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**Abstract**
Seven diets were fed for 27 days to newly arrived heifers to evaluate their impact on stocker gains during the receiving and pasture periods. The diets were as follows: soybean hulls plus soybean meal; suncured alfalfa plus wheat middlings; dehydrated alfalfa plus grain sorghum; distillers dried grain plus cottonseed hulls; brome hay plus 2 lb protein supplement/day; prairie hay plus 2 lb protein supplement/day; and a commercial receiving ration. During the receiving period, diets of soybean hulls plus soybean meal, distillers dried grain plus cottonseed hulls, and the commercial receiving ration produced the highest cattle gains. The soybean hull plus soybean meal diet and the commercial receiving ration resulted in the best combined dry lot and pasture gains as well.

**Keywords**
Cattlemen's Day, 1987; Kansas Agricultural Experiment Station contribution; no. 87-309-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 514; Beef; Stocker cattle; Diet; Pasture gains

# Effect of Stocker Receiving Diet on Subsequent Pasture Gains[1]

Frank Brazle[2], Gerry Kuhl, and David Harmon

## Summary

Seven diets were fed for 27 days to newly arrived heifers to evaluate their impact on stocker gains during the receiving and pasture periods. The diets were as follows: soybean hulls plus soybean meal; suncured alfalfa plus wheat middlings; dehydrated alfalfa plus grain sorghum; distillers dried grain plus cottonseed hulls; brome hay plus 2 lb protein supplement/day; prairie hay plus 2 lb protein supplement/day; and a commercial receiving ration. During the receiving period, diets of soybean hulls plus soybean meal, distillers dried grain plus cottonseed hulls, and the commercial receiving ration produced the highest cattle gains. The soybean hull plus soybean meal diet and the commercial receiving ration resulted in the best combined drylot and pasture gains as well.

## Introduction

Receiving rations for feedlot cattle are designed to adapt the rumen's microflora to a grain diet. Adapting the rumen's microflora to a lush pasture diet may be just as important. We evaluated seven receiving diets to determine their affect on pasture gains of intensive-early grazed stocker cattle.

## Experimental Procedures

In March, 301 yearling heifers averaging 500 lbs were purchased in Oklahoma City and shipped to Moline, Kansas. The stockers were fed prairie hay and water on arrival and were processed the following morning. The cattle were vaccinated for Infectious Bovine Rhinotracheitis (IBR); Bovine Virus Diarrhea (BVD); Parainfluenza$_3$ ($PI_3$); Leptospirosis pomona; Clostridium chauvei, septicum, novyi, sordellii, and perfringens C and D (7-way); dewormed with Tramisol® injectable; and implanted with Ralgro®.

The heifers were randomly allotted to 7 receiving rations with 3 pens of cattle on each diet. The major ingredients in the receiving rations were as follows:

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1) soybean hulls (83%) plus soybean meal (10%); 2) suncured alfalfa (47%) plus wheat middlings (47%); 3) dehydrated alfalfa (55%) plus grain sorghum (39%); 4) distillers dried grain (41%) plus cottonseed hulls (51%); 5) a commercial receiving ration; 6) poor quality brome hay plus 2 lb soybean meal-based supplement per head daily; and 7) prairie hay plus 2 lb soybean meal-based supplement daily (Table 26.1). Cattle on the first 5 diets also received 2 lb of prairie hay per head daily.

All concentrate mixtures were pelleted and fortified with Deccox® (125 mg/head daily), salt, and vitamin A. All diets except the two hay- based rations were designed to contain minimum nutritional levels (dry basis) of 14% crude protein, 15% crude fiber, 60% TDN, .4% calcium, .3% phosphorus, and 1% potassium. Heifers were individually weighed at the start and finish of the 27-day receiving period, and at the end of 82-day grazing trial. Rumen fluid was collected from 30% of the heifers at the start and end of the receiving period. All heifers were intensive-early grazed in one native tallgrass pasture stocked at 2 acres/head.

