Distillers Grains Markets for the U.S. and Argentina

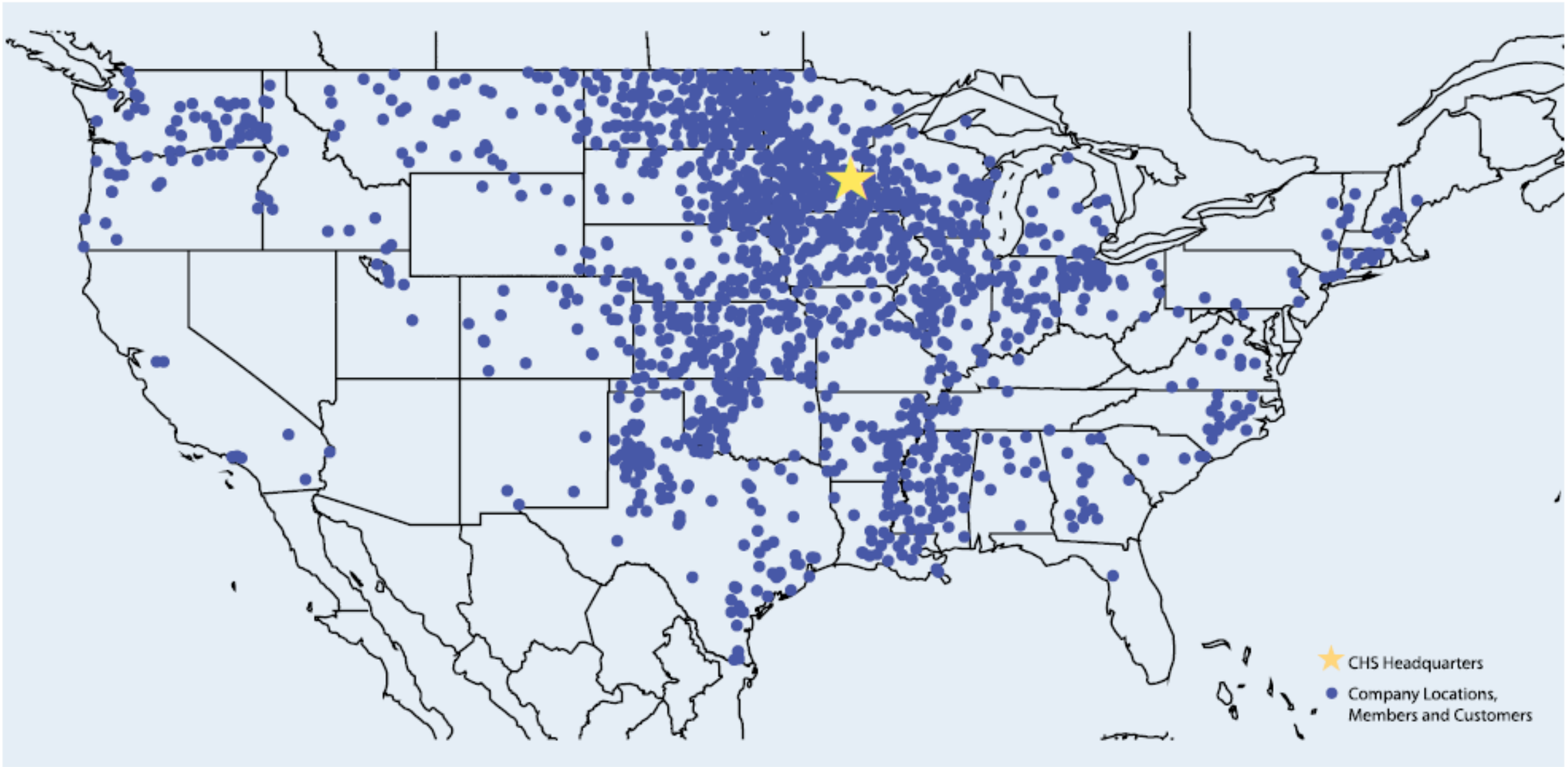
DEKALB RINDE

MONSANTO

Who We Are

- CHS is the nation's leading cooperative, owned by farmers, ranchers and co-ops across the United States.
- A diversified, global energy, grains and foods business, CHS is committed to helping producers, co-ops and other stakeholders grow their businesses.

CHS System Locations



Each dot represents a CHS location, member company or business affiliation

Global Grain Operations

Exclusive Marketing Agreements with CHS

Plant Name	Origin City	Monthly capacity in short tons	Rail Line
ABSOLUTE ETHANOL	MONA, IA	27,000	CP/CN
BIG RIVER UNITED ENERGY	DYERSVILLE, IA	30,000	CN
BLUE FLINT ETHANOL (UNDERWOOD)	COAL CREEK, ND	13,000	CP
BUSHMILLS ETHANOL	ATWATER, MN	13,000	BN
CARBON GREEN BIOENERGY	WOODBURY, MI	13,000	CSXT
CARDINAL ETHANOL	WINCHESTER, IN	27,000	CSXT
CENTER ETHANOL	SAUGET, IL	15,000	TRRA/ALS
CENTRAL INDIANA ETHANOL	MARION, IN	1300	NS
GLACIAL LAKES ENERGY	WATERTOWN, SD	27,000	BN
GLACIAL LAKES ENERGY	MINA, SD	27,000	BN
HIGHWATER ETHANOL	LAMBERTON, MN	15,000	CP
HOMELAND ENERGY SOLUTIONS	NEW HAMPTON, IA	30,000	CP
IROQUIOS BIO-ENERGY(RENSSELAER)	PLEASANT RIDGE, IN	13,000	CSXT
LINCOLN LAND AGRI ENERGY	ROBINSON, IL	13,000	INRD
LITTLE SIOUX CORN PROCESSORS	MARCUS, IA	24,000	CN
NUGEN ENERGY	MARION, SD	30,000	BN
PATRIOT ETHANOL	ANNAWAN, IL	27,000	IAIS
RED TRAIL ENERGY	RICHARDTON, ND	13,000	BN
REDFIELD ENERGY	REDFIELD, SD	13,000	BN
SIOUXLAND ENERGY(JACKSON)	TOM LYNCH, NE	13,000	BN
UNITED WISCONSIN GRAIN PRODUCERS	FRIESLAND,WI	13,000	UP
WESTERN NY ENERGY (MEDINA)	SHELBY, NY	13,000	FRR

