

Supplementing Distillers' Grains *to beef cattle grazing on pasture*

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Introduction

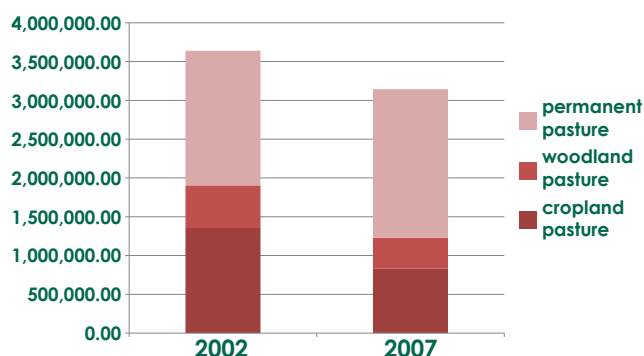
The ethanol industry is rapidly expanding nationally and Iowa is the center of this expansion. According to the surveys published periodically by the Renewable Fuels Association (RFA, 2009) the ethanol industry produced 9 billion gal of ethanol in 2008. Over 1/3 of this production is in Iowa. Assuming that 1 bu of corn produces 2.7 gal of ethanol, then it is anticipated that ethanol production consumed 3.3 billion bu of the U.S. corn crop. If 18 lb of dried distillers' grains (DDG) are produced per bushel, then the production of distillers' grains was approximately 30 million T in 2008. As a point of reference, the 2007 calf crop in the United

States totaled 42 million dairy and beef calves (USDA Census of Agriculture). This represents approximately 1500 lb of distillers' grains for each calf born in 2007. Of course some distillers' grains will be fed to other species and some will be exported to other countries. However, this puts into perspective the quantity of feed product that was produced annually.

The expanded ethanol industry has increased competition for land use in Iowa. While data is not available on current quantities of grazing land in Iowa, the USDA Census of Agriculture confirms a reduction of nearly 16% between 2002 and 2007 (Figure 1). Clearly the forage resource base for Iowa beef production is shrinking. This has implications for Iowa beef cow numbers in the future, depending on the extent to which distillers' grains and other supplemental feeds can replace this resource. On the individual farm level, faced with a shrinking pasture base, producers may maintain cow numbers, causing overgrazing, or reduce cow numbers and face increased costs per head. Long term, both of

these options are likely unsustainable from an ecological and an economical perspective. A third option in this scenario is using the newly abundant corn co-products from ethanol production to substitute for forage and pasture nutrients lost. To explore the opportunities of this third option, a three-year project was conducted by members of Iowa State University Extension and the Iowa Beef Center, with funding from the Leopold Center for Sustainable Agriculture. This project, consisting of grazing demonstrations, stocker studies, and a survey for producers and consultants, evaluated the opportunities and limitations to utilizing corn co-products from the ethanol industry to provide low-cost nutrition through low input delivery systems to beef cattle in extensive production environments.

Figure 1: Iowa Pasture Acres, 2002 and 2007, USDA



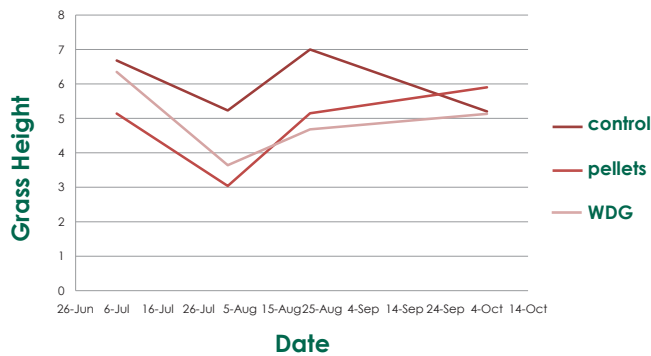
ISU Distillers' Grains Projects

PRODUCER GRAZING DEMONSTRATIONS

Two beef producers participated in demonstrations evaluating the supplementation of distillers' grains in grazing situations for cow-calf operations. On the Henry Langstraat farm in Lucas County, IA, the herd was divided into three groups, in three separate pastures. The three groups of cow-calf pairs received either (1) no supplementation, (2) 6 lb of 50% DDG, 50% soyhulls (pellets) every other day, or (3) 12 lb of wet distillers' grains every other day. The supplementa-

tion continued for 58 days. Body condition scores and grass heights were measured throughout the study. The cost of supplementation was \$.18 per day for the pelleted mixture and \$.045 per day for the wet distillers' grains. The results from this demonstration showed that grass heights tended to recover more quickly in the supplemented groups, as shown in Figure 2.