## Results and Discussion

Heifers fed the diets containing soybean hulls plus soybean meal, the commercial receiving ration, and distillers dried grain plus cottonseed hulls gained the fastest during the 27-day receiving period. Cattle fed the prairie and brome hay plus protein supplement diets were intermediate in gains during the receiving period, and those consuming wheat middlings plus suncured alfalfa or grain sorghum plus dehydrated alfalfa had the lowest gains (Table 26.2).

Highest cattle intake during the first 27 days was achieved on the commercial receiving ration, followed by the brome and prairie hay diets. The wheat middlings plus dehydrated alfalfa diet resulted in lowest heifer intake (Table 26.2). The best cattle feed conversions were obtained on the soybean hulls plus soybean meal, commercial receiving ration, and distillers dried grain plus cottonseed hull diets. Heifers fed the soybean hulls plus soybean meal and wheat middlings plus suncured alfalfa diets had the lowest ruminal pH and highest rumen propionic acid levels on day 27. Results suggest that these two rations had higher digestable energy levels than the other rations and may explain the lower heifer intakes, even though the soybean hulls plus soybean meal ration was one of the highest in crude fiber. About 25% of the heifers were treated for shipping fever, with no differences among treatments.

The heifers started on distillers dried grain plus cottonseed hulls had the lowest pasture gains. This may be explained by the fact that, although this ration was the highest in crude protein, its high ruminal bypass potential resulted in the lowest ($P<.05$) rumen ammonia level at the end of the receiving period, which likely inhibited ruminal microbial growth.

This trial confirms that the receiving ration fed to stockers before going to grass can affect short-term grass gains. Feeding a higher energy ration that results in faster gains for 3 to 4 weeks before grass will not necessarily reduce subsequent grass gains, as illustrated by the heifers fed diets containing soybean hulls plus soybean meal, and the commercial receiving ration. Feeding prairie hay plus 2 lb of protein supplement did not optimize stocker gains on grass, as has been suggested. However, stockers fed high energy starting rations for a longer period would be fleshier going to grass, which could result in lower grass gains.

Table 26.1. Ingredient Composition and Analysis of Receiving Rations

| Items | Prairie Hay + 2 lb Prot. Suppl.[1] | Brome Hay + 2 lb Prot. Suppl.[1] | Distillers Dried Grain + Cottonseed Hulls | Soybean Hulls + Soybean Meal | Wheat Midds + Suncured Alfalfa | Grain Sorghum + Dehydrated Alfalfa | Commercial[2] Receiving Ration |
|---|---|---|---|---|---|---|---|
| | | | Ration Ingredients, lb/ton | | | | |
| Soybean Meal | 1835 | 1835 | ----- | 200 | ----- | ----- | ----- |
| Soybean Hulls | ----- | ----- | ----- | 1667 | ----- | ----- | ----- |
| Cottonseed Hulls | ----- | ----- | 1025 | ----- | ----- | ----- | ----- |
| Dist. Dried Grain | ----- | ----- | 832 | ----- | ----- | ----- | ----- |
| Suncured Alfalfa | ----- | ----- | ----- | ----- | 940 | ----- | ----- |
| Wheat Midds | ----- | ----- | ----- | ----- | 948 | ----- | |
| Dehydrated Alfalfa | ----- | ----- | ----- | ----- | ----- | 1100 | ----- |
| Grain Sorghum | ----- | ----- | ----- | ----- | ----- | 778 | ----- |
| Liquid Molasses | ----- | ----- | 100 | 100 | 100 | 100 | ----- |
| White Salt | 50 | 50 | 10 | 10 | 10 | 10 | ----- |
| Dicalcium Phosphate | 100 | 100 | ----- | 20 | ----- | 10 | ----- |
| Limestone | ----- | ----- | 20 | ----- | ----- | ----- | ----- |
| Potassium Chloride | ----- | ----- | 10 | ----- | ----- | ----- | ----- |
| Vitamin A&D Premix | 10 | 10 | 2 | 2 | 1 | 1 | ----- |
| Deccox Premix | 5 | 5 | 1 | 1 | 1 | 1 | ----- |
| | | | Chemical Analysis, Dry Matter Basis | | | | |
| Crude Protein, % | 5.0[2] | 6.0[2] | 17.9 | 15.2 | 14.5 | 15.2 | 16.2 |
| Crude Fiber, % | 36.0[2] | 35.0[2] | 24.0 | 33.0 | 22.0 | 19.0 | 26.0 |
| Potassium, % | .83[2] | 1.29[2] | 1.51 | 1.41 | 1.63 | 2.77 | 1.17 |