CHS Services for Ethanol/DDGS Producers

Take all production

Eliminate credit risk

Manage transportation

Maximize value

Provide access to nutritional advice to support customer use

Provide industry leadership

CHS

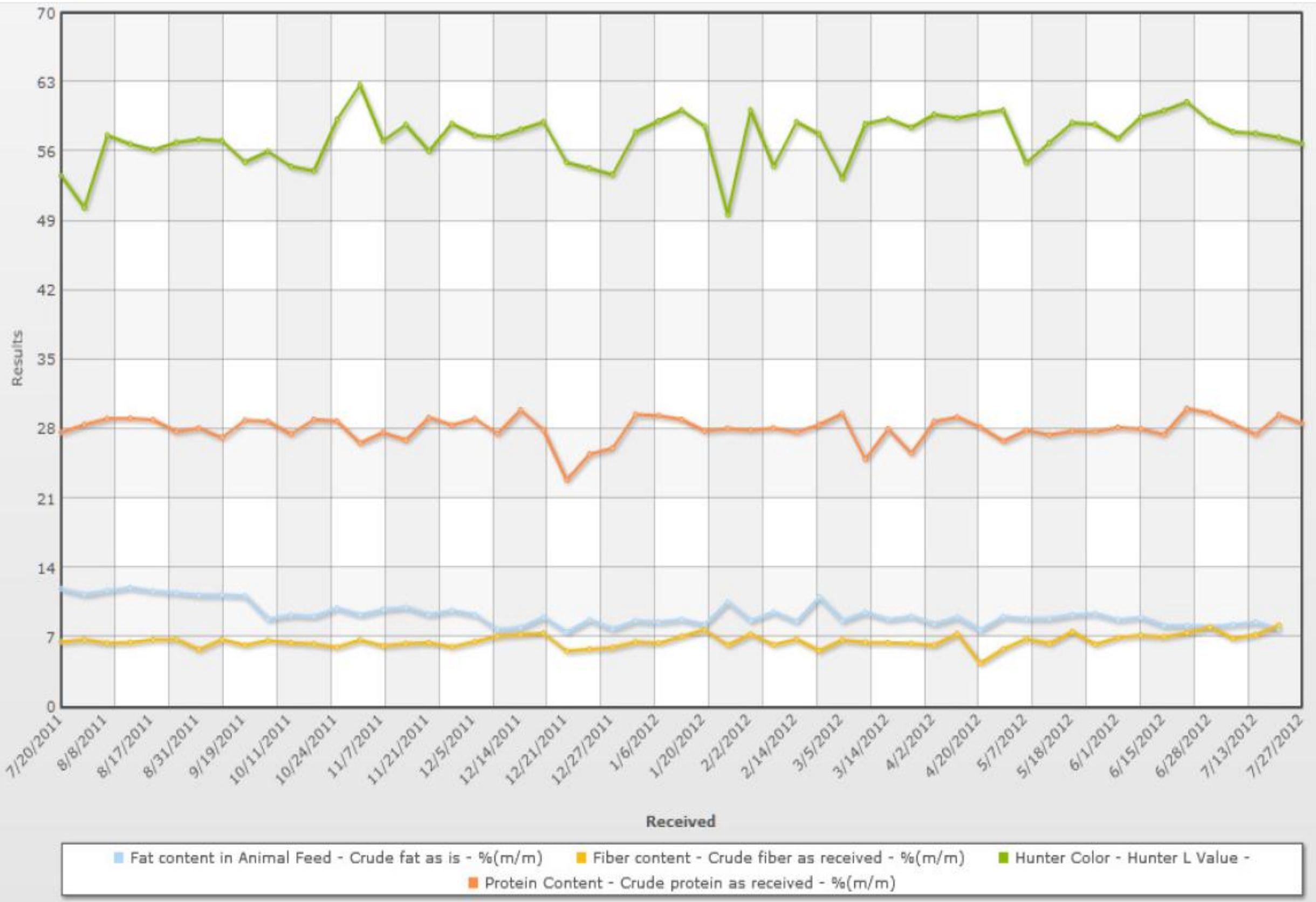
SGS

SGS North America
241 34th Ave
Brookings, SD 57006

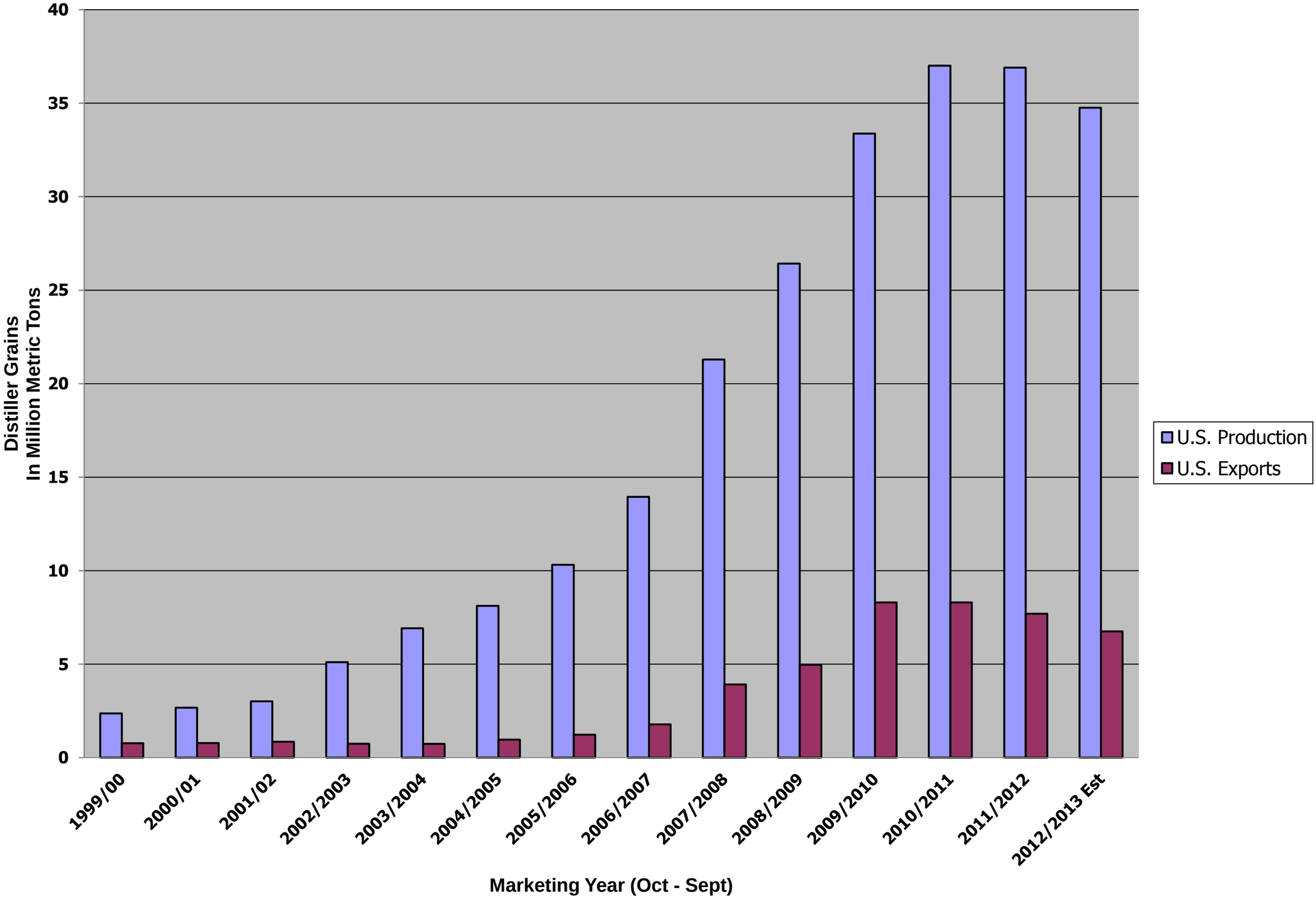
Certificate of Analysis

Analysis	Result	Units	Detection Limit	Uncertainity	Limits	Method
Hunter L Value	58.21		0.00			ColorFlex User's Guide, Ver. 2.5
Phosphorous content as received	1.00	%(m/m)	0.01			AOAC 968.08
Potassium content as received	1.11	%(m/m)	0.00			AOAC 968.08
Calcium content as received	0.02	%(m/m)	0.01			AOAC 968.08
Magnesium content as received	0.34	%(m/m)	0.00			AOAC 968.08
Zinc content as received	56.98	PPM	1.48			AOAC 968.08
Manganese content as received	12.59	PPM	0.09			AOAC 968.08
Copper content as received	5.09	PPM	0.08			AOAC 968.08
Iron content as received	68.99	PPM	0.24			AOAC 968.08
Sodium content as received	0.21	%(m/m)	0.00			AOAC 968.08
Sulfur content as received	0.57	%(m/m)	0.02			AOAC 968.08
Sugar as Invert	1.07	%	0.00			

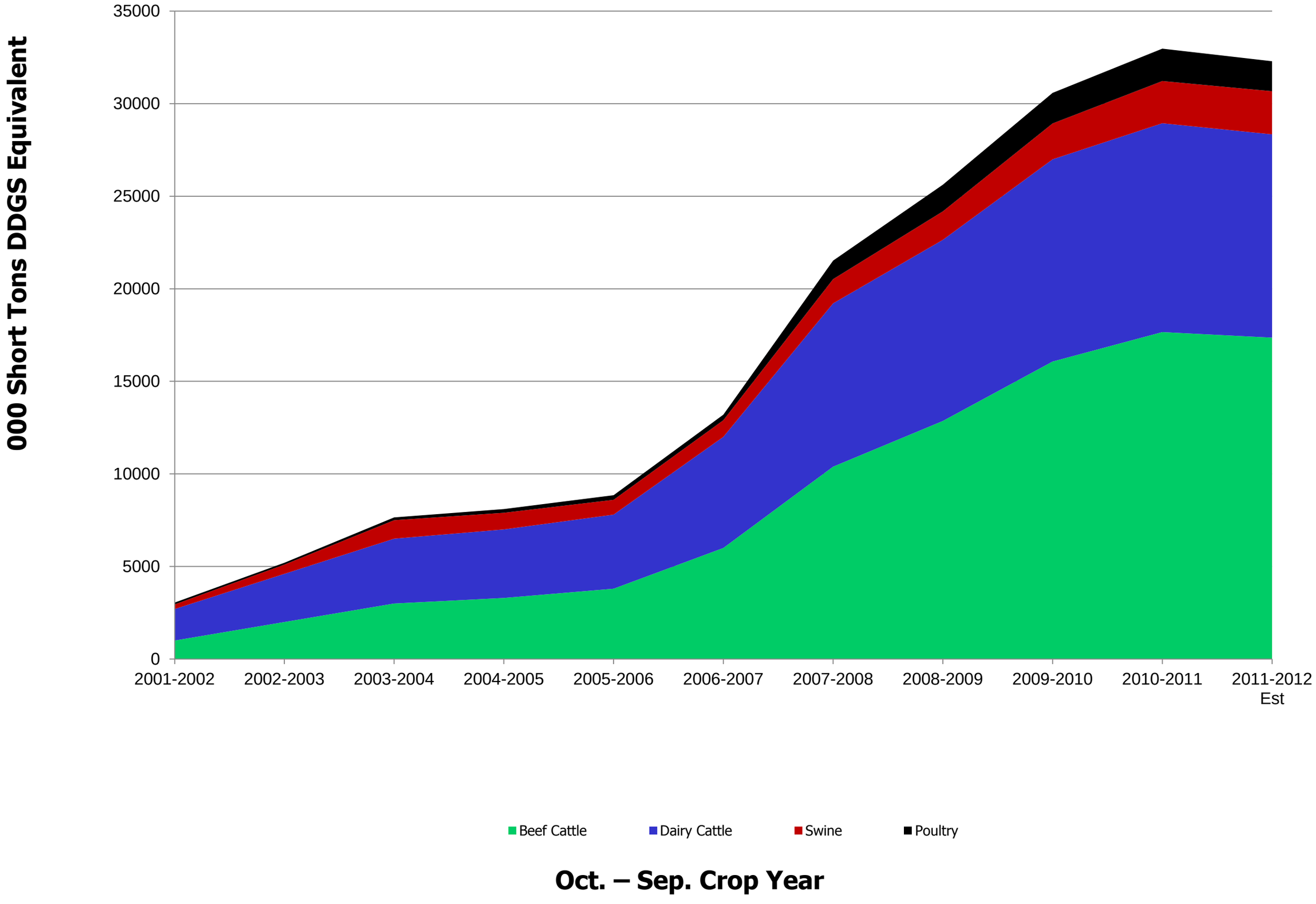
Analysis	As Received	On Dry Matter	Units	Method
Starch Content	3.100	3.421	g/100g	AOAC996.11
Moisture content	9.39	--	%(m/m)	NFTA 2.2.2.5
Drymatter content	90.61	--	%(m/m)	NFTA 2.2.2.5
Crude ash content	4.372	4.825	%(m/m)	AOAC 942.05
Crude fiber content	6.50	7.17	%(m/m)	AOAC 962.09
Acid detergent fiber	14.43	15.93	%(m/m)	Calculation
Total digestible nutrients	73.78	81.42	%(m/m)	Calculation
Net Energy Lactation	0.77	0.85	Mcal/lb	Calculation
Net Energy Maintenance	0.85	0.94	Mcal/lb	Calculation
Net Energy Gain	0.56	0.61	Mcal/lb	Calculation
Digestible Energy	1.601	1.766	Mcal/lb	Calculation
Metabolizable Energy	1.45	--	Mcal/lb	Calculation
NDF	25.41	--	%	ANKOM Technology Method 6
Crude fat content	9.79	10.80	%(m/m)	AOAC 2003.06
Crude protein content	27.79	30.67	%(m/m)	AOAC 972.43 (Nx6.25)