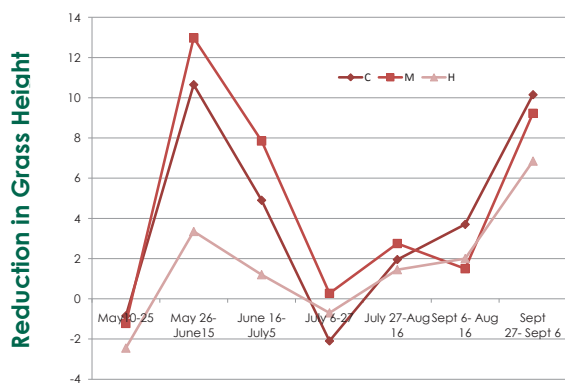
Figure 2: Grass Height Change in Lucas Co. Demonstration



Cow-calf pairs on the Ron Dunphy farm in Union County, IA, were split into two groups that both grazed on high quality, improved pasture that had abundant availability. One of the two groups was supplemented with 5 lb of a 60% DDG-based cube every other day, at a cost of \$.25 per day for 60 days, while the other group received no supplementation. No changes were observed in grass height between treatments. The results may indicate a trend for supplemented cows to lose condition at a slower rate during the supplementation period.

Generally, supplementing DDG in these grazing demonstrations on summer pasture with cow-calf pairs did not appear to substitute for summer pasture to a great extent. Low rates of substitution and generally abundant forage supplies likely contributed to these differences. Observations on producer acceptance of supplementation delivery methods and timing, initial palatability and acceptance by the cattle, and cost differences among supplement types were important observations noted in these demonstrations.

Figure 3: Reduction in Paddock Sward Height by Treatment



the group supplemented the lower rate. The cattle fed the highest rate of DDG supplementation appeared to consume less grass per head as shown in the reduction of pasture sward height (Figure 3). Cattle on the three treatments gained 223, 304 and 830 lb per acre. This increased productivity was due to a combination of an increased rate of gain for supplemented cattle and also the stocking rate. The cattle were fed a 100% pelleted DDG pellet for the first half of the study, then switched to typical DDG meal fed in bunks for the remainder of the study. Bunk feeding appeared to control the waste, but increased the labor required when rotating pastures.

In the second stocker study at the McNay Farm, unsupplemented heifers were compared to those supplemented with 1.5% of their body weight of Dakota Bran. Dakota Bran is a co-product produced by a fractionation process where the corn germ is separated and oil partially removed prior to fermentation. The corn bran is also removed at that time and the remaining endosperm fraction is used for ethanol fermentation. Dakota Bran is a combination of corn bran and condensed distillers' soluble. This feedstuff can be more easily pelleted, making it an attractive grazing supplement from a handling perspective. During the supplementation period, cattle fed the Dakota Bran gained 1.48 lb per day compared with .79 lb per day for the control cattle. Calculations based off sward height measurements indicated that the supplemented cattle consumed 26.8% less pasture. Gain per acre increased by approximately 100 lb and at a similar cost based on the costs at the time of the study.

MCNAY STOCKER SUPPLEMENTATION STUDIES

To evaluate the effect of rates of distillers' grain supplementation on substitution for pasture, two stocker grazing studies were conducted at the ISU McNay Research Farm near Chariton, Iowa. In the first year, three groups of growing heifers were compared. They were grazed for 136 days and supplemented with 0, .5 or 1.1% of their body weight with DDG. Stocking rates were increased 22% and 44% for the two respective supplemented treatments. Estimates of pasture consumption, based on sward height measurements, suggested no difference between the control and

