


Cows, Forage, Corn and Residues

The Great Opportunity for
Nebraska Agriculture




The Situation

- 2 million beef cows
- 2.5 million cattle on feed
- 10.3 million acres corn
 - 6.3 million irrigated
 - 4 million dryland




The Change

- Ethanol Industry
- Second state in Nation (24 plants)
- Uses 35% of corn
- ↑ corn price
 - \$2.25 → \$6.50
- Byproducts




The Challenge

- Corn Price
- Pasture → Corn
- Supply and Price of Forage
- Abundance of Corn Residues




Corn Residue


- 10.3 million acres
 - 6.3 irrigated
 - 4.0 dryland
- 170 bu/ac yield?
 - 200 irrigated
 - 122 dryland
- 80% of grain as residue (dry)
 - 4.8 tons/ac irrigated
 - 2.93 ton/ac dryland




Cattle, Corn, Grasslands, and Bioenergy – an Integrated, Economic System




Grasslands



Grain Crops

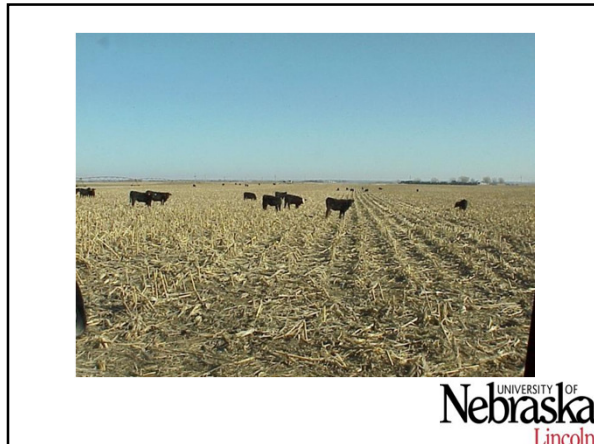


Cattle & Feedlots



Bio-refineries

\$\$\$
&
Sustainability



UNIVERSITY OF
Nebraska
Lincoln

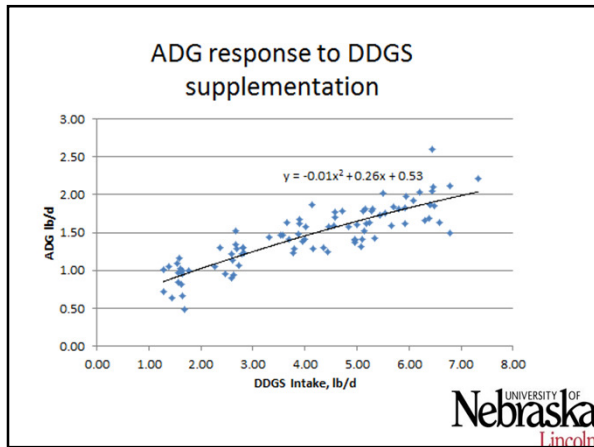
Effects of Supplementation on Corn Residue on Cow and Calf Performance

Treatment

Item	Supplemented	Control
October Wt., lb	1263	1265
February Wt., lb	1351	1327
October BCS	5.4	5.4
February BCS	5.6 ^a	5.4 ^b
Calf Birth Wt., lb	86	85
Pregnancy Rate, %	94	91
Weaning Wt., lb	552	548