[1]Protein supplement ingredients only.
[2]Purina Receiving Chow® with Deccox®.
[3]Hay analysis only.

Table 26.2. Effect of Starting Ration on Stocker Performance Durinng Receiving and Grazing Periods

| Item | Prairie Hay + 2 lb Prot. Suppl. | Brome Hay + 2 lb Prot. Suppl. | Distillers Dried Grain + Cottonseed Hulls | Soybean Hulls + Soybean Meal | Wheat Midds + Suncured Alfalfa | Grain Sorghum + Dehydrated Alfalfa | Commercial Receiving Ration |
|---|---|---|---|---|---|---|---|
| No. Heifers | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| Starting Wt., lb | 493 | 475 | 485 | 483 | 483 | 491 | 490 |
| Daily Gain, lb: | | | | | | | |
| Receiving-27 Days | $2.16^{ab}$ | $2.09^{ab}$ | $2.30^{a}$ | $2.30^{a}$ | $1.88^{b}$ | $1.92^{b}$ | $2.45^{a}$ |
| Grazing-82 Days | $1.24^{a}$ | $1.36^{a}$ | $1.08^{b}$ | $1.34^{a}$ | $1.24^{a}$ | $1.36^{a}$ | $1.31^{a}$ |
| Overall-109 Days | $1.48^{ab}$ | $1.54^{ab}$ | $1.38^{b}$ | $1.58^{a}$ | $1.40^{b}$ | $1.49^{ab}$ | $1.59^{a}$ |
| Daily Feed Intake, lb: | | | | | | | |
| Receiving-27 Days | $14.2^{ab}$ | $14.5^{a}$ | $14.0^{b}$ | $13.8^{b}$ | $13.4^{b}$ | $13.8^{b}$ | $14.6^{a}$ |
| % of Body Wt. | 2.88 | 3.05 | 2.88 | 2.86 | 2.78 | 2.83 | 2.98 |
| Feed/Gain, lb | $6.6^{b}$ | $7.0^{ab}$ | $5.0^{c}$ | $6.0^{c}$ | $7.2^{a}$ | $7.2^{a}$ | $6.0^{c}$ |
| Rumen Parameters, Day 27: | | | | | | | |
| pH | $6.78^{b}$ | $6.72^{b}$ | $6.82^{b}$ | $6.45^{a}$ | $6.51^{a}$ | $6.83^{b}$ | $6.72^{b}$ |
| Ammonia, mmoles/l | $3.39^{b}$ | $5.30^{ab}$ | $.48^{c}$ | $5.25^{ab}$ | $3.65^{b}$ | $5.69^{ab}$ | $3.14^{b}$ |
| Total VFA's, mmoles/l | $72.7^{b}$ | $73.3^{b}$ | $55.6^{c}$ | $87.7^{ab}$ | $76.6^{b}$ | $60.6^{c}$ | $64.6^{c}$ |
| Propionic Acid, mmoles/l | $10.9^{b}$ | $12.1^{b}$ | $10.9^{b}$ | $17.2^{a}$ | $16.9^{a}$ | $12.2^{b}$ | $10.2^{b}$ |

[abc]Means with different superscripts differ (P<.05).