Pasture Supplementation of Distillers Dried Grains to Growing Heifers in Southern Iowa

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Introduction

The rapid growth of the ethanol industry in the upper Midwest is well documented. This growth affects the Iowa cattle industry on several levels. Increased demand for corn puts pressure on feed and pasture costs and availability. However, increased production of dried distillers grains with solubles (DDGS) may provide an economical supplement to provide nutrients and stretch pasture supplies. DDGS have many benefits for forage based beef production. Relatively high levels of undegraded protein, can be needed early in the grazing season. Low levels of starch and high levels of phosphorous complement forage based systems. Convenient and cost effective systems of feed delivery may limit the successful application of supplementation programs incorporating DDGS. Also lower levels of supplements may simply stimulate feed intake rather than substitute for forage intake. This study was designed to evaluate two levels of DDGS supplementation with grazing heifers under Southern Iowa grazing conditions.

Materials and Methods

Eighty-eight fall born Angus heifers were blocked by sire and weight and randomly allotted to eight pastures and three supplement treatments. The three treatments were a non-supplemented control (CONT), medium level of supplementation (MED) and a high (HIGH) level of supplementation. These supplementation levels represented approximately .5 (MED) and 1.1 (HIGH) percent of the heifers body weight as dried distillers grains with solubles (DDGS). The eight pasture groups consisted of 16 paddocks ranging from 3.09 to 3.36 acres. Twelve of the paddocks consisted primarily of mixed cool-season grasses. The remaining four paddocks contained a mixture of cool- and warm-season grasses. A two-pasture rotation was used for each replication. Two replications of the cool-season pastures were assigned to each of the three supplement treatments. The pastures containing the warm-season grasses were assigned to the MED treatment. Stocking rate differed by treatment. For each replication 9, 11, or 13 cattle were assigned to CONT, MED, and HIGH levels, respectively.

The heifers were weighed, condition scored, and assigned to treatments on May 10, 2007. On July 6, they were re-weighed, condition scored, poured with Dectomax (doramectin, Pfizer), and tagged with organophosphate ear tags for fly control (Dominator, Schering). Final weights and condition scores were collected on September 27. Initial and final weights were taken with cattle off water and pasture 14 hours. Total grazing days were 136. All cattle were given access to a free choice mineral containing 12% Ca, 8% P, 10% salt, 2500 ppm Mn, 3000 ppm Cu, 23 ppm Ca, 30 ppm Se, 5,000 ppm Zn, 300,000 IU/lb Vitamin A, 35,000 IU/lb, Vitamin D, and 500 IU/lb Vitamin E (as-fed). Supplemental rates were adjusted periodically for changes in cattle weights to target .5 and 1.1% of body weight for MED and HIGH treatments, respectively. Pelleted distillers grain from an experimental pelleting process were available for use through the month of May. DDGS used June–September was in the meal form and was fed in portable bunks. The analyses of the DDGS used in this study are shown in Table 1. Pasture sward heights were measured in ten locations when cattle were rotated in and out of each paddock. The data were analyzed using the GLM procedure of SAS. There was no pasture type effect and it was dropped from the model.

Results and Discussion

The weights, daily gains, and condition scores of the heifers are shown in Table 2. Overall the weight gain of the heifers was less than expected. Weighing conditions may explain much of the relative differences in weight gain between the early and later part of the grazing season.

As might be expected, much of the response to supplementation came later in the grazing period. Overall, cattle on the high level of supplementation gained faster ($P < .05$) than controls. MED cattle gained faster than controls during the last 83 days. At the end of the experiment, supplemented cattle had higher condition scores, gaining .7 to .9 units during the grazing period, compared with controls.

Figure 1 shows the change in pasture sward heights by period. This clearly shows a reduction in pasture intake by the HIGH treatment compared with MED and CONT, especially early in the season. An attempt to calculate daily dry matter intake based on sward height reduction in grazed pastures and sward height growth in rested pastures yielded an estimate of 19.2, 18.5, and 10.8 for CONT, MED, and HIGH, respectively. Considerable variation existed in sward height data and these values are quite high compared with expectations. The relative differences do appear to confirm that supplementing DDGS at .5% of the animal's body weight may not reduce pasture intake. Supplementing at 1.1% of the animal's body weight seemed to substitute for pasture.

Summarized in Table 3 are pasture productivity and pasture supplement costs. These costs are not intended to reflect total cost of production, only those costs that change given changes in the rate of supplementation. Given changes in stocking rates, (22 and 44% increase for MED and HIGH) and daily gain responses, gain per acre increased 90 and 204 lb for MED and HIGH supplementation levels. Assuming pasture costs of $50/acre and DDGS costs of $150/ton, costs per lb of gain actually increased with MED and HIGH level of supplements. This study supported the concept of using supplemental DDGS to increase pasture productivity, however feeding levels greater than 1% of body weight may be necessary to have a significant substitution effect on pasture consumption, and to lower costs of gain given current feed and pasture cost relationships.

Acknowledgements

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Table 1. Analysis of distillers grains used to supplement grazing cattle.

Item	DDGS pellets	DDGS meal
Dry matter, %	91.6	88.6
	--------------DM basis------------------	
Crude protein, %	29.3	29.7
NDF, %	24.0	22.0
Fat, %	13.7	12.8

Table 2. Performance of grazing heifers supplemented with DDGS.