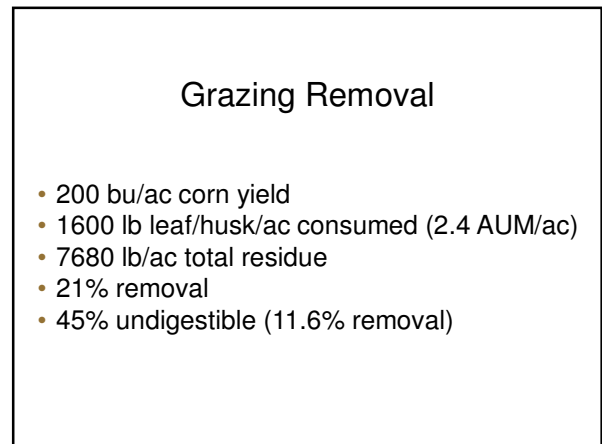
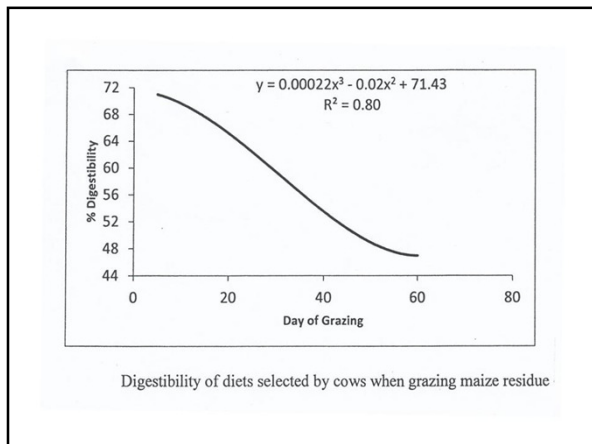
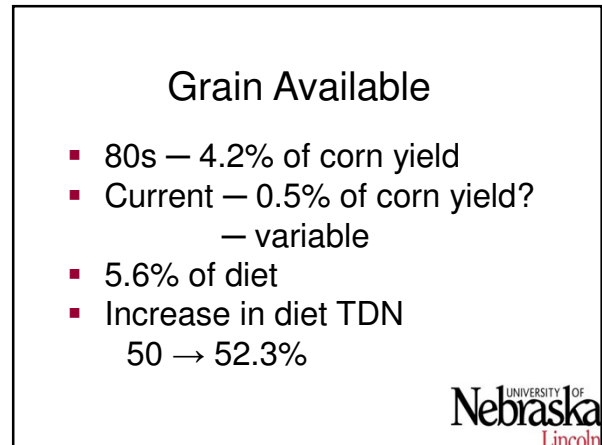
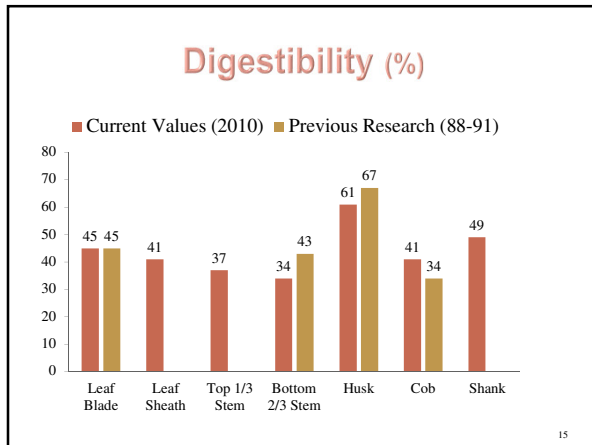
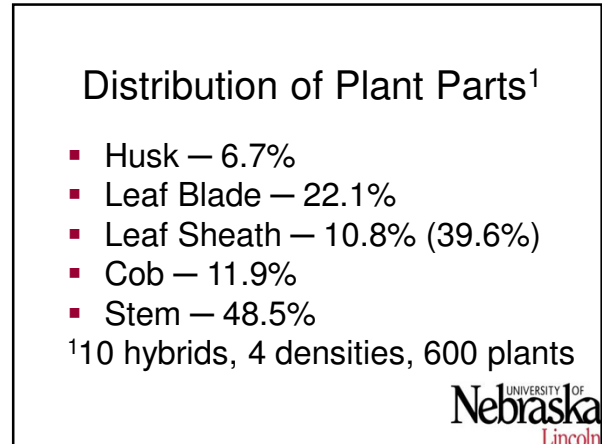
5-Year study n=85 head per treatment per year; March calving cows
 Supp cows = 2.2 lb/hd/da DM basis, distiller based cube
 Oct = pre-corn residue grazing
 Feb = post-residue grazing
^{a,b} differ at P_≤0.05

