corn silage, lespedeza hay, and 1 pound of soybean oil meal daily. Two additional lots (3 and 4) were wintered to gain 1 pound per day (average). They were fed only corn silage and lespedeza hay. Thus, adding soybean meal increased the rate of gain ½ pound daily.

During the first part of the summer all lots were grazed together without grain. Lots 1 and 2, liberally wintered, gained 1.02 pounds per day on pasture. Steers wintered on silage and hay (Lots 3 and 4) produced a daily gain of 1.37 pounds per day on pasture.

On July 28, all four lots were put on a full feed mixture of 10 parts shelled yellow corn and 1 part by

TABLE 10--FULL FEEDING IN DRY LOT VS. FULL FEEDING ON KOREAN LESPEDEZA PASTURE AFTER EXTENSIVE PERIODS ON ROUGHAGE AND PASTURE JULY 28 TO DECEMBER 6, 1943

| | Lot 1 | Lot 2* | Lot 3 | Lot 4* |
|---|---|---|---|---|
| Winter Ration | Corn Silage<br>Lespedeza Hay<br>1 lb. S.B.O.M.<br>per day | Corn Silage<br>Lespedeza Hay<br>1 lb. S.B.O.M.<br>per day | Corn Silage<br>Lespedeza Hay | Corn Silage<br>Lespedeza Hay |
| Winter Daily Gain | 1.46 | 1.46 | 1.0 | 1.0 |
| Finishing Ration | Dry Lot<br>Shelled Corn<br>S.B.O.M.<br>Alfalfa Hay | Bluegrass<br>Korean Lespedeza<br>Pasture<br>Shelled Corn<br>S.B.O.M. | Dry Lot<br>Shelled Corn<br>S.B.O.M.<br>Alfalfa Hay | Bluegrass<br>Korean Lespedeza<br>Pasture<br>Shelled Corn<br>S.B.O.M. |
| Days on Feed | 132 | 132 | 132 | 132 |
| Avg. Initial Weight (lb.) | 618.0 | 618.9 | 612.8 | 612.8 |
| Avg. Final Weight (lb.) | 855.9 | 919.9 | 869.4 | 922.6 |
| Total Gain (lb.) | 237.9 | 301.0 | 256.6 | 309.8 |
| Avg. Daily Gain (lb.) | 1.80 | 2.28 | 1.94 | 2.35 |
| Avg. Total Feed: | | | | |
| Shelled Corn (lb.) | 1338.0 | 1024.0 | 1348.62 | 1057.0 |
| Shelled Corn (bu.) | 23.89 | 18.28 | 24.08 | 18.87 |
| Soybean Oil Meal (lb.) | 133.75 | 102.3 | 134.75 | 105.75 |
| Alfalfa Hay (lb.) | 973.0 | 86.0** | 974.0 | 88.6** |
| Avg. Daily Ration: | | | | |
| Shelled Corn (lb.) | 10.13 | 7.75 | 10.21 | 8.00 |
| Soybean Oil Meal (lb.) | 1.01 | .78 | 1.02 | .80 |
| Alfalfa Hay (lb.) | 7.37 | 6.61** | 7.38 | 6.82** |
| Feed Consumed per 100 lb. Gain: | | | | |
| Shelled Corn (lb.) | 562.4 | 340.1 | 525.5 | 341.1 |
| Shelled Corn (bu.) | 10.04 | 6.07 | 9.38 | 6.09 |
| Soybean Oil Meal (lb.) | 56.2 | 33.9 | 52.5 | 34.1 |
| Alfalfa Hay (lb.) | 408.99 | 2.85** | 379.57 | 2.85** |
| Dressing Percentage | 57.8 | 59.7 | 57.9 | 59.1 |
| Carcass Grade | High Good | High Good | High Good | Low Choice |

* The steers in Lots 2 and 4 were fed together on Korean lespedeza pasture.
**Korean lespedeza hay fed only the last 13 days of feeding period.

weight of soybean oil meal. Lots 1 and 3 were fed in dry lot and Lots 2 and 4 continued on lespedeza pasture. By this arrangement two comparisons were made: (1) finishing in dry lot versus finishing on lespedeza pasture and (2) effect of winter treatment on the results.

Table 10 gives the results.

Gains of cattle fed on lespedeza pasture were approximately 24 percent over the gains produced in dry lot. Pasture fed groups also produced gains more economically, indicating considerable gain from lespedeza.

Wintering liberally increased winter gains but reduced subsequent gains. Steers limited fed during the winter produced 7 percent larger daily gains during the fattening period than steers that had been wintered liberally. The wintering effects were not as pronounced for the steers finished on lespedeza pasture.

The carcass grades were the same except for Lot 4. Lot 4 graded one-third of a grade higher. The fat on the steers full fed on lespedeza was only slightly more creamy in color than the fat on the steers fed in dry lot; carcass color of fat was satisfactory in all cases and did not affect the carcass value adversely.

Table 11 shows results of another comparison made between full feeding in dry lot and full feeding on pasture, using the same method of handling the cattle. This time the pasture was Korean lespedeza-mixed grass.

Lots 1 and 2, wintered on a liberal ration of corn silage, lespedeza hay, and 1 pound soybean oil meal daily made an average gain of 1.42 pounds per day. Two additional lots (3 and 4), fed only silage and hay, gained 1.25 pounds per day; thus, the difference in rate of grain was relatively small.

During the first part of the summer all lots grazed lespedeza together without grain. Steers wintered liberally (Lots 1 and 2) gained 1.02 pounds per day on pasture. Lots 3 and 4, wintered on silage and hay, gained 1.14 pounds per day average.

On July 19, all four lots were put on a full feed using a mixture of 10 parts yellow corn and 1 part by weight of soybean oil meal. Lots 1 and 3 were fed in dry lot and Lots 2 and 4 continued on Lespedeza pasture.