70
63
56
49
42
35
28
21
14
7
0
Results
7/20/2011
8/8/2011
8/17/2011
8/31/2011
9/19/2011
10/11/2011
10/24/2011
11/7/2011
11/21/2011
12/5/2011
12/14/2011
12/21/2011
12/27/2011
1/6/2012
1/20/2012
2/2/2012
2/14/2012
3/5/2012
3/14/2012
4/2/2012
4/20/2012
5/7/2012
5/18/2012
6/1/2012
6/15/2012
6/28/2012
7/13/2012
7/27/2012
Received
Fat content in Animal Feed - Crude fat as is - %(m/m)
Fiber content - Crude fiber as received - %(m/m)
Hunter Color - Hunter L Value -
Protein Content - Crude protein as received - %(m/m)

U.S. DDG Production and Exports



Composition of Domestic Usage

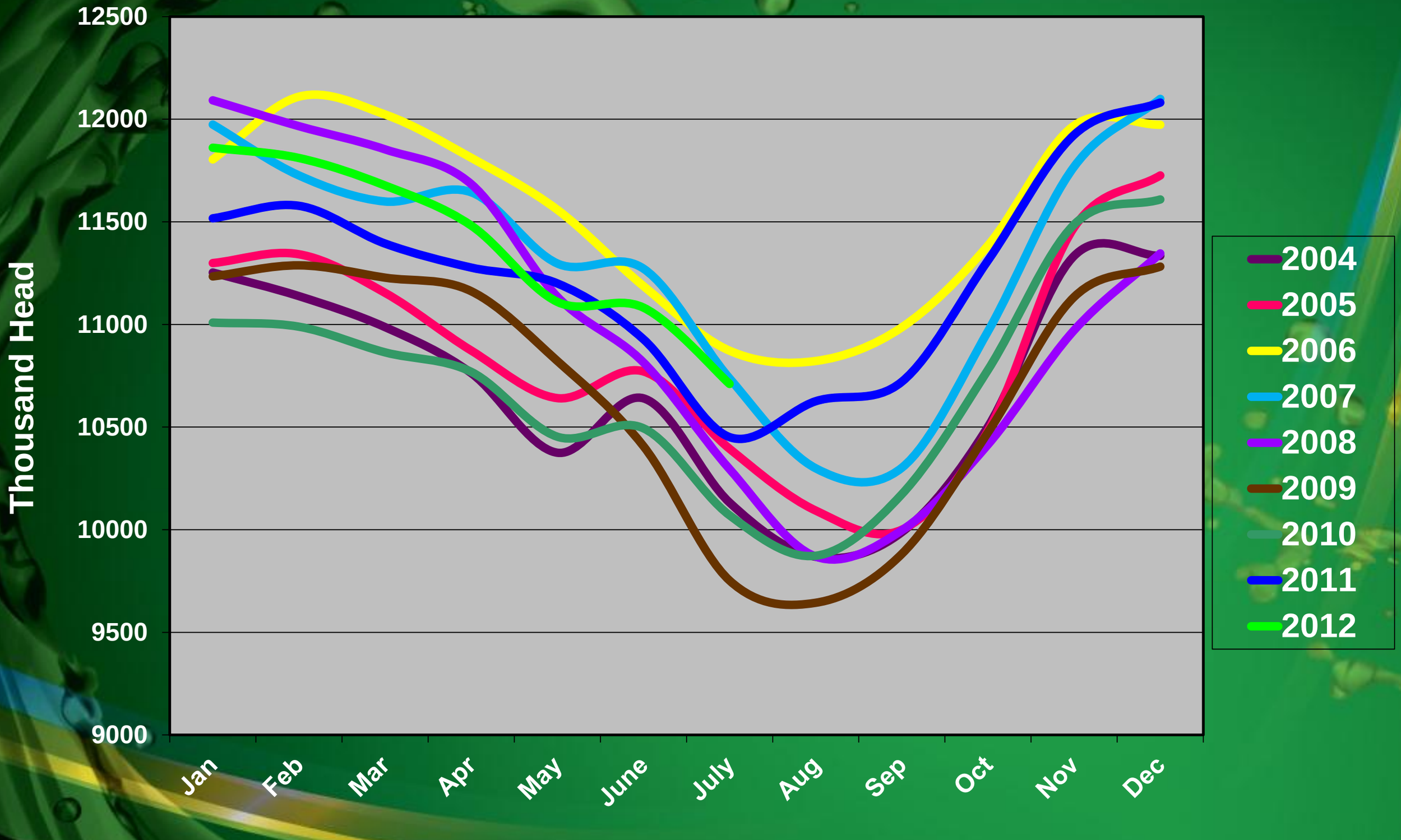


DDG Balance Table

	2006- 07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13 Est
Carryin (Sep 1)							
Production	13,951	21,294	26,422	33,253	37,007	36,696	34,758
Imports	191	145	251	409	434	350	400
Total Supply	14,141	21,439	26,673	33,783	37,438	37,046	35,158
Domestic Use	12,361	17,518	21,704	25,484	29,136	29,346	28,408
Exports	1,780	3,921	4,969	8,299	8,302	7,700	6,750
Total Use	14,141	21,439	26,673	33,783	37,438	37,046	35,158
Carryout (Aug 31)							
Export ratio	12.76%	18.41%	18.81%	24.96%	22.43%	20.98%	19.42%

X 1,000 Metric Tons

U.S. Cattle on Feed



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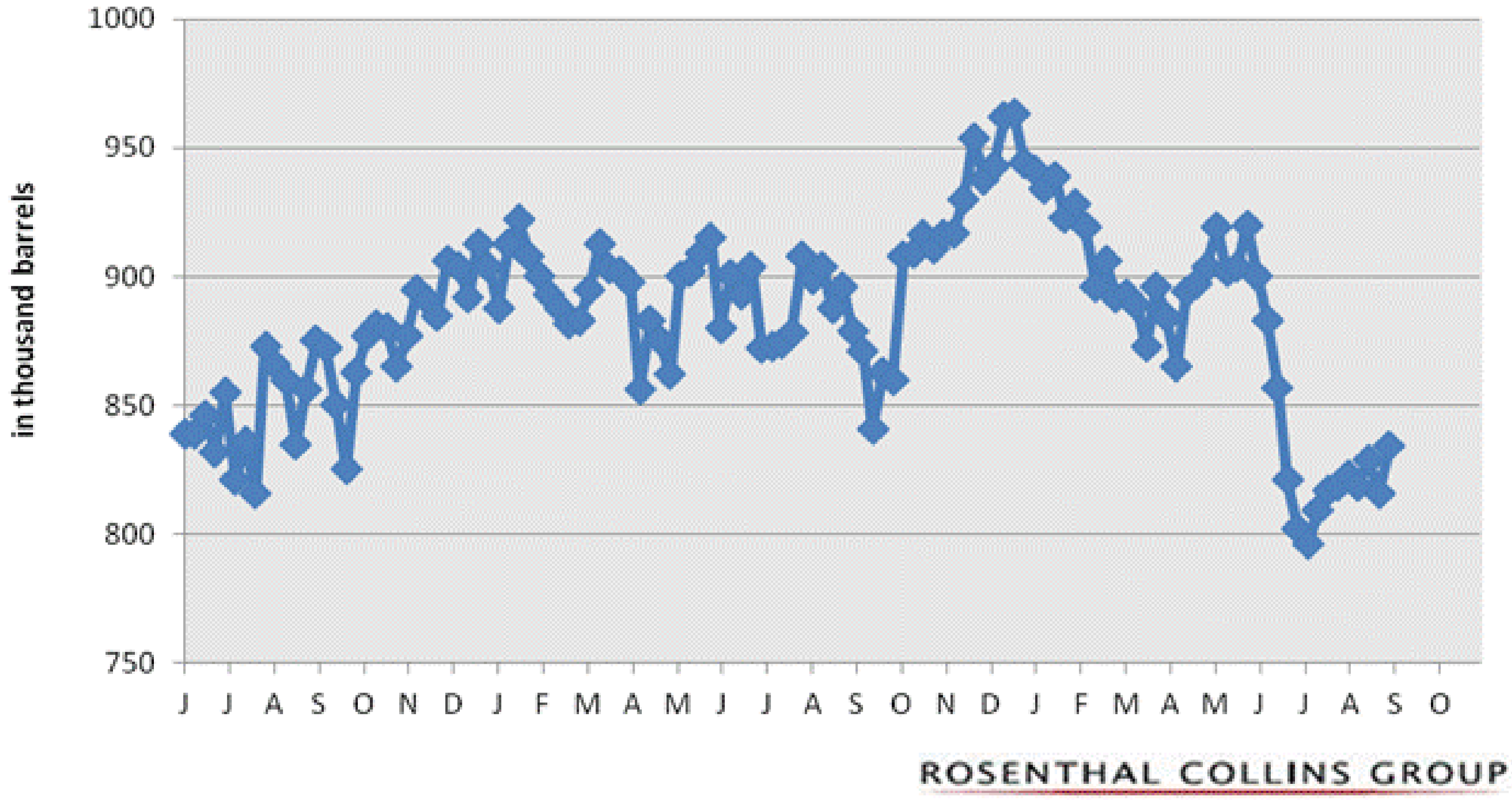
Weekly U.S. Fuel Ethanol Production

(Thousand Barrels per day)



