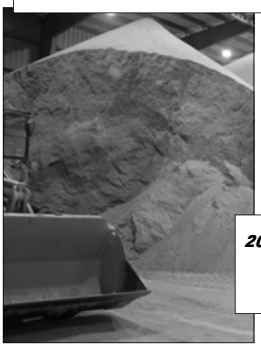
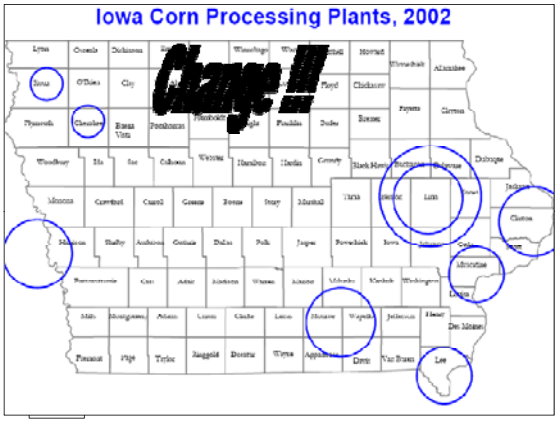
Feeding Distiller's Grains

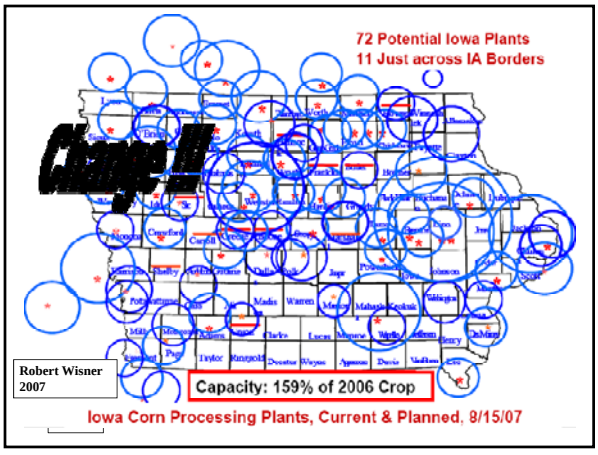


2007 **Gulf Coast Beef Nutrition Series**

Dr. Daryl Strohbehn
Extension Beef Specialist
Iowa Beef Center @ ISU

Iowa Corn Processing Plants, 2002





Ethanol Plants – Simple Standpoint

20-25 million tons of co-products!

- **56 lb bushel of corn**
  - **1/3 is Ethanol (about 2.8 gals)**
  - **1/3 is Distillers Grains (17-18 lbs)**
  - **1/3 is Carbon Dioxide**

Co-Products of Dry Milling

- Distiller's Grains (wet & dry)
- Condensed Distiller's Solubles
- Distiller's Grains w/solubles
- Modified Distiller's Grains w/solubles
- List has increased with corn fractionation

Distiller's Grains

Nutrient Value Rule of Thumb: 3x of Corn

- High protein source with good bypass value
- High fiber energy source with high digestibility
- Energy content - 125% of corn in forage diets
- High in fat content, this may limit amount used in rations
- Can be high in Sulfur and Phosphorus content - can be variable

Wet & Dried Distiller's Grains with Solubles

Typical Analysis	
Moisture	9-12% vs. 60-70%
Protein	30-36%
TDN	87-110%
Fat	9-12%
Phosphorus	.4-.7%
Sulfur	.4-.7%

Modified Distiller's Grains with Solubles

Typical Analysis	
Moisture	49-54%
Protein	26-32%
TDN	90-110%
Fat	11-16%
Phosphorus	.8-1.4%
Sulfur	.4-1.2%

Condensed Distillers Solubles

Typical Analysis	
Moisture	55-75%
Protein	14-23%
TDN	95-120%
Fat	15-24%
Phosphorus	1.3-1.5%
Sulfur	.9-1.4%

Feeding Limitations

- Driven by 3 nutrients and dependent on class of cattle
  - Fat level
  - Phosphorus
  - Sulfur

Beef Cow Limitations

- Fat content may limit inclusion rates in forage diets
- Current recommendation: don't exceed 5% - 6% fat in the diet on dry matter basis
- Usually don't recommend overfeeding protein, but with 30% crude protein and a need for low cost ration energy it is ok to do so.
- Phosphorus supplement will not be needed when feeding 2-4 lbs of DG dry matter.
- Monitor sulfur intakes and account for water sulfates.