Steers wintered liberally made slightly smaller gains during the finishing period than those wintered sparingly. The difference in wintering effects was not as marked in

TABLE 11--FULL FEEDING YEARLING STEERS - DRY LOT VS. KOREAN-MIXED GRASS PASTURE
JULY 19 TO NOVEMBER 8, 1945

| | Lot 1 | Lot 2* | Lot 3 | Lot 4* |
|---|---|---|---|---|
| Winter Ration | Corn Silage<br>Lespedeza Hay<br>1 lb. S.B.O.M.<br>per day | Corn Silage<br>Lespedeza Hay<br>1 lb. S.B.O.M.<br>per day | Corn Silage<br>Lespedeza Hay | Corn Silage<br>Lespedeza Hay |
| Winter Daily Gain | 1.42 | 1.42 | 1.25 | 1.25 |
| Finishing Ration | Dry Lot<br>Shelled Corn<br>S.B.O.M.<br>Alfalfa Hay | Mixed Grass-<br>Korean Lespedeza<br>Pasture<br>Shelled Corn<br>S.B.O.M. | Dry Lot<br>Shelled Corn<br>S.B.O.M.<br>Alfalfa Hay | Mixed Grass-<br>Korean Lespedeza<br>Pasture<br>Shelled Corn<br>S.B.O.M. |
| Days on Feed | 112 | 112 | 112 | 112 |
| Avg. Initial Weight (lb.) | 663.5 | 668.3 | 662.3 | 661.8 |
| Avg. Final Weight (lb.) | 924.2 | 858.0 | 937.7 | 857.2 |
| Total Gain (lb.) | 260.7 | 189.7 | 275.4 | 195.4 |
| Avg. Daily Gain (lb.) | 2.33 | 1.69 | 2.46 | 1.74 |
| Avg. Total Feed: | | | | |
| Shelled Corn (lb.) | 1286.4 | 1374.9 | 1300.4 | 1416.3 |
| Shelled Corn (bu.) | 22.97 | 24.55 | 23.21 | 25.29 |
| Soybean Oil Meal (lb.) | 128.6 | 137.5 | 130.0 | 141.6 |
| Alfalfa Hay (lb.) | 1096.9 | | 1118.4 | |
| Avg. Daily Ration: | | | | |
| Shelled Corn (lb.) | 11.49 | 12.27 | 11.61 | 12.65 |
| Soybean Oil Meal (lb.) | 1.15 | 1.23 | 1.16 | 1.27 |
| Alfalfa Hay (lb.) | 9.79 | | 9.99 | |
| Feed Consumed per 100 lb. Gain: | | | | |
| Shelled Corn (lb.) | 493.44 | 724.80 | 472.18 | 724.80 |
| Shelled Corn (bu.) | 8.81 | 12.94 | 8.43 | 12.94 |
| Soybean Oil Meal (lb.) | 49.34 | 72.48 | 47.22 | 72.47 |
| Alfalfa Hay (lb.) | 420.75 | | 406.10 | |
| Dressing Percentage | 60.1 | 59.5 | 58.8 | 58.9 |
| Carcass Grade | Low Choice | High Good | Low Choice | High Good |

*The steers in Lots 2 & 4 were fed together on mixed grass-Korean lespedeza pasture.

A group of the yearling steers on wheat-lespedeza pasture in May.

this experiment as in the previous one. This was probably due to small difference in winter gain.

Feeding in dry lot produced 28 percent larger daily gains than feeding on lespedeza pasture; the cost was lower, too.

Steers finished in dry lot graded one-third of a grade higher than steers fed on pasture. There was no significant difference in color of fat between the four lots of cattle.

These tests indicate that a pasturing period of 60 to 70 days on mixed grass-lespedeza pasture without grain tends to equalize the total weight prior to the finishing period. Consideration should be given to the condition of steers after the wintering period. If steers are carrying considerable finish, perhaps they should be fed grain rather than lose the finish by going to pasture without grain.

There was a difference in the performance of the cattle in these two trials. Dry lot feeding was more satisfactory than feeding on lespedeza pasture in 1945 but the cattle fed on pasture gave the best results in 1943 tests. The answer to this is not known, but seasonal variation may have been a contributing factor.

SUMMARY OF TWO TRIALS

| | Lot 1 Dry Lot | Lot 2 Lespedeza Pasture | Lot 3 Dry Lot | Lot 4 Lespedeza Pasture |
|---|---|---|---|---|
| Avg. daily gain | 2.04 | 2.01 | 2.18 | 2.07 |
| Feed consumed per hundred pounds gain: | | | | |
| Shelled corn (lb.) | 526.3 | 488.87 | 498.8 | 489.56 |
| Soybean oil meal | 52.61 | 45.60 | 49.72 | 48.95 |
| Alfalfa hay | 415.12 | --- | 393.30 | --- |

The summary table of the two trials indicates that steers fed in dry lot produced a slightly higher rate of gain. Steers fed on pasture produced gains more economically than steers fed in dry lot. Pasture or roughage charge was not included. Only the concentrates required per unit of gain were considered in economy of gains.

A total of 25 bushels or less of shelled corn produced yearlings that graded high Good on the rail.

## IMPLANTS OF GROWTH-PROMOTING SUBSTANCES

A number of tests have been run at the Missouri Station to study the effect of hexestrol (dihydrostilbestrol) implants on rate and economy of gain.

Hexestrol, at the time of writing, has not been cleared through the Pure Food and Drug Administration for commercial purposes. It was used rather than stilbestrol in the following experiments because experimental results indicate that the effects on the rate and economy of gain are similar between these two hormones and that hexestrol tends to produce less undesirable side effects when implanted.

Hormone implant effects on the rate and economy of gain were determined in one test where cattle were (1) fed wintering ration, (2) grazed without grain or continued on a wintering ration in dry lot, and (3) fattened either on pasture or in dry lot.