ROSENTHAL COLLINS GROUP

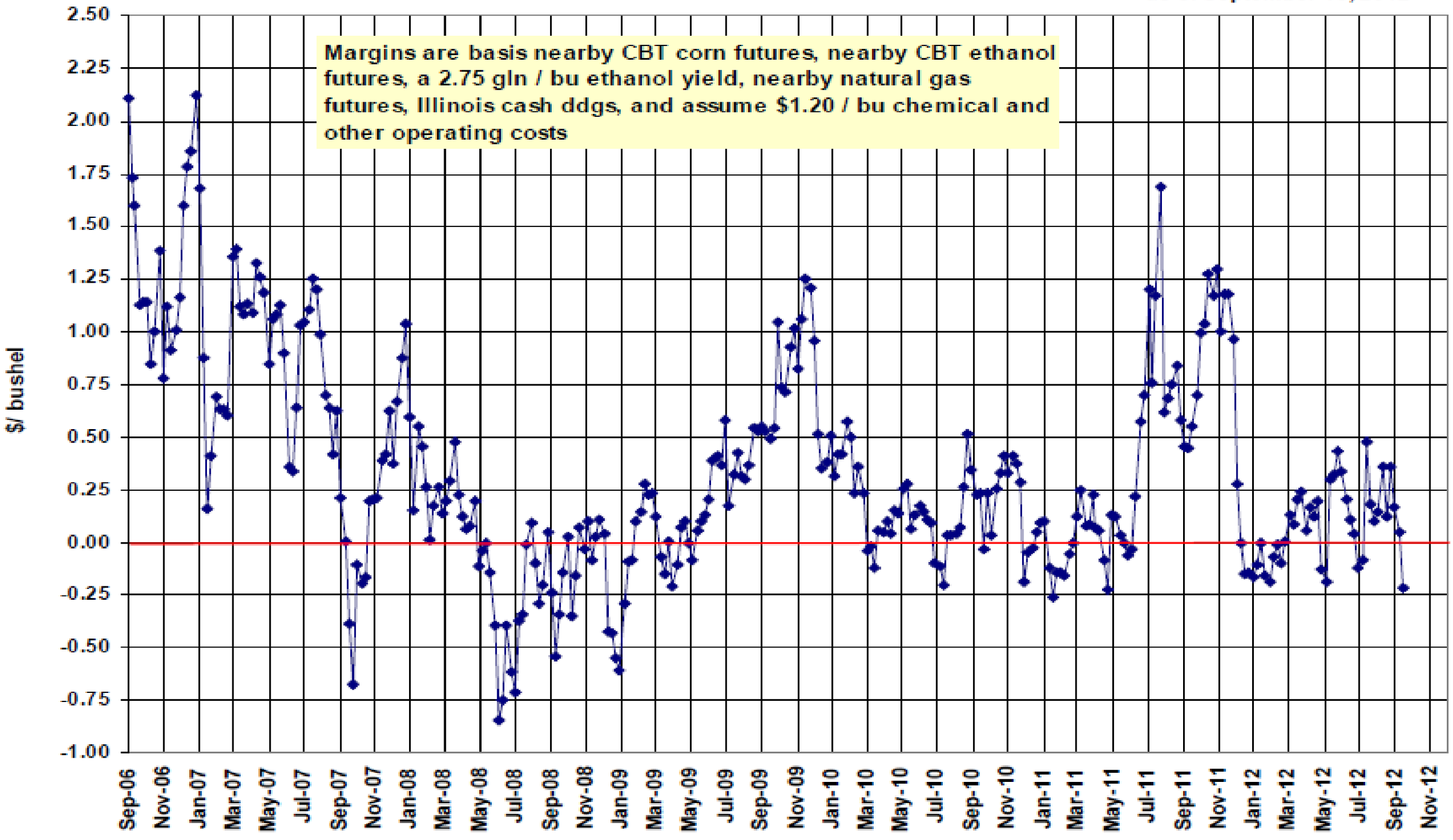
DEKALB RINDE®

Ethanol Production Margins

MONSANTO ®

as of September 18, 2012

Margins are basis nearby CBT corn futures, nearby CBT ethanol futures, a 2.75 gln / bu ethanol yield, nearby natural gas futures, Illinois cash ddgs, and assume $1.20 / bu chemical and other operating costs



LaSalle Group
ROSENTHAL COLLINS GROUP

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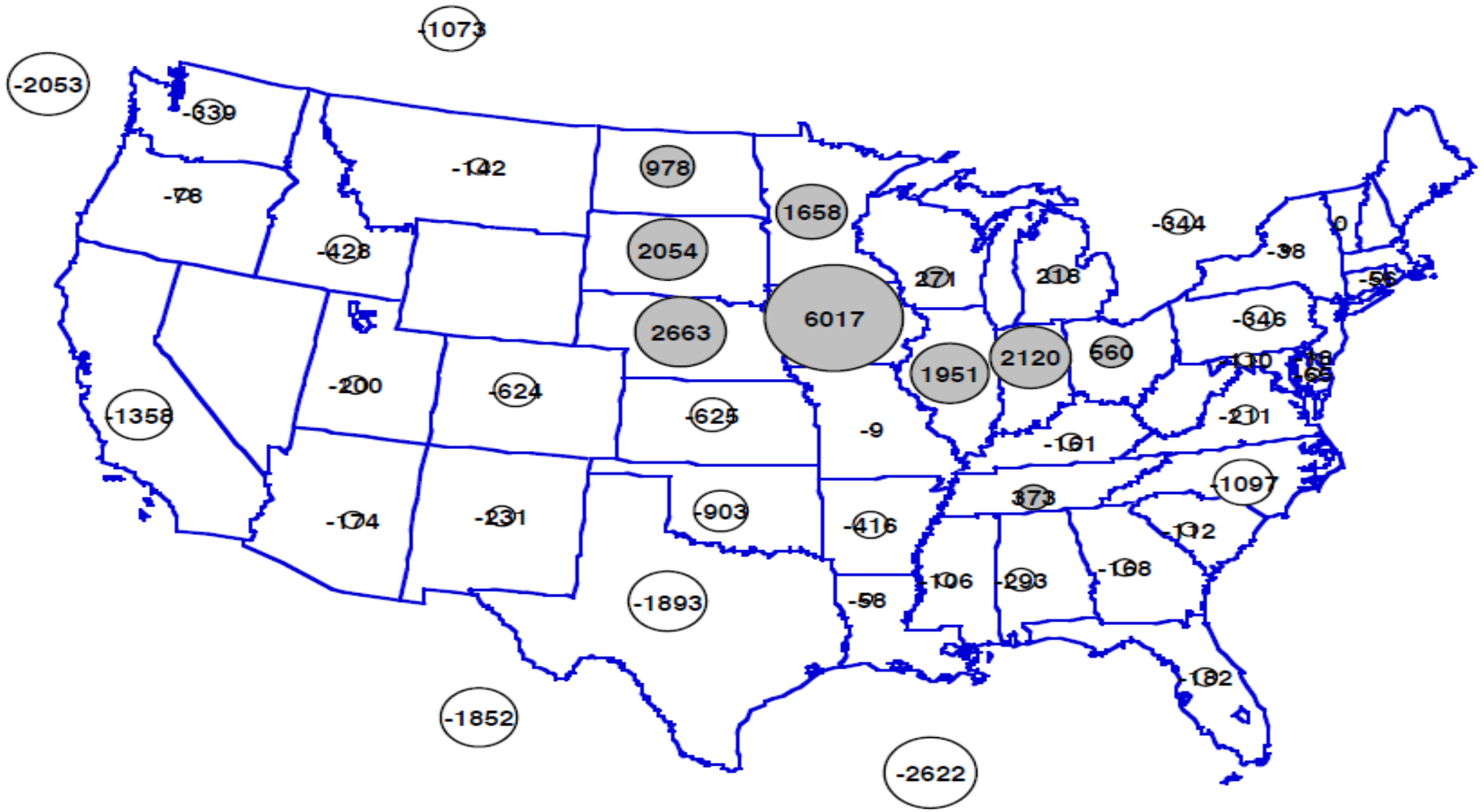
DDG NET EXPORTS (+)/NET IMPORTS (-) BY STATE, 12-13