BEEF PRODUCER AND CONSULTANT SURVEY

Two surveys were conducted to assess producers' and consultants' attitudes toward the challenges in supplementing corn co-products in extensive production systems. The surveys were sent to 2,145 producers and 164 veterinarians and feed consultants. When asked about the reasons for supplementing grazing cattle with co-products, 38% mentioned increased carrying capacity as the primary reason. Other important reasons for supplementation noted were supplemental nutrition (33%), average daily gain (33%), and reduced cost. Additional reasons mentioned were conception rates (19%), easier to check and gather (15%), and improved health (12%). When asked about the extent of improvement in carrying capacity expected by supplementation, 43% indicated a 5 to 10% improvement was expected. The veterinarians and feed consultants were less certain as to the expected response, with 30% answering that they were not sure. When asked about the challenges in supplementing cattle on pasture with distillers' grains, producers listed weather (70%), labor (42%), fuel cost (42%) and site accessibility (36%). The consultants listed site accessibility (61%), weather (48%), feeding losses (42%), and labor availability (42%) as the primary limitations. The producers indicated that 61% fed the cattle daily and estimated an additional one to five hours per week in labor. The top three feeding methods were bunks (52%), but tires and hay rings were also used, and some respondents indicated they fed the supplementation directly off the ground.



Cattle fed distillers' grains at the ISU McNay Research Farm, shown here, experienced an increased rate of gain and consumed less grass.

WHAT WE LEARNED

The following are useful observations from the preceding projects:

- 1. Acceptance/animal performance.** In general the cattle readily consumed the products with little adjustment period. One exception was a demonstration with very high quality and readily available pasture. In that situation, a few individuals in the supplemented group did not consume the supplement readily.
Animal performance as measured by average daily gain, or body condition, was improved with higher levels of supplementation. At low supplementation levels, body condition was either not changed or improved by supplementation.
- 2. Physical form/waste.** While it was difficult to measure actual feed waste under the conditions of this project, several forms of distillers' grains were utilized and observations noted. The traditional meal form of dry distillers' grains is very finely ground and easily wasted by wind losses and trampling when feeding on the ground. When feeding this form it is advised to use feed bunks to reduce feeding losses. Feed bunks add to the labor challenge when using rotational grazing as a management system. Pelleting of dry distillers' grains is possible with the right technology, but is not a widely available feedstuff at this time. Pelleted co-products are available from the new generation of ethanol plants that use fractionation to reduce the oil content of the co-products. These feeds are an excellent option for supplementing cattle on grass. Other options that are widely available and can reduce feeding losses are pellets produced with mixtures of distillers' grains and other co-products, including soy hulls and corn gluten feed. Wet distillers' grains also can be an excellent pasture supplement if available locally.

3. **Timing/quantity.** While daily feeding is the most common supplementation program by producers, some may only supplement three or five times per week. In this project supplementation was conducted either every other day or five times per week with good results. Five times per week was the schedule used on the high supplementation levels (.5 to 1.5% of body weight). Every other day was an acceptable schedule on the cow supplementation demonstrations. Since labor can be an important issue in these programs, more research is needed to evaluate the tradeoffs relative to feeding frequency.
4. **Forage substitution.** For ethanol co-products to be effective in maintaining cattle numbers with decreased pasture, the cattle must reduce their forage consumption when supplemented. This project found little change in pasture consumption when supplementation was less than .5% of the animal's body weight. At supplementation levels of 1% or more, forage consumption decreased by as much as 26%. There are factors that likely can affect the level where forage substitution can occur such as forage quality and availability, the specific co-product used and animal age and stage of production. However, if the goal is to stretch pasture supply, levels of supplementation higher than expected may be required.

Summary

This three-year research and demonstration project was conducted to evaluate the supplementation methods, levels, and strategies utilizing corn co-products for beef cattle grazing forages. Through grazing demonstrations, supplementation studies, and producer and consultant surveys, we were able to make useful observations to offer a better understanding of the opportunities and limitations found in distillers' grains supplementation.

Study Partners

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Iowa Beef Center

The Iowa Beef Center at Iowa State University in Ames, Iowa, serves as the university's extension program to cattle producers. Our center is comprised of a dedicated group of faculty and staff from the College of Agriculture and Life Sciences, the College of Veterinary Medicine and Iowa State University Extension. We work together to develop and deliver the latest in research-based information to improve the profitability and vitality of Iowa's beef industry.

At the Iowa Beef Center, we strive to be the No. 1 source "For all things beef."



Leopold Center for Sustainable Agriculture

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