Three groups of steer calves were wintered liberally on a ration of good quality corn silage, 2 pounds daily of soybean meal, and mineral. At the beginning, implants of 12 milligrams (Lot 2) and of 24 milligrams (Lot 3) were made.

Results are summarized in the following table.

WINTERING WEANER CALVES WITH AND WITHOUT HORMONE IMPLANTS

| | Lot 2 | Lot 3 | Lot 4 & 5 |
|---|---|---|---|
| Hexestrol Implant level (mg.) | 12 | 24 | None |
| Avg. daily gain (lb.) | 2.03 | 2.15 | 1.82 |
| Feed consumed per hundred pounds gain: | | | |
| Corn silage | 1760 | 1588 | 1815 |
| Soybean oil meal | 103 | 94 | 110 |

Winter of 1956-57

Hexestrol implants increased the rate of gain and feed conversion; the 24 milligram implant increased the rate 18 percent and the 12 milligram, 11 percent over controls.

Implanted steers required less feed per unit of gain. The 24 milligram level resulted in 12½ percent less feed and the 12 milligram level, in 3 percent less feed per unit of gain than the control group.

During the summer phase, a comparison was made of grazing on pasture.

Twenty-four well-wintered steers were redistributed from the various lots April 24 for the grazing period—18 from control groups (Lots 4 & 5) and six from Lots 2 and 3. They were divided into three lots according to quality, finish, weights, type and conformation. Methods of handling the three lots in the intermediate phase were:

**Lot 1: No implants. Continued on a liberal silage feed in dry lot.**

**Lot 2: 24 mg. implants on April 24 when turned on pasture, grazed orchard grass and lespedeza pasture.**

**Lot 3: No implants. Grazed orchard grass and lespedeza pasture.**

Results of the period from April 24 to July 10 are summarized in the following table.

DRY LOT VS. PASTURE - APRIL 24 - JULY 10 -- 77 DAYS

| | Lot 1 Dry Lot No Implants | Lot 2 Orchard Grass and Lespedeza 24 mg. implants | Lot 3 Orchard Grass Lespedeza No implants |
|---|---|---|---|
| No. of head per lot | 8 | 8 | 8 |
| Avg. daily gain | 1.52 | 1.10 | 1.23 |
| Feed consumed per hundred pounds gain: | | --- | --- |
| Corn silage | 2762 | --- | --- |
| Soybean oil meal | 130 | --- | --- |

Implants did not increase the rate of gain on pasture. Early summer gains on pasture were probably lowered because of the high rate of gains produced during the wintering period.

The silage-fed steers were heavier and fatter at midsummer than steers on pasture. They produced 38 percent and 23 percent more gain than steers on pasture for the intermediate phase but made 0.3 pounds per day less gain in the intermediate phase than during the winter phase.

On July 10, all three lots were started on grain. Lot 1 was continued in dry lot and Lots 2 and 3 were fed on pasture. A comparison was made of dry lot feeding and pasture feeding. The steers in Lots 1 and 2 were implanted again to reach a 36 milligram level in the finishing period to study the hormone effects. The plan was as follows:

**Lot 1: 36 mg. hexestrol implants. Ground ear corn, 1.5 pounds soybean oil meal and alfalfa hay.**

**Lot 2: Three steers implanted in winter had 36 mg. implants added July 19. The five steers implanted with 24 mg. implants April 24 had 12 mg. added July 10. Ground ear corn, 1.5 pounds soybean oil meal and lespedeza pasture.**

**Lot 3: No implants. Ground ear corn, 1.5 pounds soybean oil meal and lespedeza pasture.**

**Lots 2 and 3: In dry lot 20 days before marketing.**

Table 12a summarizes results.

TABLE 12A--FATTENING YEARLINGS ON PASTURE AND IN DRY LOT, WITH AND WITHOUT ADDITIVES JULY 10 TO NOVEMBER 1, 1957

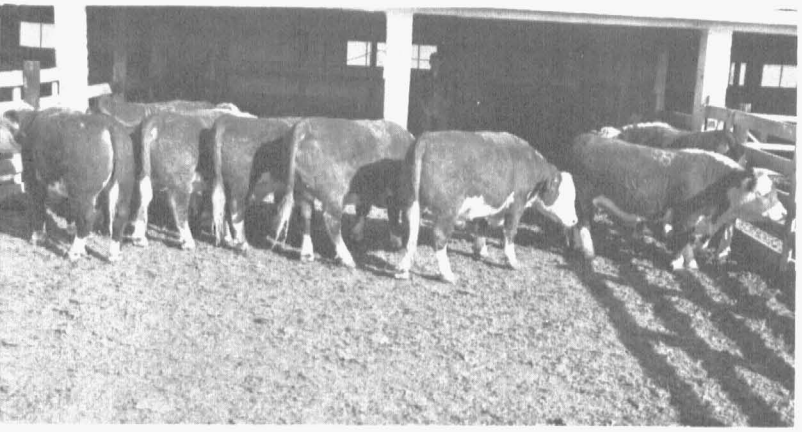
| | Lot 1 Dry Lot Hexestrol 36 mg. | Lot 2 Lespedeza Hexestrol 36 mg. | Lot 3 Lespedeza No Implants |
|---|---|---|---|
| | Gr. Ear Corn Soybean O.M.* 1.5 lb. Daily | Gr. Ear Corn Soybean O.M 1.5 lb. Daily | Gr. Ear Corn Soybean O.M. 1.5 lb. Daily |
| Days on Feed | 114 | 114 | 114 |
| Avg. Initial Weight (lb.) | 821 | 789 | 795 |
| Avg. Final Weight | 1096 | 1068 | 1040 |
| Total Gain (lb.) | 275 | 279 | 245 |
| Avg. Daily Gain (lb.) | 2.41 | 2.45 | 2.15 |
| Avg. Total Feed: | | | |
| Ground Ear Corn (lb.) | 1851 | 1993 | 1825 |
| Ground Ear Corn (bu.) | 26.4 | 28.4 | 26.0 |
| Soybean Oil Meal (lb.) | 165 | 166 | 166 |
| Alfalfa Hay (lb.) | 725 | --- | --- |
| Corn Silage (lb.) 10 Days | 215 | --- | --- |
| Oat Hay (lb.) 20 Days | --- | 68 | 67 |
| Rumen Extract (First 28 Days) | 4gm/h/day | 4 gm/h/day | 4 gm/h/day |
| Avg. Daily Ration: | | | |
| Ground Ear Corn (lb.) | 16.24 | 17.48 | 16 |
| Soybean Oil Meal (lb.) | 1.45 | 1.45 | 1.45 |
| Alfalfa Hay (lb.) | 6.36 | --- | --- |
| Corn Silage (lb.) 10 Days | 21.5 | --- | --- |
| Oat Hay (lb.) 20 Days | --- | 3.40 | 3.35 |
| Rumen Extract (First 28 Days) | 4gm/h/day | 4 gm/h/day | 4 gm/h/day |
| Feed Consumed per 100 lb. Gain: | | | |
| Ground Ear Corn (lb.) | 673 | 714 | 744 |
| Soybean Oil Meal (lb.) | 60 | 59 | 68 |
| Alfalfa Hay (lb.) | 264 | --- | --- |
| Dressing Percentage | 60.8 | 62.0 | 60.7 |
| Carcass Grade | Good | Good | Low Good |