Based on All Animals, PRX Formulas (Not surveyed by USDA), 000MT



Pro Exporter

DEKALB RINDE®

Export Table

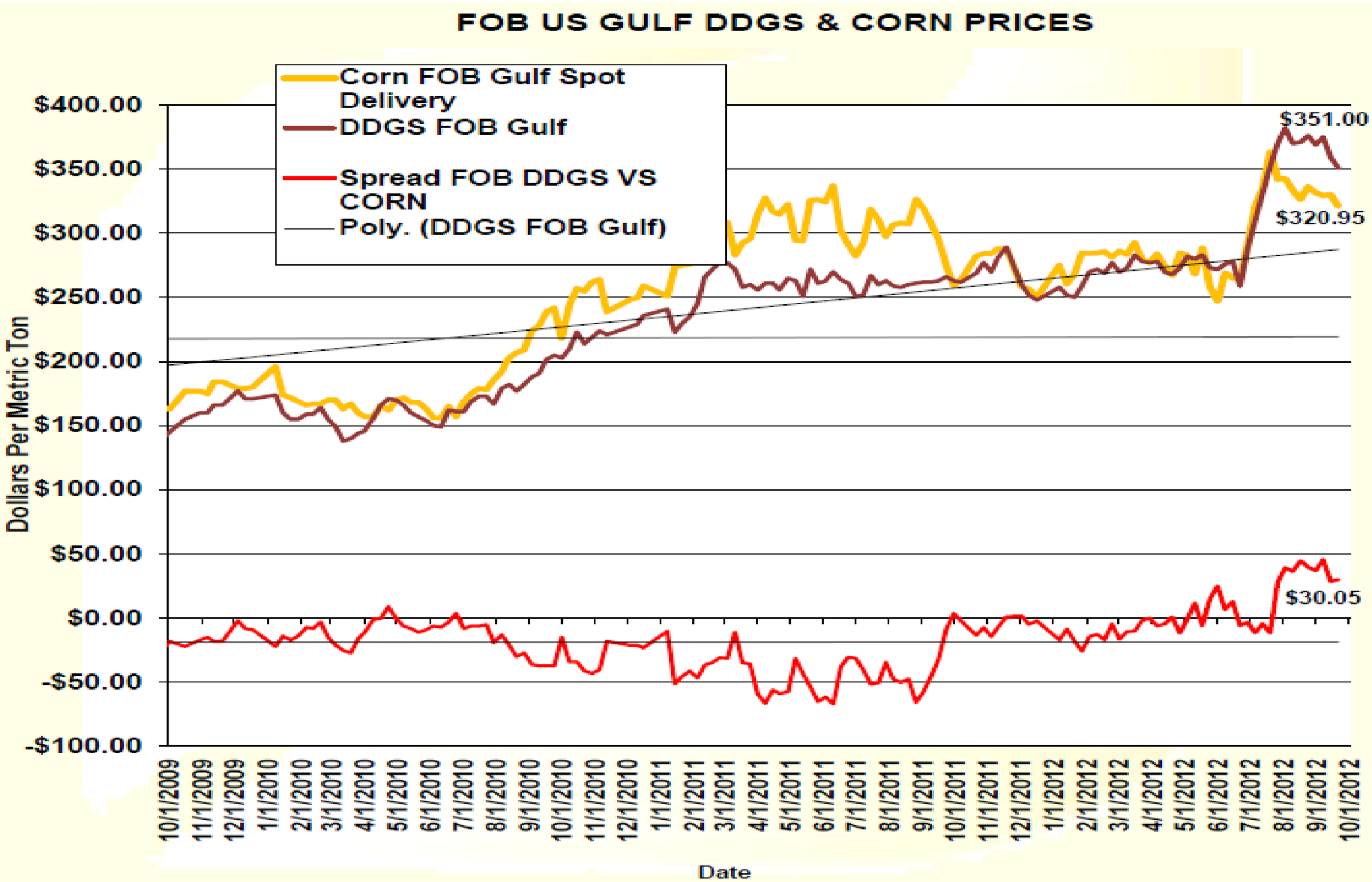
MONSANTO®

COUNTRY	2010 YR	2011 YR	Jan/Jul 2011	Jan/Jul 2012	% Change	Net Change
World Total	9,027,043	7,635,747	4,407,557	4,608,984	5	*201,427*
Mexico	1,650,308	1,774,736	1,086,730	950,536	-13	-136,194
China	2,531,452	1,370,368	638,301	1,488,336	133	850,035
Canada	1,042,215	746,374	465,107	376,642	-19	-88,465
Vietnam	430,236	494,599	267,502	235,529	-12	-31,973
Korea, South	506,474	300,934	170,697	192,454	13	21,757
Japan	217,780	300,699	158,346	221,173	40	62,827
Indonesia	251,073	246,007	150,340	92,932	-38	-57,408
Taiwan	144,485	234,877	107,004	113,242	6	6,238
Israel(*)	162,695	214,074	118,182	76,286	-35	-41,896
Thailand	291,070	202,633	141,304	101,177	-28	-40,127

Metric Tons

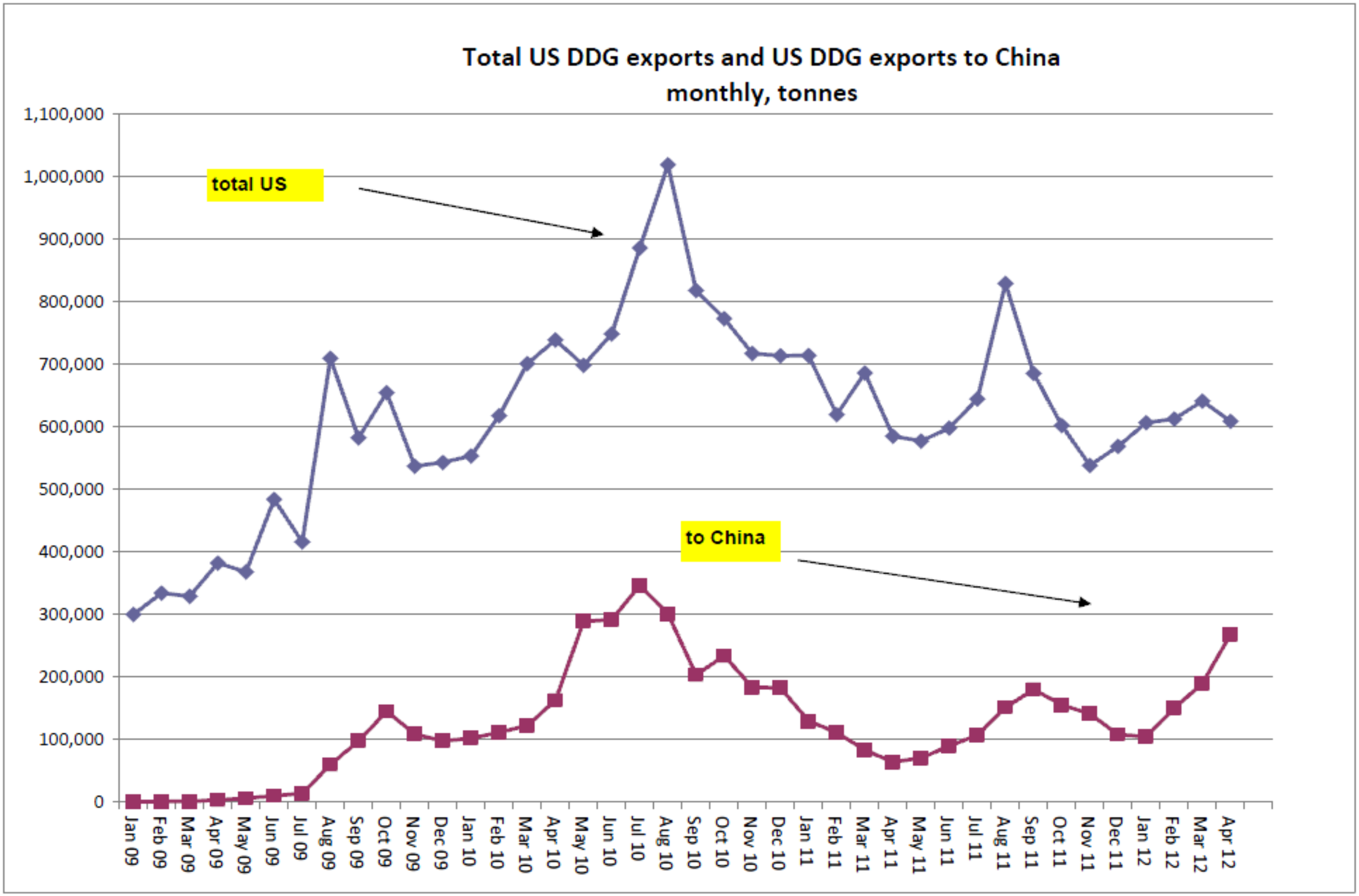
U.S. Grains Council

FOB US GULF & CORN PRICES

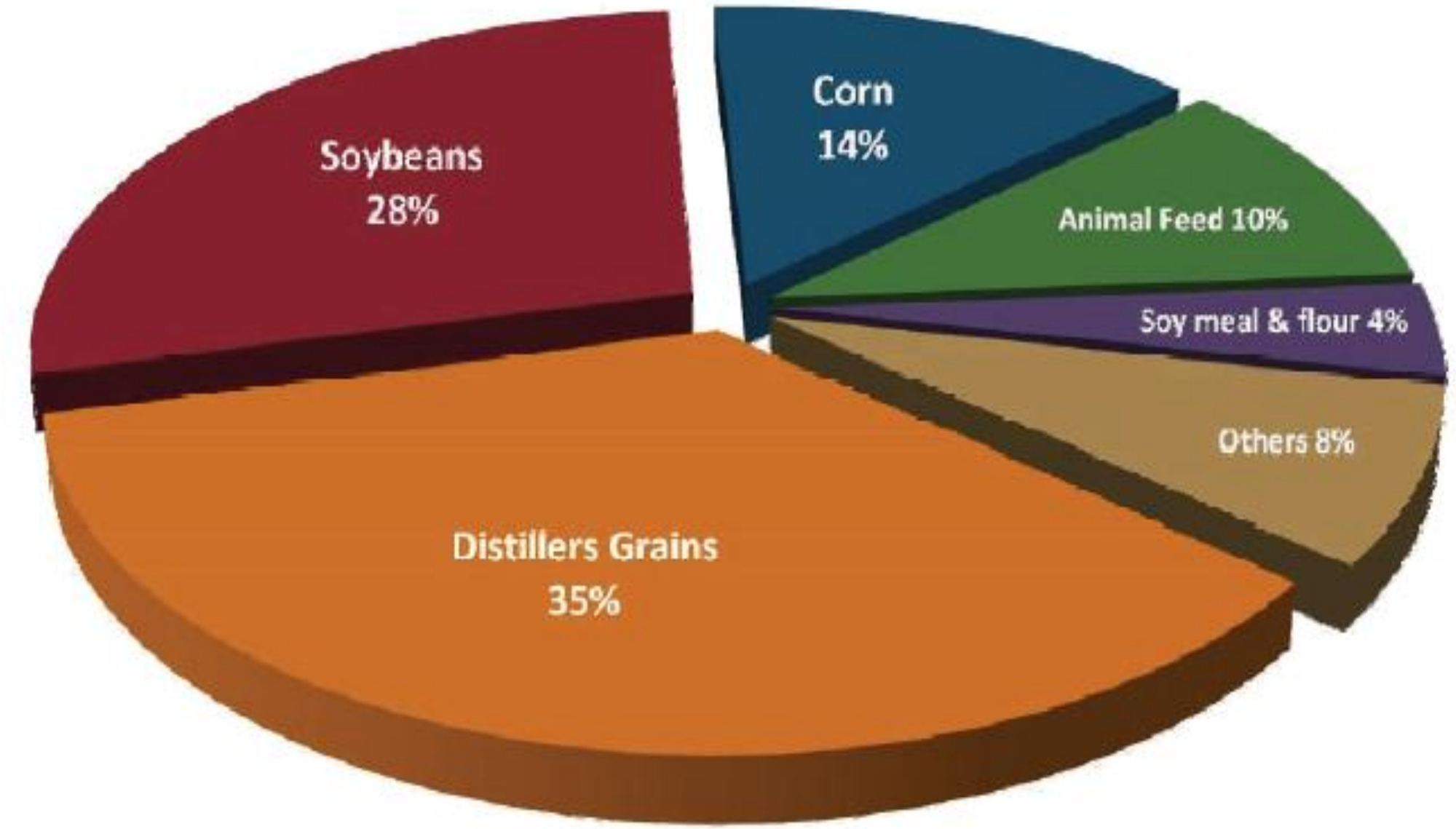


US Grains Council

Total US DDG exports and US DDG exports to China monthly, tonnes



Top U.S. Export Container Grain Commodities



Top U.S. Export Container Grain Commodities

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www.ddgs.umn.edu

Argentina DDGS Demand

Using average U.S. DDGS inclusion rates Argentina could consume an estimated 10 million metric tons of 10% moisture DDGS, or that dry matter equivalent in wet distillers at cattle feed lots alone, not including pasture fed cattle. Argentina's Dairy industry could consume an additional 3 million metric tons