UNIVERSITY OF
Nebraska
Lincoln



UNIVERSITY OF
Nebraska
Lincoln






Cattle Needs

- Cow Grazing
- Calf Grazing
- Feedlot Cattle, Stalks, Silage
- Drylot Cows




Cattle Needs

- Cow Grazing 1.8 million tons
- Calf Grazing .25 million tons
- Feedlot Cattle .46 million tons
- Drylot Cows .48 million tons
- Total 2.99 million tons




Corn Residue Balance

- Irrigated – 30.24 million tons
- Dryland – 11.7 million tons
- Total – 41.96 million tons
- Maximum use – 2.99 million tons
- Percent maximum use – 7.1%
- Irrigated only – 9.9%




Consequences

- Subsequent Crop Yields
- Soil
- Water




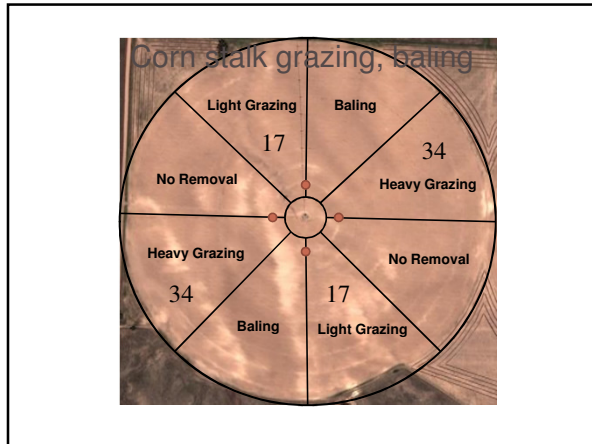
	Corn	Soybeans
1	Fall Grazed 277 Rows	
	Spring Grazed 36 Rows	
	Ungrazed 32 Rows	
2	Spring Grazed 36 Rows	
	Fall Grazed 100 Rows	
Road		
3	Fall Grazed 164 Rows	
	Spring Grazed 36 Rows	
	Ungrazed 32 Rows	
4	Spring Grazed 36 Rows	
	Fall Grazed 184 Rows	



Crop Yields – Fall/Winter Grazing

- Linear-Move, '96 – '11, corn/soybean Soybeans, 60.4 vs 62.4 grazed
Corn, 205.8 vs 208.9 grazed
- Dryland '93 - '95, corn/corn
Corn, 147 vs 149.5 grazed





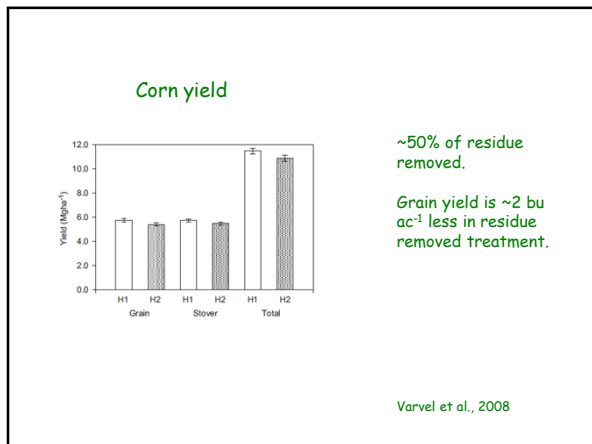
Corn Yields

Year	Treatment			
	Control	1 AUM/Ac	2 AUM/Ac	Baling
2009	124	128	133	124
2010	141	144	145	142
2011	165	159	170	166
Average	143	144	149	144



Rainfed Site

Marginal site would have qualified for CRP
 No-tillage, continuous corn
 Three N rates
 54, 107, and 160 lbs ac⁻¹
 Two residue removal treatments
 Residue removed or residue retained.