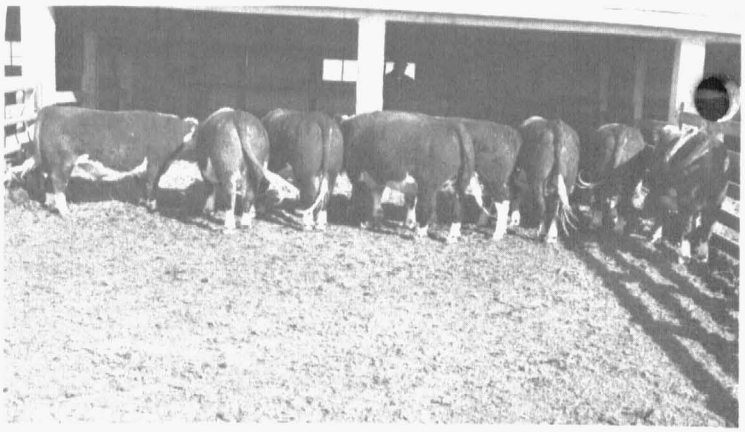
*Soybean Oil Meal

Steers implanted and fed grain on pasture produced greater gains on less feed per unit of gain than steers that were not implanted. They gained 14 percent faster, consumed 9 percent more corn, but required 4 percent less corn to produce 100 pounds of gain than steers without implants.

Steers implanted and fed in dry lot produced slightly lower daily gain but required 6 percent less grain per hundred pounds gain than the implanted pasture lot. The fleshy steers fed in dry lot produced larger daily gains during the intermediate phase, which probably accounted for the lowered gains received during the finishing period. The dry lot fed cattle were heavier and appeared smoother at marketing time, which may have accounted for $1.00 higher market price per hundred weight.

The cattle fed in dry lot and implanted at the 36 milligram level and the steers fed on pasture and implanted at the same level graded one-third of a grade higher than cattle fed on pasture without an implant. The two implanted groups graded the same. Therefore,





**Level-of-Additives Tests: Left to right across pages are Lots 1, 2, 3, and 4. *Lot 1* continued on winter ration in dry lot until June 30, then full fed; received 36 mg. implant in finishing stage. *Lot 2* had same treatment as Lot 1 except received 12 mg. implant of Hexestrol in winter and reimplanted with 18 mg. in spring and another 18 mg. at start of finishing. *Lot 3* steers grazed wheat-lespedeza April 19 to June 30, then were full fed 138 days on pasture; they received no**

in this trial hexestrol implants improved the market grades.

Table 12b is a summary of the three phases.

TABLE 12B--FATTENING YEARLINGS ON PASTURE AND IN DRY LOT, WITH AND WITHOUT ADDITIVES. SUMMARY FOR THREE PERIODS (WINTERING, GRAZING & FINISHING) JANUARY 3 TO NOVEMBER 1, 1957

| | Lot 1 Dry Lot 36 mg. Implant | Lot 2 Pasture 36 mg. Implant | Lot 3 Pasture No Implant |
|---|---|---|---|
| Avg. Total Feed: | | | |
| Corn Silage (lb.) | 6991 | 3539 | 3539 |
| Ground Ear Corn (lb.) | 1851 | 1993 | 1825 |
| Soybean Oil Meal (lb.) | 531 | 380 | 380 |
| Alfalfa Hay (lb.) | 725 | --- | --- |
| Pasture | --- | Orchard Grass-Lespedeza | Orchard Grass-Lespedeza |
| Gain in Weight per Steer: | | | |
| Winter - Jan. 3 to April 24 | 211 | 208 | 209 |
| Early Summer - April 24 to July 10 | 117 | 85 | 95 |
| Fattening Period - July 10 to Nov. 1 | 275 | 279 | 245 |
| Total Gain (lb.) | 603 | 572 | 549 |

Wintering steers liberally on corn silage provided a method to market yearlings earlier with a larger overall total gain for a desirable marketing date.

Hexestrol implants increased the overall total gains produced in all phases (Jan. 3 to Nov. 1). Implanted steers fed in dry lot produced 5 percent more gains than steers implanted and fed on pasture and 10 percent greater gains than steers fed on pasture without implants.

### Level of Additives Tested

In another experiment the effects of implanting steer calves with hexestrol at different levels were determined for steers which were wintered, grazed and finished.