Potential for DDGS export

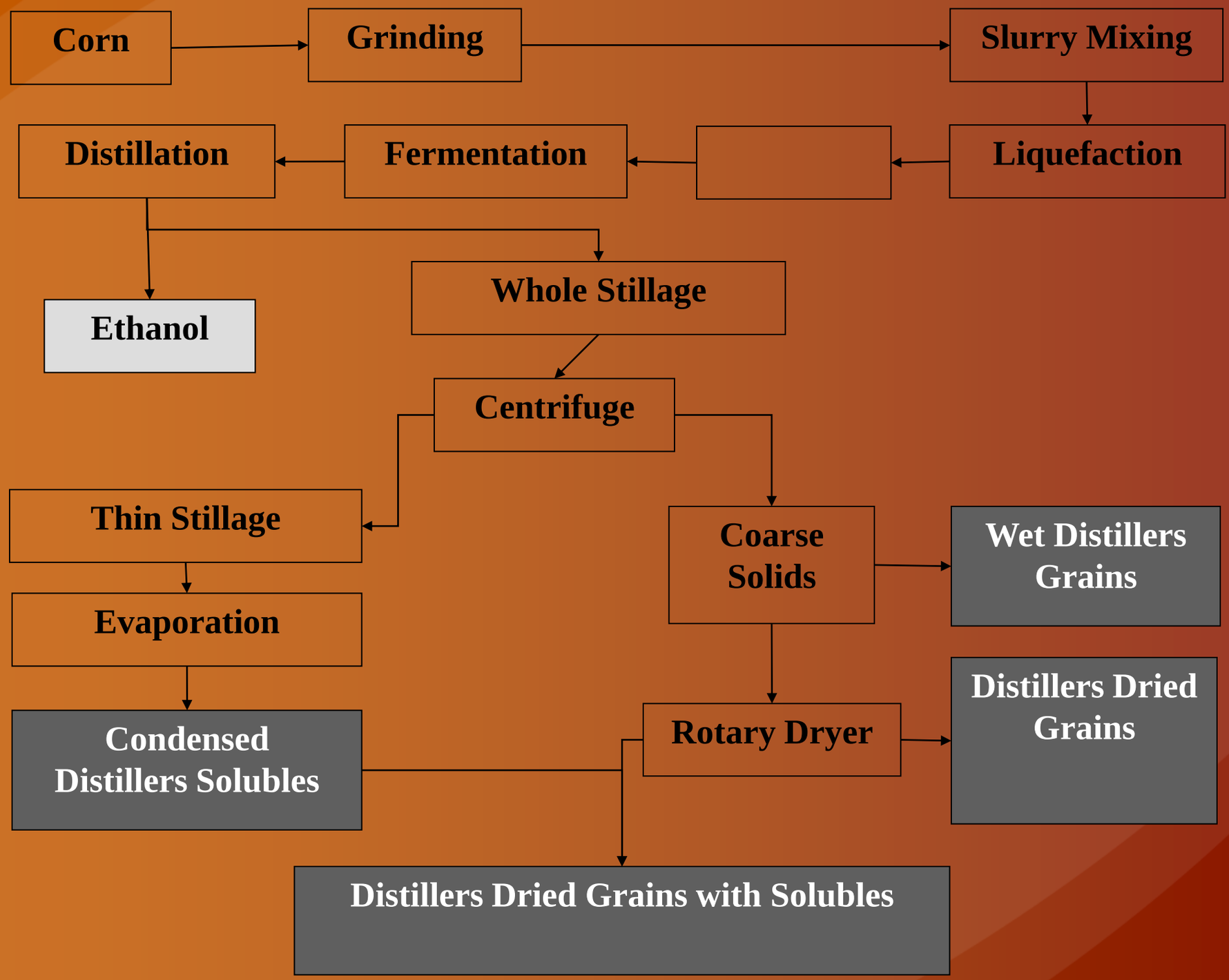
DDGS exports well to countries currently buying corn and/or soybeans

Loading vessels with a hold or two of DDGS along with heavy grain helps to overcome DDGS's light test weight and is the preferred delivery method for many U.S. DDG export customers.

World price of DDGS in today's market

Based on DDGS bids and vessel freight available the week of 9/17/2012, high quality DDGS would be worth $352 per metric ton loaded in a vessel in an Argentinean port, provided there was no export/tax imposed.

Dry-grind Ethanol Production Processes and Co-products (Erickson et al., 2005)



Composition of Selected Nutrients Among 32 DDGS Sources (DM basis)

Nutrient	Average (CV, %)	Range
Dry matter, %	89.3	87.3 – 92.4
Crude protein, %	30.9 (4.7)	28.7 – 32.9
Crude fat, %	10.7 (16.4)	8.8 – 12.4
Crude fiber, %	7.2 (18.0)	5.4 – 10.4
Ash, %	6.0 (26.6)	3.0 – 9.8
Swine ME, kcal/kg (predicted)	3810 (3.5)	3504 – 4048
Lysine, %	0.90 (11.4)	0.61 – 1.06
Phosphorus, %	0.75 (19.4)	0.42 – 0.99

Source: University of Minnesota

The most expensive nutritional components in animal feeds

1. **Energy**
   - **Ruminants**
     - **NE_m, NE_g, NE_l, TDN**
   - **Swine**
     - **DE, ME, NE**
   - **Poultry**
     - **AME_n, TME_n**

2. **Protein and amino acids**
   - **Ruminants – crude protein (N x 6.25)**
   - **Non-ruminants – digestible amino acids**

3. **Phosphorus**
   - **Non-ruminants – digestible or available P**

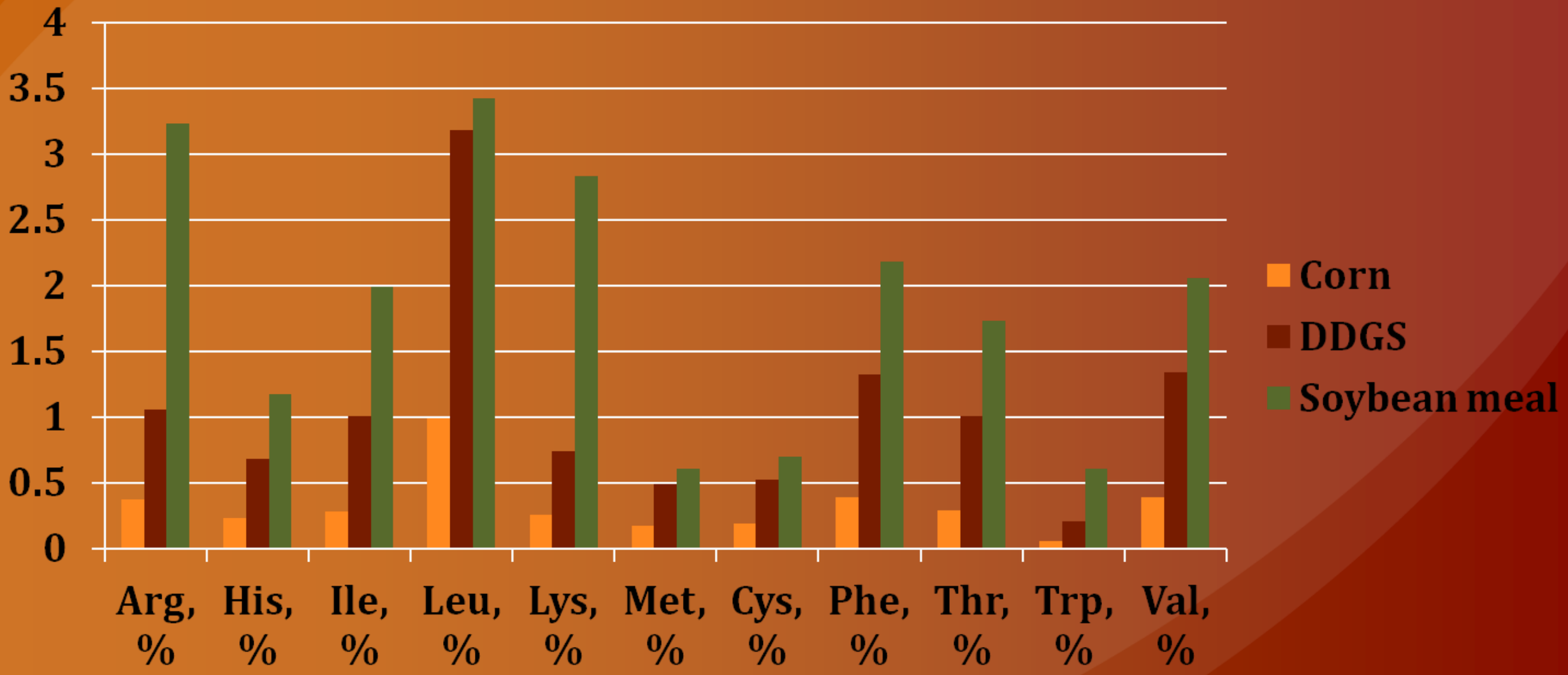
DDGS is Primarily an Energy Source

- **Ruminants**
  - **102-127% energy value of corn**
- **Swine**
  - **100% energy value of corn**
- **Poultry**
  - **85% energy value of corn**

Why is there a difference?