Irrigated Site

Continuous corn, 180 lbs N ac⁻¹

Two tillage treatments

Disk tillage or No tillage

Three residue removal treatments

0, 50, or 100% removal

Grain and stover yields in an irrigated study at Mead, NE (2009-2010)

Tillage	Stover removal (%)	Grain yield Bu/a	Stover		
			Total lbs/a	Removed lbs/a	%
Disk	0	201.7	10677	0	0
	50	207.5	10684	3816	36
	100	212.4	11241	8549	76
	Mean	207.2	10867		
No tillage	0	180.9	9659	0	0
	50	205.9	11018	4323	39
	100	202.0	10145	8230	81
	Mean	196.2	10274		

1. Corn residue offers an opportunity to maintain and grow the beef cattle industry in Nebraska and compensate for the increase in corn cost and reduction in pasture acres.

2. Even with increased numbers and use of corn residue, the beef industry would use less than 15% of the state's corn residue.

3. Removal of residue by cattle grazing is less than 15% in most cases. **Maybe but I have the impression that it is more in some cases and especially in rainfed situations. The residues appear to be more palatable with lower yields and, in variable fields, the most heavily grazed is often where more cover is needed.**

4. Grazing of irrigated corn residue or harvest of 20 to 30% of the residue likely increases subsequent crop yields if no-till. **Probably even 40 to 50%.**

5. Tillage is more detrimental to erosion and probably subsequent yields than residue removal up to 20%. Even up to 40-50% for irrigated situations.

6. No residue should be removed from highly erodible fields. That is fields with highly erodible soil but with inappropriate management for erosion control. Unfortunately, some of the heaviest removal occurs on fields of highly erodible soil with management inappropriate for erosion control. This is a major concern and where stewardship appears to be moving backward. It is my impression that land stewardship is currently worse than it has been during the past 3-4 decades in some parts of the state!

7. Light to moderate grazing of non-irrigated fields of low erodability is likely without Consequence.

8. Residue harvest should be done primarily on irrigated fields. Yes, but even rainfed fields in higher rainfall eastern Nebraska where conditions and management prevent much erosion.

9. Residue harvest should be limited to 20% to 30%. Management of this level of removal is problematic and needs further research. The acceptable removal demands on the amount produced. We do not have good guidelines in regards to effect on yield. There may now be sufficient data available from numerous corn belt and Great Plains studies for a good analysis of residue remaining and effects on yield in consideration of annual or early season water availability; better guidelines could be developed. RUSLE2, as we applied it for NebGuide G1846, is valuable for accessing effects on water erosion as is NRCS WEPS for wind erosion.

10. Husk and cob removal is of little consequence, especially on irrigated acres.

11. Silage harvest should be accompanied with heavy manure application and(or) cover crops. **Sowing of cover crops immediately after harvest needs to be strongly promoted for the ground cover and soil protection but also for grazing or hay, at least for irrigated land.**

12. NebGuide G1864 covers residue material well but might be interpreted that any removal will reduce crop yield. Hopefully that can be changed so not to be misinterpreted. **This is under revision in consideration of more recent research findings.**

Hypothetical

- 2 – 3 bu yield loss
- @ \$6/bu = \$12 to 18/ac
- Equal to grazing lease
- Hypothetical “DOESN'T CUT IT”

The screenshot shows the UNL Beef website interface. At the top, there is a navigation menu with links for Home, Learning Modules, Educational Programs, Ask an Expert, Beef Basics Home, and Find a Faculty. A search bar is located in the top right corner. The main content area features an article titled "Grazing Corn Stalk Residue" with a photograph of a herd of cattle grazing in a field. To the right of the article, there are sections for "Educational Programs" and "Beef Basics Home Study Course". The left sidebar contains various links and resources related to beef production and university information.

<http://beef.unl.edu>