Results of the wintering phase (1957-58) using weanling calves are summarized in the following table.

WINTERING PHASE

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 |
|---|---|---|---|---|
| No. head per lot | 10 | 10 | 10 | 10 |
| Hexestrol implant level (mg.) | None | 12 | None | 24 |
| Avg. daily gain | 1.57 | 1.68 | 1.61 | 1.88 |
| Feed consumed per hundred pounds gain: | | | | |
| Corn silage | 2375 | 2300 | 2300 | 2164 |
| Soybean oil meal | 125 | 116 | 122 | 105 |

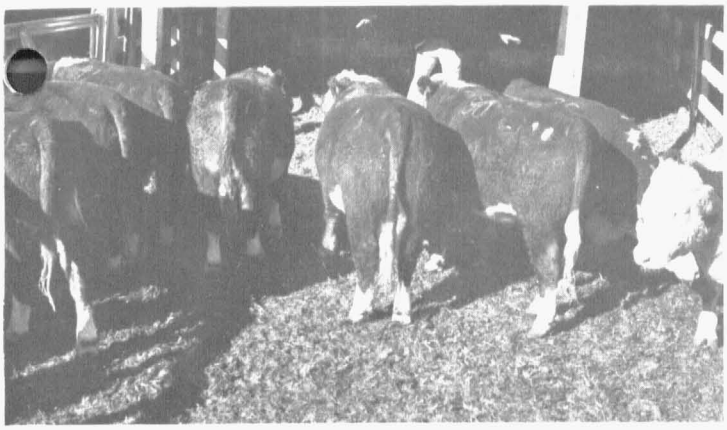
Hexestrol implants resulted in larger gains and more efficient use of feed. The 24 milligram implant was more effective than the 12 milligram implant; the former increased the rate of gain by 18 percent and the latter by 5 percent over controls. Similarly, the higher level increased feed efficiency by 8 percent while the lower level increased feed efficiency only a negligible amount.

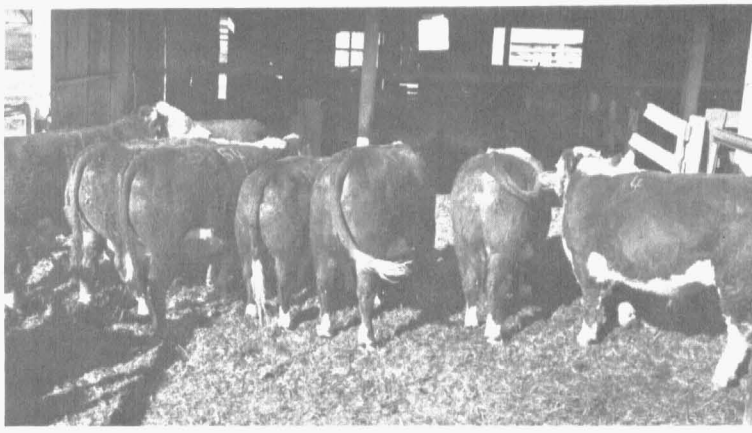
On April 19, or at the beginning of the grazing season, two steers were removed from each of the four lots to make a fifth lot (Lot 5). Certain groups were implanted for a 24 milligram level during the intermediate phase (April 19 to June 30). Steers previously treated were retreated with the idea that 50 percent of the initial winter treatment had been utilized during the winter. This was purely an assumption. Methods of management of the five groups in the intermediate phase were:

**Lot 1: No implants—winter ration continued in dry lot.**

**Lot 2: Reimplanted with additional 18 mg. to bring to 24 mg. level. Treated with 12 mg. during the winter. Continued on winter ration in dry lot.**

**Lot 3: No implants. Grazed wheat and lespedeza pasture.**





**implants.** *Lot 4* **was treated same as Lot 3 except they received 24 mg. implant in winter and 24 in the finishing period. Hexestrol implants had little effect on pasture gains but gave marked increases when concentrates were fed. Large implants at beginning of wintering and finishing phases were more effective than smaller ones at the beginning of each phase.**

Lot 4: No implants. Grazed wheat and lespedeza pasture.

Lot 5: Each steer was implanted or reimplanted for a 24 mg. level. Grazed wheat and lespedeza pasture. Implantation for Lot 5 was as follows:

4 steers from Lots 1 and 3—24 mg. hexestrol. Received no implants during the winter.

2 steers from Lot 2—18 mg. of hexestrol. Treated with 12 mg. during the winter.

2 steers from Lot 4—12 mg. of hexestrol. Treated with 24 mg. during the winter.

By this procedure, the effects of implants for the period between the close of the winter trial and the beginning of the fattening period or the intermediate period (April 19 to June 30) were determined. Two lots (Lots 1 and 2) were in dry lot; Lots 3 through 5 were on pasture to study a comparison of systems in developing steers to a finished grade.

Results of the period from April 19 to June 30 (Intermediate Phase) are summarized in the following table.

Hexestrol implants had very little effect on pasture gains. Lot 5 implanted steers produced only 0.05 pound per day more gain on wheat and lespedeza pasture than Lot 4 without implants. Lot 4 had received a 24 milligram treatment during the winter.

Winter gains affected the gains produced on pasture. Steers (Lot 4) which produced the largest gains in the winter (24 mg. implant group) produced 0.21 of a pound lower daily gain on pasture than Lot 3 (no implants in winter).

Steers which were continued on the winter ration in dry lot were heavier and fatter on June 30 than comparable steers which grazed pasture without grain. The dry lot cattle fed corn silage gained nearly twice as fast as cattle which had only pasture during the intermediate period (April 19 to June 30). Implantation of steers in dry lot increased the rate of gain by 31 percent and decreased the feed requirement per unit of gain by approximately 18 percent.