- **DDGS is a high fiber ingredient**
- **Ruminants can convert fiber to energy much more effectively than swine and poultry**

Amino Acid Content in Corn, DDGS, and Soybean Meal



Positives and Negatives of Nutrients in DDGS

- Positives
  - High energy
    - Fat
    - Fiber
      - ruminants
    - Excess protein
  - Moderate source of protein and amino acids
  - High digestible P
    - non-ruminants
  - Xanthophyll
    - - poultry

- Negatives
  - High fiber
    - non-ruminants
  - Poor protein quality
    - non-ruminants
  - Variable amino acid digestibility
    - non-ruminants
  - May contain high sulfur content
    - ruminants
  - May contain high sodium content
    - poultry

DDGS Color, Nutrient Content and Digestibility Varies Among Sources

Lower Quality, Less Digestible DDGS

High Quality, Highly Digestible DDGS

Is Color an Indicator of DDGS Quality?

- Negative effect of dark color
  - May indicate excessive heat used during drying
    - Maillard reaction-reduces amino acid digestibility
  - May indicate increased lipid oxidation
  - May indicate reduced xanthophyll content

Benefits and Limitations of DDGS for Lactating Dairy Cows

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Benefits

- More protein and energy than corn
- Feed at up to 20% of ration dry matter
- Highly digestible fiber source
  - Fewer digestive upsets
  - Can be a partial forage replacement
- Highly palatable

Limitations

- Low protein (lysine) quality
  - Add other supplements high in lysine
- Manure P excretion increases at high feeding levels
- No effect on milk fat if adequate forage in the ration

Nutrient Content (DM basis) of DDGS for Ruminants

Nutrient	DDGS
Crude protein, %	30.8
RUP, % of CP	55.0
NE_L, Mcal/kg	2.26
NE_M, Mcal/kg	2.07
NE_G, Mcal/kg	1.41
NDF, %	39.0
ADF, %	16.1
Crude fat, %	11.2
Ash, %	5.7
Calcium, %	0.05
Phosphorus, %	0.79
Magnesium, %	0.31
Potassium, %	1.02
Sodium, %	0.26
Sulfur, %	0.69

How Much DDGS Can Be Fed to Lactating Dairy Cows?

- Recommend a maximum of ~ 20% of ration dry matter
  - 4.5 – 6 kg/day (DDGS)
- No palatability problems
- At 30% of ration DM
  - May decrease DM intake
  - May decrease milk yield
  - May decrease milk protein content

Benefits and Limitations for Finishing Feedlot Cattle

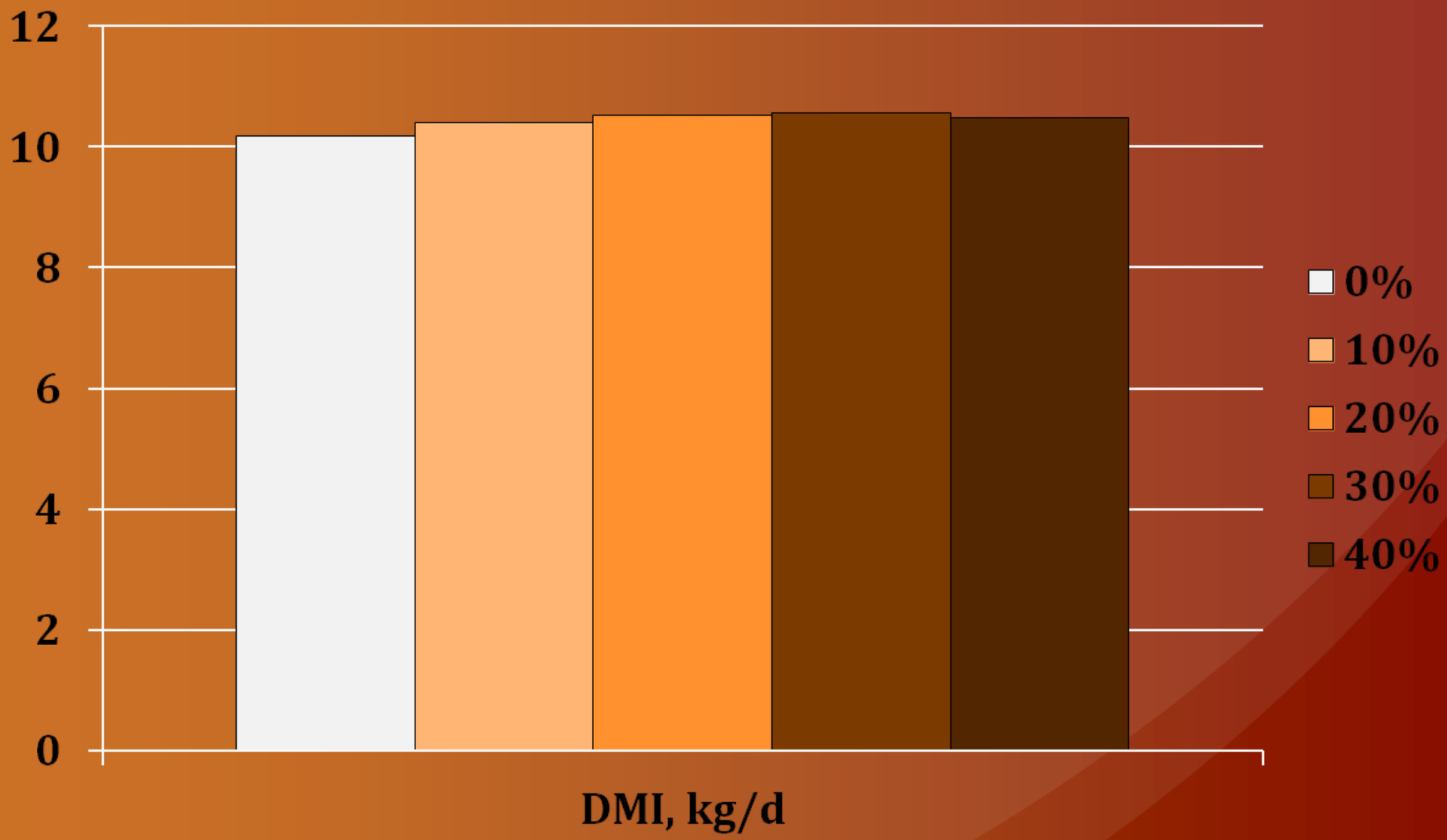
Benefits

- 120 to 150% the energy value of corn
- 3x higher in protein than corn
- Feed up to 40% of ration dry matter to replace corn
  - Feed excess protein and P
- Highly digestible fiber source
  - Fewer digestive upsets
- No effect on carcass yield, quality, or eating characteristics of beef

Limitations

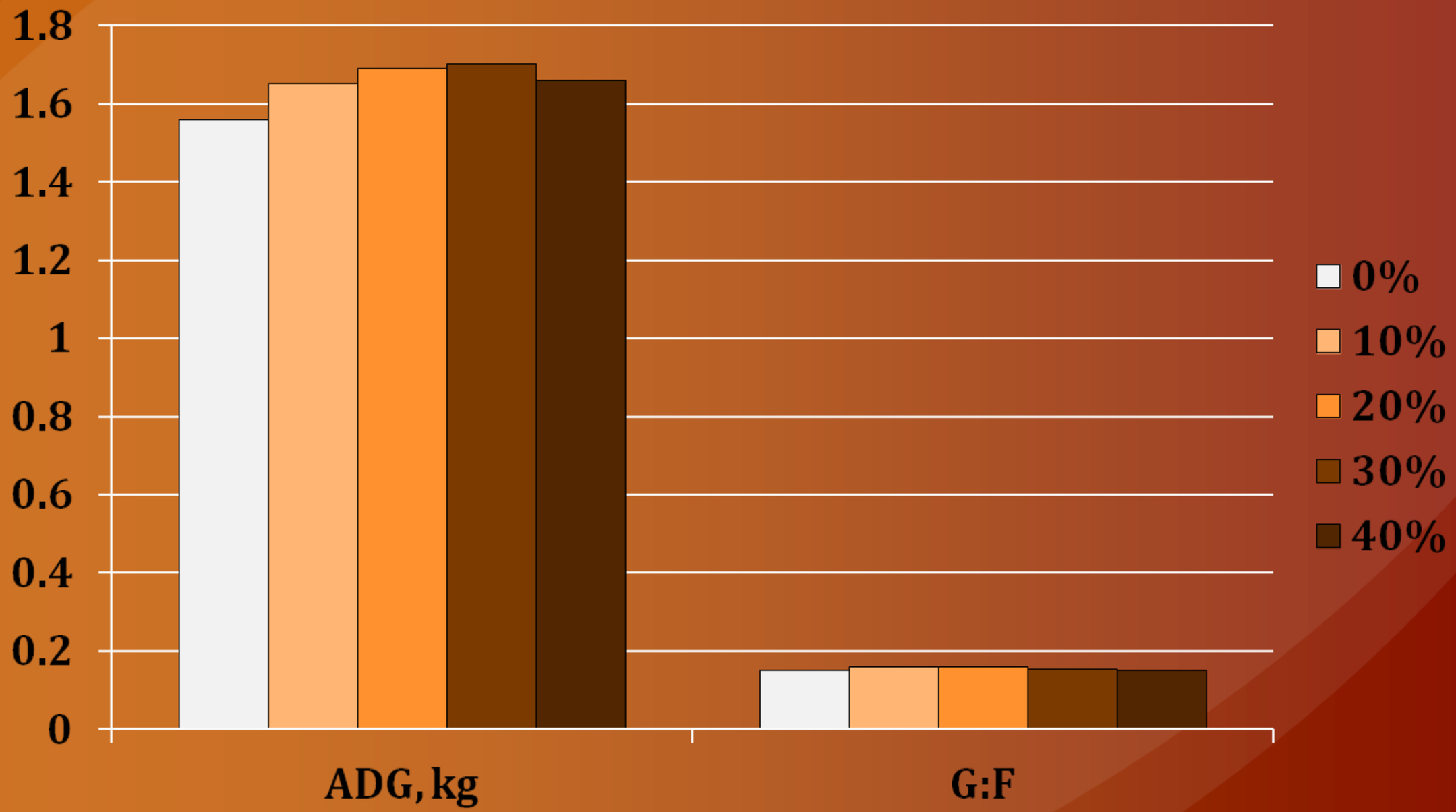
- Need to supplement calcium to achieve proper Ca:P ratio
  - Avoid urinary calculi
- Manure N and P excretion increases at high feeding level
- Monitor sulfur level of water and diet (< 0.4% ration DM)
  - Avoid polioencephalmalacia