Potential Problem: SULFUR

Ration Sulfur Content with DDG & Hay (0.2%)

DDG DMI %=>	10%	20%	30%	40%	50%
% S	3 lbs	6 lbs	9 lbs	12 lbs	15 lbs
0.4%	0.22%	0.24%	0.26%	0.28%	0.30%
0.6%	0.24%	0.28%	0.32%	0.36%	0.40%
0.8%	0.26%	0.32%	0.38%	0.44%	0.50%
1.0%	0.28%	0.36%	0.44%	0.52%	0.60%
1.2%	0.30%	0.40%	0.50%	0.60%	0.70%
1.4%	0.32%	0.44%	0.56%	0.68%	0.80%

Iowa Hay Analysis Summary 1994 -95 Average Sulfur Content = 0.2%

Does not include any sulfur from water source.

Research Trials

- 4 Winter or Drylot Feeding Trials with Cows or Pregnant Heifers
- 4 Grazing Trials or Demonstrations with cows
- 3 Developing Heifer Trials
- 3 Creep Feeding Trials

Summary Research/Demo Trials

- Winter or Drylot Feeding Trials
  - **All trials had favorable cow performance when distillers grains were included in treatment rations.**
- Grazing Trials or Demos
  - **All trials had favorable cow performance. Question remains how much forage dry matter intake is reduced. Certainly not a 1 for 1 replacement rate due to low effective fiber level and low feeding rates. Stay tuned.**

Summary Research/Demo Trials

- Developing Heifer Trials
  - Mixed results on traits measured, but generally distillers grains treated heifers were heavier, had equal or greater AI pregnancy rates, but were similar in overall pregnancy rates. Large trial results showed that calves were heavier at birth and weaning.
- Creep Feeding with Distillers Grains
  - Results showed that DDG as a protein source worked similar to SBM for ADG and Feed Conversion.

Stockers/Backgrounding

- Can supplementation with distiller's grains improve gain and substitute for forage intake?
- Yes

Rick Rasby, U of Nebraska

Response of Yearlings Grazing Pasture to Distillers Supplementation

Initial Weight, lb	ADG, Control, lb	Suppl. Rate, % of B.Wt.	ADG, Suppl. lb
638	1.6	.48	2.13
638	1.6	.92	2.49

- Each 1 lb of distillers replaced .5 lb of grass
- Economic return – for each $1.00 spent on distillers = $1.41 to $1.95 return
- Price of grass = $27.31/AUM = $80/T (680 lb DM/AUM)
- Price of distillers = $138/t DM at the pasture

2007 NE Beef Cattle Report

Conclusions from Grazing Cattle

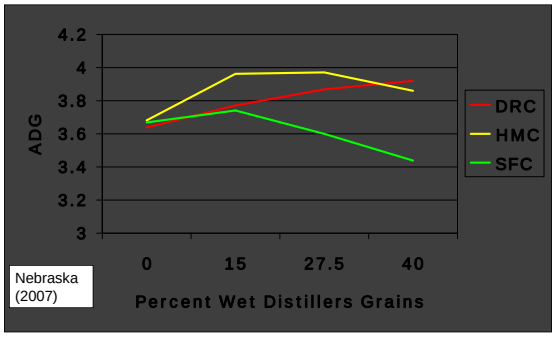
- Distiller's grains as a supplement for forage grazing
  - Compliments forage – no negative interactions
  - Improves or maintains nutritional status of the grazing animal (gain, body condition, etc.)
- Substitution rate
  - Thus far, for each 1 lb of DG dry matter included one replaces .4 - .6 lb forage dry matter