INTERMEDIATE PHASE

DRY LOT VS. PASTURE (APRIL 19 - JUNE 30, 1958--73 DAYS)

| | Lot 1 Dry Lot No Implants | Lot 2 Dry Lot 24 mg. Implants | Lot 3 Wheat & Lespedeza Pasture No Implants | Lot 4 Wheat & Lespedeza Pasture No Implants | Lot 5 Wheat & Lespedeza Pasture 24 mg. Implant |
|---|---|---|---|---|---|
| No. Head per lot | 8 | 8 | 8 | 8 | 8 |
| Avg. daily gain | 2.04 | 2.67 | 1.21 | 1.0 | 1.05 |
| Feed consumed per hundred pounds gain: | | | | | |
| Corn silage | 2126.9 | 1766.7 | --- | --- | --- |
| Soybean oil meal | 94.8 | 72.4 | --- | --- | --- |

Beginning on July 1, all lots were started on a fattening ration composed of ground ear corn, full fed, and 1.5 pounds of soybean oil meal per head daily. All cattle which had previously been implanted, were reimplanted with enough additional implants to equal an initial implant of 36 milligrams. The amounts of implants that were thought to be needed to equal a 36 milligram level were an estimation. The actual treatments used at the beginning of the finishing period, along with previous treatments are tabulated below.

| | Lot 1 | Lot 2 | Lot 3 | Lot 4 | Lot 5 |
|---|---|---|---|---|---|
| Winter Dec. 14, 1957 to April 18, 1958 | None | 12 mg. | None | 24 mg. | 4 steers--None<br>2 steers--12 mg.<br>2 steers--24 mg. |
| Intermediate April 19, to June 20, 1958 | None | 18 mg. | None | None | 4 steers--24 mg.<br>2 steers--18 mg.<br>2 steers--12 mg. |
| Finishing July 1, to November 15, 1958 | 36 mg. | 18 mg. | None | 24 mg. | 12 mg. |

Table 13a gives results.

During the finishing period, cattle full fed on pasture produced larger gains with less grain than steers full fed in dry lot; however, prior to that time, cattle (Lots 1 and 2) had made faster gains and were heavier and fatter at the beginning of the finishing period. This probably contributed to a slower rate of gain and the lower feed conversion. Steers fed in dry lot graded slightly higher, which indicated that they carried more finish.

TABLE 13A--FATTENING YEARLINGS ON PASTURE AND IN DRY LOT, WITH AND WITHOUT ADDITIVES JULY 1 TO NOVEMBER 15, 1958

| | Lot 1 Dry Lot Hexestrol Implant 36 mg. | Lot 2 Dry Lot Hexestrol Implant 36 mg. | Lot 3 Lespedeza Pasture No Implant | Lot 4 Lespedeza Pasture Hexestrol Implant 36 mg. | Lot 5 Lespedeza-Red Clover Pasture Hexestrol Implant 36 mg. |
|---|---|---|---|---|---|
| Ration | Ground Ear Corn Soybean Oil Meal 1.5 lb. daily Alfalfa Hay | Ground Ear Corn Soybean Oil Meal 1.5 lb. daily Alfalfa Hay | Ground Ear Corn Soybean Oil Meal 1.5 lb. daily Alfalfa Hay | Ground Ear Corn Soybean Oil Meal 1.5 lb. daily Alfalfa Hay | Ground Ear Corn Soybean Oil Meal 1.5 lb. daily Alfalfa Hay |
| Days on Feed | 138 | 138 | 138 | 138 | 138 |
| Avg. Initial Weight (lb.) | 805.8 | 872.3 | 741.9 | 764.3 | 741.5 |
| Avg. Final Weight (lb.) | 1074.0 | 1088.5 | 1038.8 | 1117.0 | 1054.9 |
| Total Gain (lb.) | 268.2 | 216.2 | 296.9 | 352.7 | 313.4 |
| Avg. Daily Gain (lb.) | 1.94 | 1.57 | 2.15 | 2.56 | 2.27 |
| Avg. Total Feed: | | | | | |
| Ground Ear Corn (lb.) | 2711.6 | 2728.3 | 2385.5 | 2595.3 | 2545.8 |
| Ground Ear Corn (bu.) | 38.7 | 38.9 | 34.1 | 37.1 | 36.4 |
| Soybean Oil Meal (lb.) | 208.0 | 209.5 | 188.9 | 192.5 | 193.4 |
| Alfalfa Hay (lb.) | 356.8 | 362.0 | 164.4* | 158.1* | 76.9* |
| Avg. Daily Ration: | | | | | |
| Ground Ear Corn (lb.) | 19.65 | 19.77 | 17.28 | 18.80 | 18.45 |
| Soybean Oil Meal (lb.) | 1.50 | 1.51 | 1.37 | 1.39 | 1.40 |
| Alfalfa Hay (lb.) | 2.6 | 2.6 | 4.7 | 4.5 | 2.20 |
| Feed Consumed per 100 lb. Gain: | | | | | |
| Ground Ear Corn (lb.) | 1010.8 | 1261.9 | 803.5 | 735.7 | 812.3 |
| Soybean Oil Meal (lb.) | 77.5 | 96.9 | 63.6 | 54.6 | 61.7 |
| Alfalfa Hay (lb.) | 133.0 | 167.4 | 55.3 | 44.8 | 24.5 |
| Dressing Percentage | 61.8 | 60.5 | 62.1 | 61.9 | 62.1 |
| Carcass Grade | Good | High Good | Low Good | Low Good | Good |

*Alfalfa hay fed last 35 days.

However, there was not a great difference in the final weight at marketing time.

A 36 milligram implant at the beginning of the finishing period was more effective than an 18 milligram implant. The 18 milligram implant, however, had been preceded by implants of 12 milligrams and 18 milligrams at the beginning of the winter and intermediate phases, respectively. Lot 1, which received the 36 milligram implant produced 23 percent larger daily gain with 20 percent less concentrates per unit of gain that Lot 2, which received the small implant (18 milligrams). However, steers in Lot 2 weighed slightly heavier at marketing time and graded one-third of a grade higher than steers in Lot 1. This was due to the greater gains produced during the winter and intermediate phase with implants. Therefore, the combined effects of repeated treatment on grade and final weight must be considered.