	CONT	MED	HIGH
Initial weight, lb	438 ± 13	439 ± 9	445 ± 11
July 6 weight, lb	566 ± 16	544 ± 10	558 ± 13
Sept. 27 weight, lb	592 ± 17[c]	616 ± 11[c,d]	645 ± 14
Initial condition score	3.94 ± .13	3.88 ± .09	3.84 ± .11
July 6 condition score	3.83 ± .17	3.98 ± .11	4.23 ± 14
Sept. 27 condition score	4.11 ± 19[a]	4.59 ± .12[b]	4.73 ± .16[b]
ADG May 10–July 6, lb	.31 ± .10[a]	.86 ± .06[b]	1.05 ± .08[a,b]
ADG July 6–Sept. 27, lb	2.41 ± .18[a]	1.97 ± .11[b]	2.14 ± 15[a,b]
Overall ADG, lb	1.13 ± .09[a]	1.30 ± .06[a,b]	1.47 ± .08[b]

[a,b]Means differ (P < .05)
[c,d]Means differ (P < .01)

Table 3. Pasture productivity and costs.

	CONT	MED	HIGH
Gain per acre; lb	223	313	427
DDGS/head/day, lb	---	2.69	6.05
Pasture and supplement cost			
Cost/acre[a]	$50	$99	$182
Cost/lb of gain	$.22	$.32	$.43

[a]Assumes $50/acre pasture rent and $150/ton for DDGS.

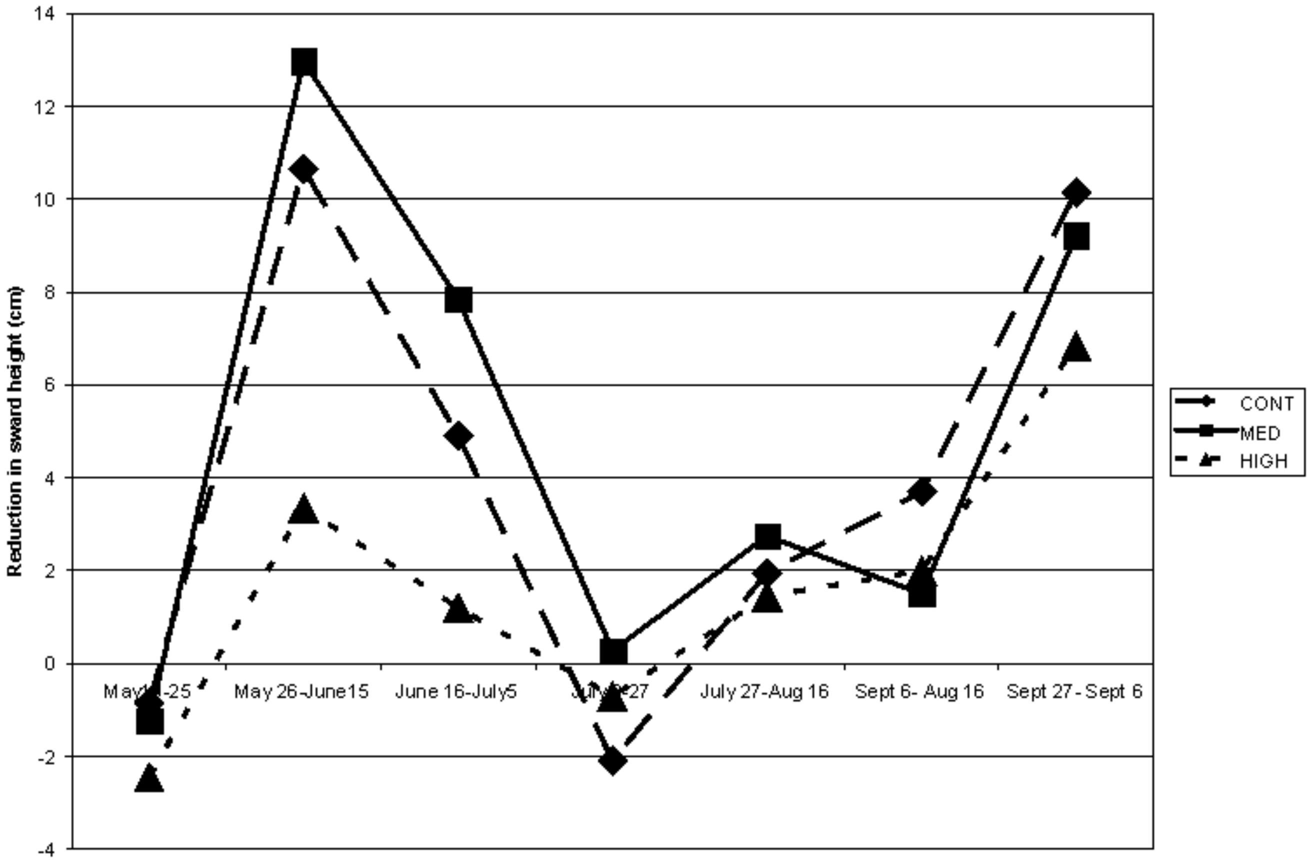

Figure 1. Reduction in paddock sward height by treatment.