Distiller's Grains in the Feedlot

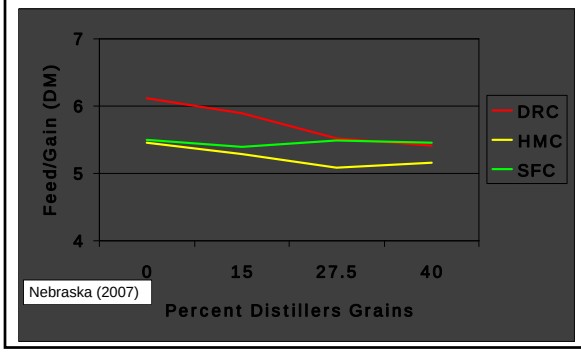
Distiller's Grains in the Feedlot

- Important facts about Distiller's Grains
  - Distiller's grains are superior nutritionally to corn grain
  - Wet distillers grain are superior to dried distiller's grains
  - Ethanol co-products work best in Upper Midwest Feeding situations

Corn Processing and Wet Distillers' Grains



Corn Processing and Wet Distillers' Grains



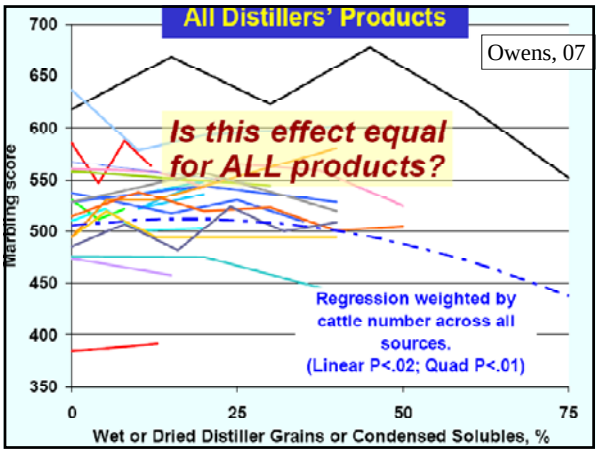
Nebraska (2007)

How Much Distiller's Grain Products Can be Fed to Finishing Cattle?

1. Depend on cost of co-products relative to corn grain
2. How much will cattle tolerate?
   - Fat content in DG
   - Fiber in co-products
   - Sulfur
   - Moisture
3. Environmental consequences of feeding higher levels - phosphorus

Do Distiller's Grain Impact Quality Grade?

- Data summary from Dr. Fred Owen, Pioneer Hybrid, a Dupont Business
- 11 trials using dried DG, 0 to 75% inclusion rates
- 15 trials using wet DG, 0 to 50% inclusion rates
- 3 trials using CDS, 0 to 20% rate
- Replaced grain in the ration.



Different Impact with Dried vs. Wet Distiller's Grains

- Wet DG + solubles – no significant decline in marbling up to 50% in ration.
- Dried DG + solubles – optimum rate was 17% inclusion in ration. Noticable reduction in Ch% once above 30% inclusion in ration.
- Why?
  - Fewer days on feed
  - Lighter carcass weight
  - Higher fat concentration in ration
  - Higher protein rations
  - Lower starch content in ration
  - Many other possibilities – more research !!!

Storage

Depends on DG product.

Condensed distiller's solubles

- Stored in tanks or concrete structures. Freezes!!!
- Looking at combinations with forages and stored.

Challenge: High Moisture DGs can deteriorate and mold rapidly, especially in warm weather

Delivery and Storage Challenges

Especially for Small to Moderate Size Beef Operations

McNay Farm
Bagging Modified Distillers Grain and Solubles

Approx. 1.25 tons/foot of bag

McNay Farm
Bagging 80% Wet DGS + 20% Ground Hay

Approx. 1.1 tons/foot of an 8' bag

Summary on Distiller's Grains

- Distiller's Grains will be increasingly available.
- Excellent source of protein & energy for all classes of cattle.
- How much can be fed will depend on economic trade off with feed grains, optimum fat intakes, phosphorus and sulfur.
- No reduction in Quality Grade at moderate inclusion rates.
- Low cost storage and feeding systems may be an obstacle for some small to moderate size operations.
- Producers will need to price these co-products against home-grown feeds and other feed options.