Dry Matter Intake of Finishing Steers Fed Rations Containing Up to 40% DDGS



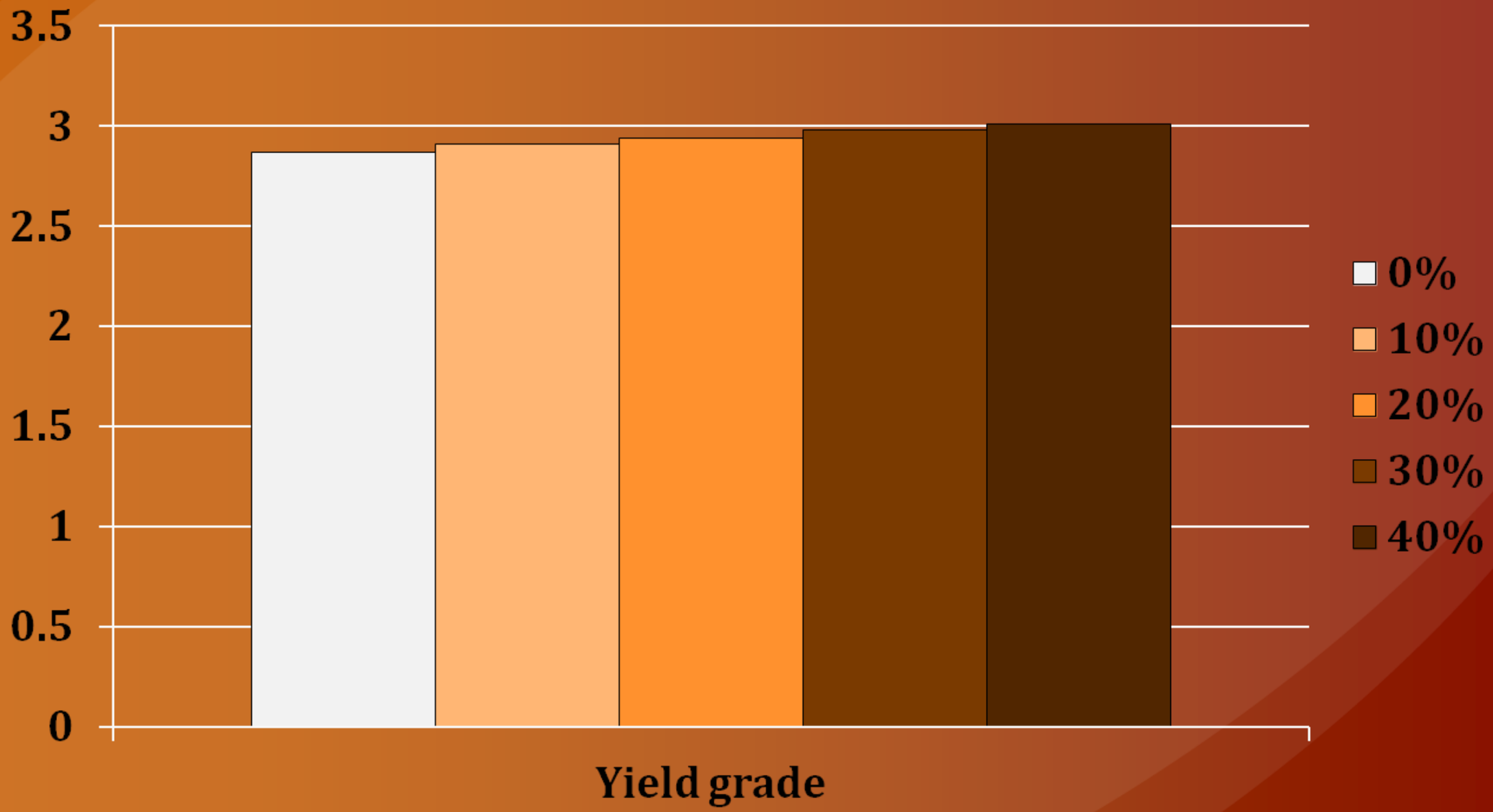
Source: Klopfenstein et al. (2008)
Meta-analysis of 5 experiments
Linear ($P < 0.01$) and quadratic ($P < 0.08$) effects of DDGS level

Growth Performance of Finishing Steers Fed Rations Containing Up to 40% DDGS



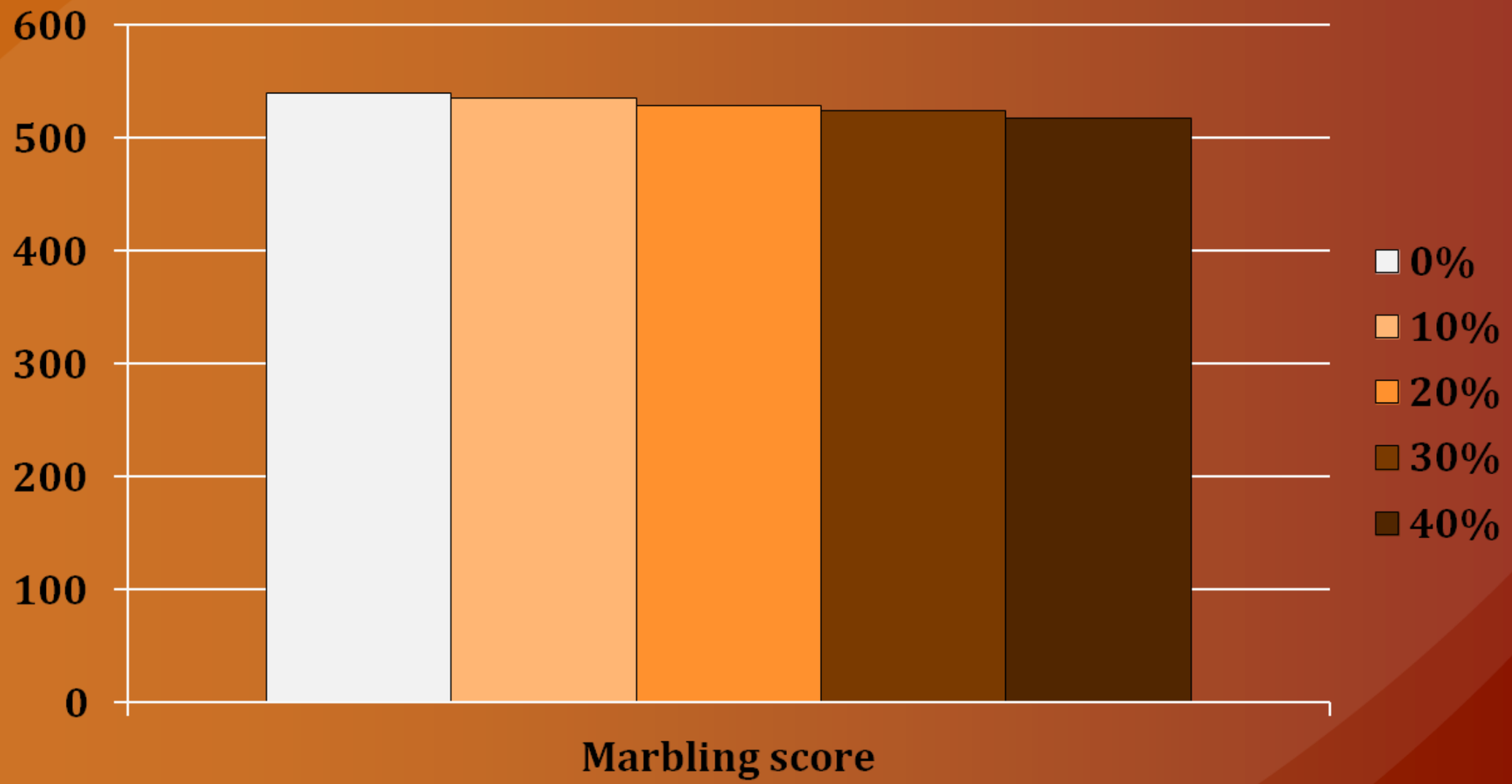
Klopfenstein et al. (2008)
Meta-analysis of 5 experiments
Significant linear and quadratic effects of DDGS level

Yield Grade of Finishing Steers Fed Rations Containing Up to 40% DDGS



Klopfenstein et al. (2008)
Meta-analysis of 5 experiments
Linear (P < 0.04) effect of DDGS level

Marbling Score of Ribeye Muscle from Finishing Steers Fed Rations Containing Up to 40% DDGS



Klopfenstein et al. (2008)
Meta-analysis of 5 experiments
Score of 500 = small
Linear ($P < 0.07$) effect of DDGS level

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Thank You

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CHINESE EAGLE