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# Effect of Pregrazing Diet on Early Season Gains by Stocker Steers Grazing Rye-Ryegrass

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## Summary

Alfalfa hay, kleingrass hay, and a feedlot grain mixture, with and without a microbial supplement, were compared as pregrazing diets. Stocker steers were fed the four grain- or hay-based diets for 3 weeks before being turned out on a rye-ryegrass pasture. Weight gains did not differ significantly among the four pregrazing treatment groups of cattle while they were grazing rye-ryegrass. The steers gained an average of 2.97 lb daily for the first 90 days of the grazing season. Provided that forage quantity and quality are adequate, high rates of gain by stocker cattle grazing small-grain pastures may depend on feeding management that prevents gorging at turnout.

## Introduction

Annual ryegrass (*Lolium multiflorum* L.) and small-grain forages in vegetative stages of growth typically have dry matter digestibility values of more than 70%. The crude protein (CP) content of these forages ranges from 20 to 30%. In some instances, young cattle grazing lush, cool-season annual grass pastures have gained 3 lb or more daily (Lippke and Forbes 1993). More commonly, however, average daily gain (ADG) ranges from 1 to 1.5 lb early in the grazing season. Such low growth rates are inconsistent with the high digestibility and CP values of the forages being consumed.

Researchers have found that (1) intake of immature ryegrass was only 70% of expected values (Lippke 1986), (2) only half the nitrogen in fresh ryegrass forages consumed by young cattle is absorbed by the small intestine (Beever 1984), and (3) both observations may be caused by digestive upset that results from gorging at turnout (Lippke and Warrington 1984, Allison et al. 1975). The change in microbial population of the rumen and reduced efficiency of microbial assimilation of nitrogen occasioned by digestive upset may persist for weeks. Some experiments have revealed that feeding supplements of dried yeast culture increased the flow of microbial protein leaving the rumen.

**Keywords:** cattle / grazing / rye / ryegrass / forage quality.

In a previous experiment (Lippke and Forbes 1993), stocker cattle gained at high rates on wheat pasture after having been fed limited amounts of alfalfa (*Medicago sativa* L.) hay during the pregrazing period and free-choice hay during the hours just before turnout. This experiment was conducted to test the hypothesis that rate of growth of stocker cattle grazing cool-season annual grass pastures is affected by the nature and digestibility of pregrazing diets.

## Procedure

Forty No. 2 Mexican steers that had been grazing kleingrass (*Panicum coloratum* L.) pasture were weighed after an overnight fast and were blocked by weight and randomly allotted within blocks to four treatment groups. Body condition scores were also recorded at the initial weighing. Each group was randomly assigned to one of four pregrazing diets: (1) alfalfa hay, (2) kleingrass hay plus cottonseed meal, (3) grain mixture, (4) or grain mixture with YEA-SACC1026. The components of the grain mixtures are shown in Table 1, and the compositions of all four diets are shown in Table 2. Hays were chopped and fed at the rate of 1% (air-dry basis) of body weight (BW) twice daily. Grain mixtures were fed at the rate of 1.2% BW twice daily. For those groups fed the grain mixtures, kleingrass hay was gradually removed from the diet over a 3-day period. The steers that were fed kleingrass were also given cottonseed meal once daily at the rate of 1.1 lb/animal. All diets were fed for at least 3 weeks.

**Table 1. Feedstuff components of grain-based diets.**

| Feedstuff | Basic mixture | YEA-SACC mixture |
|---|---|---|
| | ..... %† ..... | |
| Ground sorghum grain | 51 | 51 |
| Cottonseed meal | 23 | 22.78 |
| Cottonseed hulls | 17 | 17 |
| Molasses | 7 | 7 |
| $CaCO_3$ | 2 | 2 |
| YEA-SACC$^{1026}$ | | 0.22 |

†Air-dry basis

**Table 2. Composition of pre-grazing diets.**

| Diet | CP | NDF | ADF |
|---|---|---|---|
| | | % | |
| Alfalfa | 16.7 | 51.1 | 33.2 |
| Kleingrass | 6.7 | 71.4 | 42.3 |
| Grain mix | 17.9 | 28.6 | 18.2 |
| Grain + YEA-SACC[1026] | 17.6 | 29.6 | 16.0 |

The pasture area (40 acres) was sown with 20 lb/acre of ryegrass and 80 lb/acre of rye (*Secale cereale* L.) during the first week of October. It was irrigated immediately after planting and again during the first week in November. Soil analyses indicated no need for fertilizer and none was applied. The area was divided into four equal paddocks and stocked in mid-November when herbage mass was approaching 1,600 lb/acre. Paddock sizes were reduced to 6.6 acres each in early December to maintain herbage mass between 900 and 2,100 lb/acre.

On the day of turnout onto pasture, eight steers from each pregrazing treatment were randomly selected and assigned to the four pasture replications. In the hours just before turnout, all cattle were fed alfalfa hay free choice. The cattle were fasted overnight and weighed on the seventh day on pasture and each 28 days thereafter until the experiment was terminated in mid-February. At each weighing, the cattle replication groups were rotated sequentially among paddocks. A 1:2 mixture of salt and commercial mineral supplement was fed on alternate days at a rate to provide 0.25 lb/animal daily. One animal that had been on the basic grain diet during the pregrazing period was removed from the experiment in December because of moderately severe chronic bloat.