Implanting steers with hexestrol at the beginning of the finishing period on pasture increased the rate of gain; that is, Lot 4 implanted at the beginning of the winter phase and again at the beginning of the finishing phase at the 24 milligram level gained 19 percent faster than controls (Lot 3). Implanting steers with hexestrol at three different times, at the beginning of the winter, again at the start of the grazing season, and a third time at the beginning of the finishing period (Lot 5), produced 6 percent faster gains than the controls.

Thus implanting at the high level once at the beginning of the wintering phase and again at the beginning of the finishing phase was more effective than smaller implants given more frequently and more effective than a single 36 milligram implant at the beginning of the finishing period.

Steers in dry lot showed indications of vitamin A deficiency during the latter part of the finishing period. The silage fed during the summer phase contained nitrates. A blood test showed a vitamin A deficiency which is thought to be caused by the nitrates. Vitamin A supplement was added and feed consumption increased.

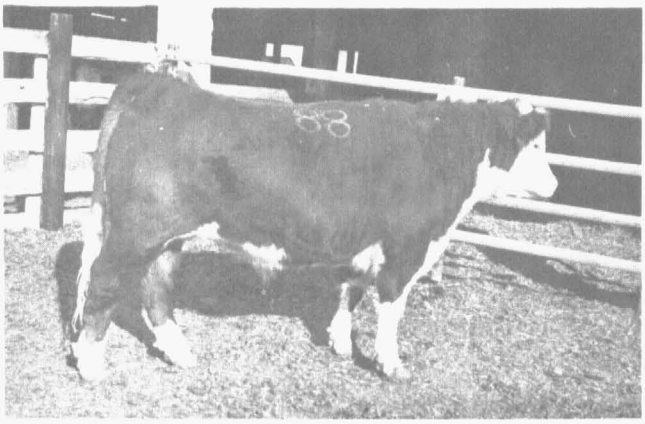
Table 13b summarizes results of the test.

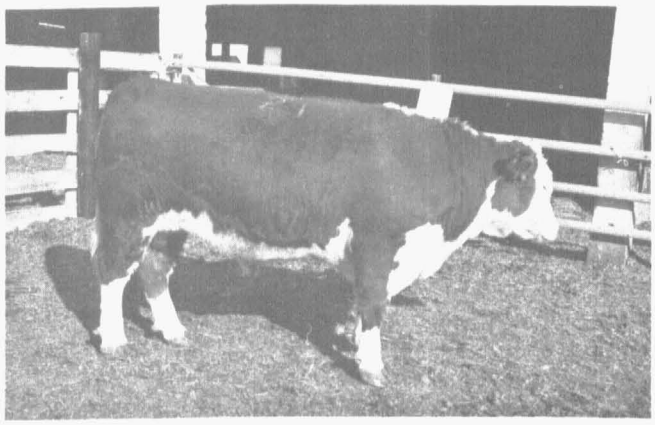
The total overall gains were increased with the use of hexestrol implants on pasture. Lot 4, treated during the winter (24 mg.) and retreated in the finishing period (24 mg.), produced 10 percent greater total gains than Lot 5 which was implanted at the beginning of each of the three phases. Lot 4 produced 13 percent greater total gains than controls, Lot 3 (no implants). Lot 4, implanted during the winter, pastured without implantation, and given a 24 milligram implant during the finishing period, produced the largest total gains on the least feed per unit of gain. This method of management indicates that there is no apparent advantage in implanting in all three phases—wintering, grazing and finishing periods.

The use of hexestrol implants during the winter, intermediate, and finishing phases in dry lot gave little improvement over an initial implant at the beginning of the finishing period. Lot 2, which received a winter treatment of 12 milligrams, summer treatment of 18 milligrams and 18 milligram treatment at the beginning of the finishing period produced only 8 pounds more total gain than Lot 1, which was not implanted until the beginning of the finishing period (36 mg.). However, Lot 1 produced larger and more economical daily gains than Lot 2 in the finishing period. The liberal gains produced during the winter and intermediate period seemed to lower gains produced in the finishing period in both lots.

TABLE 13B--FATTENING YEARLINGS ON PASTURE AND IN DRY LOT, WITH AND WITHOUT ADDITIVES SUMMARY FOR THREE PERIODS (WINTERING, GRAZING AND FINISHING)

| | Lot 1 Dry Lot | Lot 2 Dry Lot | Lot 3 Pasture | Lot 4 Pasture | Lot 5 Pasture |
|---|---|---|---|---|---|
| Hexestrol Implant Level (mg) | None | 12 | None | 24 | Mixed--0, 12, 24 |
| Winter period | 36 | 36 | No implant | 24 | 36 |
| Summer & finishing period | | | | | |
| Avg. Total Feed: | | | | | |
| Corn silage | 7673.1 | 8124.8 | 4468.7 | 4922.3 | 4646.42 |
| Ground ear corn | 2711.6 | 2728.3 | 2385.5 | 2595.3 | 2545.8 |
| Soybean oil meal | 586.0 | 587.0 | 425.3 | 429.5 | 430.2 |
| Alfalfa hay | 356.8 | 362.0 | 164.4 | 158.1 | 76.9 |
| Pasture | None | None | Wheat-Lesp. | Wheat-Lesp. | Wheat-Lesp. Red Cl. |
| Gain in weight per steer: | | | | | |
| Winter - Dec 14 - Apr 18 | 189.9 | 204.7 | 194.3 | 227.5 | 203.9 |
| Early Summer Apr 18 - June 30 | 148.8 | 194.7 | 88.1 | 73.0 | 76.8 |
| Fattening period July 1 - Nov. 15 | 268.2 | 216.2 | 296.9 | 352.7 | 313.4 |
| Total Gains (lb.) | 606.9 | 614.6 | 579.3 | 653.2 | 594.1 |