Samples of total herbage mass (clipped at ground level) and hand-plucked forage were taken at time of turnout and at bi-weekly intervals throughout the experiment. The samples were rapidly dried (< 1.5 hr) at 220 °F, composited by paddock, ground, and subsampled for determination of neutral detergent fiber (NDF), acid detergent fiber (ADF), and CP. When dead plant material began contributing significantly to total herbage mass in January, the samples were first coarsely ground after drying and an aliquot was taken to determine by microscopic examination the proportion of dead material.

## Results and Discussion

Differences among the ADG were not significant in the pregrazing treatment groups. The overall ADG from day 7 to day 91 on pasture was 2.97 lb. The patterns of body weight changes in the treatment groups are shown in Figure 1. Even though the steers were fasted overnight before each weighing, gut fill was undoubtedly greater at the initial weighing than it was at the weighing after 7 days on the rye-ryegrass pasture. Condition scores ranged from 2 to 4 on a 10-point scale and averaged 3.4, indicating a capacity for compensatory gain. This was reflected in the patterns of weight change (Fig. 1), where ADG in the last 28-day period (2.54 lb) was only 75% ($P < 0.05$) of that in the first period (3.38 lb). However, improving body condition with time on pasture was confounded with other dynamic factors such as herbage mass (Fig. 2) and climatic conditions.

Forage quality probably did not contribute to declining rates of gain with time. Figure 3 shows the

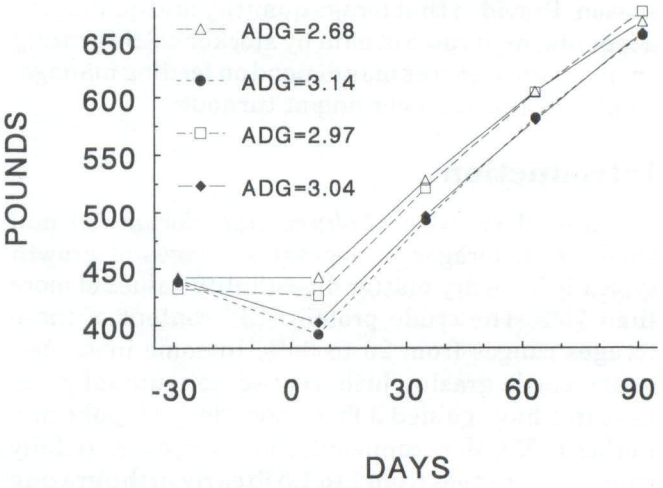


**Figure 1. Average shrunk body weights of stocker steers fed grain mixture (△), grain mixture with YEA-SACC (□), alfalfa hay (♦), or kleingrass hay (•) during the pregrazing period. Turnout was at Day 0.**

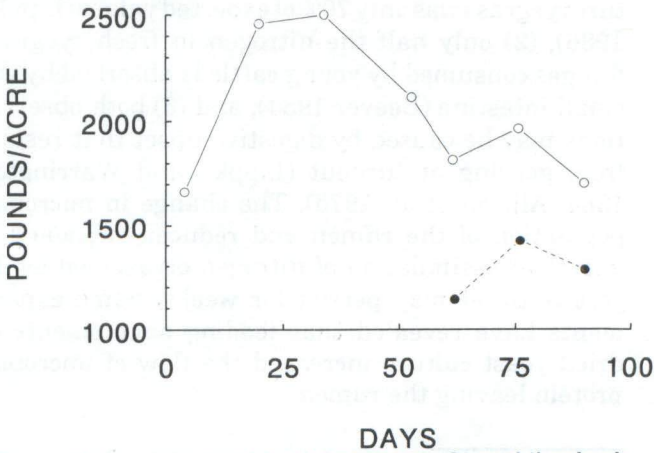


**Figure 2. Average total herbage mass (O) and live herbage mass (•).**

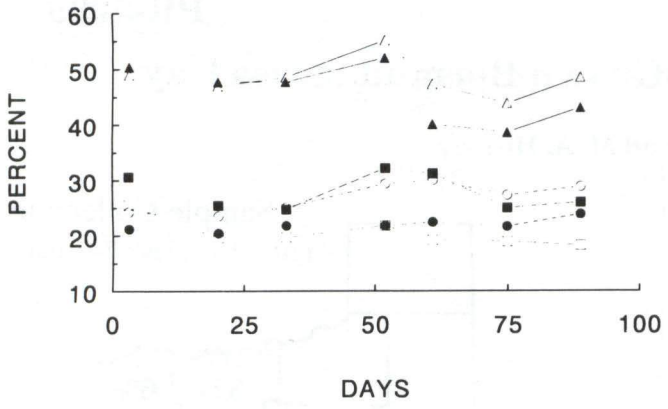


**Figure 3. Level of NDF (Δ), ADF (O), and protein (❑), in clipped forage and level of NDF (▲), ADF (•), and protein (■) in plucked forage.**

pattern of changes in NDF, ADF, and CP of clipped and plucked samples of forage. The content of these components changed relatively little except for a major drop in NDF in January followed by a slight rise in mid-February. Forage samples that are plucked from the sward in a manner to simulate that part selected by grazing cattle are generally regarded as having a higher nutritive value than the total sward. With forage nutritive value negatively related to the levels of NDF and ADF and positively related to the level of protein, the differences in these measures between clipped and plucked forage samples were expected.

The factors common to all pregrazing treatments, i.e., restricted diets followed by free-choice alfalfa hay fed just before turnout, may have been responsible for the similar high rates of gain for all four pregrazing treatment groups. Provided that forage quantity and quality are adequate, high rates of gain on ryegrass - small-grain pastures may depend simply on achieving enough pregrazing rumen fill to prevent gorging on lush small-grain forage. This hypothesis will be explored in future research.

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