**The picture at left shows the characteristic flat loin and high tail head that implanted steers sometimes develop. The steer at right, however, received the same implant and shows no side effects.**

### CONCLUSIONS ON PLAN C

Finishing yearling steers under this method requires careful management due to the increased utilization of pasture without grain. Pasture gains are influenced by the rate of gain produced during the winter period. Steers wintered to gain 1 to 1.25 pounds daily produced larger daily gains on lespedeza pasture than steers wintered to gain 1.50 pounds per head daily. Thus, the smaller winter gains were more desirable in obtaining increased gains from lespedeza pasture. However, the larger winter and intermediate gains may result in finishing for an earlier market with a slightly greater total gain. The best type of winter management is dependent on the cost of concentrates and type and availability of pasture.

Implants of a growth promoting substance (Hexestrol) increased the rate and economy of gains while feeding a good quality winter ration. Implants did not affect gains produced on pasture. They were effective in increasing the rate of gain and feed efficiency during the finishing phase.

Implantation at the beginning of the winter phase and again at the beginning of the fattening phase was the most desirable method of implantation in pasture feeding.

An implant of 36 milligrams at the beginning of a dry lot finishing period produced as large an overall gain as implanting at low levels at the beginning of each of the three phases—winter, intermediate, and finishing. However, steers treated with a low level implant at the beginning of each phase graded one-third of a grade higher than steers treated with an initial implant at the begining of the finishing phase.

## Summary

Studies on production of fat yearling steers conducted through the years at the University of Missouri are summarized in this bulletin. Studies having to do with each of the three general plans of management for producing fat yearlings are grouped together. Conclusions are drawn as to the implications of test results toward management of each of these feeding plans.

### PLAN A: FATTEN IMMEDIATELY

Good to Choice weanling calves required large quantities of concentrates and small amounts of roughage

to finish to a slaughter grade ranging from high Good to middle Choice. Approximately 28 bushels of corn, 175 to 200 pounds protein supplement, 500 pounds of legume hay and 1200 pounds of corn silage were required. The finished steers were marketed in April, May and early June, which is not normally the highest market period for Choice slaughter cattle. Steers weighing 350 pounds initially required 187 days to reach the desired finish. Steers weighing 425 pounds required only 168 days. The younger, lighter cattle were fed more economically over a longer period. If winter feeding with concentrates is desired, this method applies.

Feeding 50 percent of a full feed of grain plus roughage for 151 days or for the entire period was compared with feeding roughage alone for 74 days and then full feeding grain for 77 days. Steers were yearlings of Medium grade that weighed 606 pounds (average) at the beginning. Cattle were finished to a low Good grade and sold in June. The half feed method required 15 bushels of corn. The other plan of management used 19 bushels. Other feeds were consumed in about the same total amounts. Feeding a half grain ration during the entire period (151 days) conserved corn. The group fed concentrates during the last half of the finishing period (77 days) dressed higher, indicating more finish.

## PLAN B: WINTER ON ROUGHAGE—FULL FEED

Weanling steer calves were wintered liberally to make an average daily gain of 1.5 pounds. The cattle were then finished by full feeding concentrates either in dry lot or on pasture or by a combination of the two.

Cattle finished in dry lot gained faster than cattle finished on bluegrass pasture. However, the dry lot cattle required more concentrates per unit of gain and finished earlier than the pasture-fed cattle. The early finish might be an important advantage when prices for finished cattle are on a downward trend.

This method of management gets cattle ready for sale when prices normally are best for Choice yearlings.

Different ratios of shelled corn to protein concentrate (12 pounds to 1; 8 pounds to 1; a 16 percent supplement) were compared for cattle being fed concentrates on pasture. The most economical, considering the entire 168 day finishing period, was a mixture of 12 parts corn to 1 part cottonseed cake. When only the last 112 days were considered, the 8 to 1 mixture was best. This result suggests that a mixture of 12 to 1 for the first 8 weeks on pasture and a mixture of 8 to 1 after that might be best.

By wintering cattle liberally and then full feeding either in dry lot or on pasture, the cattle were made Choice and ready for market when prices normally are highest for Choice cattle. There was little difference between finishing in dry lot or on pasture. Compared with some other methods, rather large amounts of grain were used—in this case, about 40 bushels. The winter gains were relatively low cost; the summer gains were relatively costly.

## PLAN C: WINTER ON ROUGHAGE—GRAZE—FULL FEED

This method requires skill in management. The way steers are wintered affects their pasture gains. Steers wintered to gain 1 to 1.25 pounds daily produced larger daily gains on lespedeza pasture than steers wintered to gain 1.50 pounds per head daily. Small winter gains were desirable from the standpoint of increased gains from lespedeza pasture but larger winter gains generally result in finishing for an earlier market and a slightly greater total gain. The best type of winter management is dependent on the cost of concentrates and type and availability of pasture.

In a more recent experiment cattle were wintered liberally to make average daily gains of 1.5 pounds. Some grazed forage until July 1, while others continued on the silage ration in dry lot. Beginning July 1, all were full fed concentrates. During the April to July 1 period the silage ration produced faster gains than pasture alone. During the finishing period the performance in dry lot and on pasture was about the same in one test; however, in a second test cattle fed grain on pasture made faster gains than the cattle in dry lot.

Implants of a growth promoting substance (Hexestrol) increased the rate and economy of gains while feeding a good quality winter ration. Implants did not affect gains produced on pasture. They were effective in increasing the rate of gain and feed efficiency during the finishing phase.

Implantation at the beginning of the winter phase and again at the beginning of the fattening phase was the most desirable method for the Plan C management system.

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