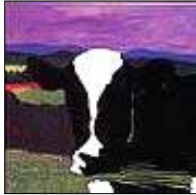


State of the Industry

- ✘ 2008 Overview for Seed and Hay
 - Weather challenges
 - Commodity price impact
 - Anticipated supply for 2009
- ✘ Future Trends
 - Alfalfa Breeding
 - Biotechnology
 - Seed Treatments
 - Industry Consolidation



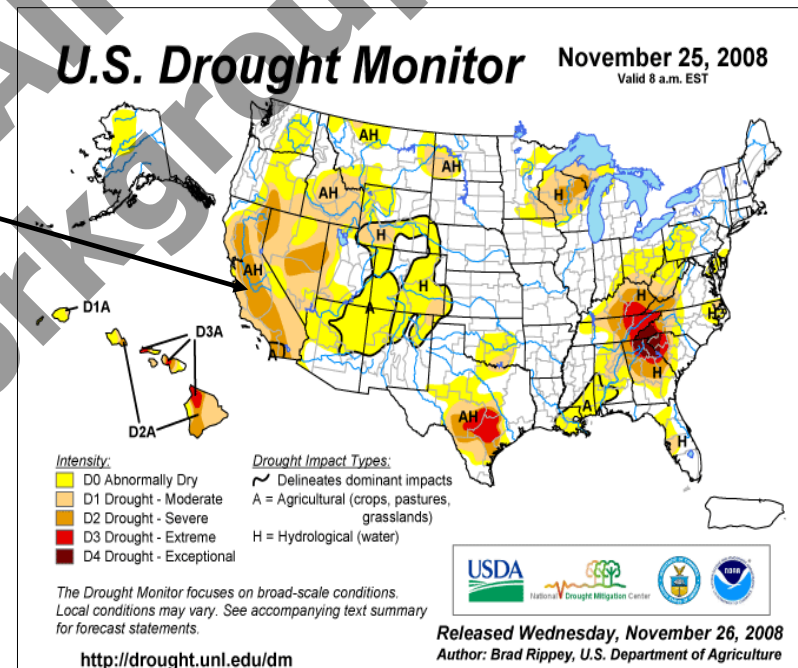


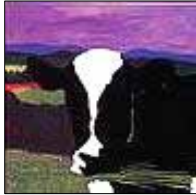
2008 Season

✘ Weather

- A late spring and decent fall
- Dry in the West

California fall seeding down 20-30%.





2008 U.S. Crop

✘ 2008 Seed Crop

- Dormant
- Non-dormant

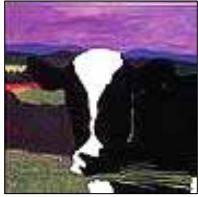
✘ 2008 Hay Crop

- Acres harvested
- Yield/acre

✘ 2008 Prices

- Seed
- Hay





2008 U.S. Crop

✘ 2008 Seed Crop

- Dormant (acres down slightly, yield average)
- Non-dormant (acres and yield up moderately)

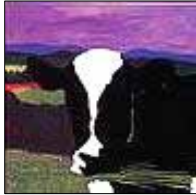
✘ 2008 Hay Crop

- Acres harvested
- Yield/acre

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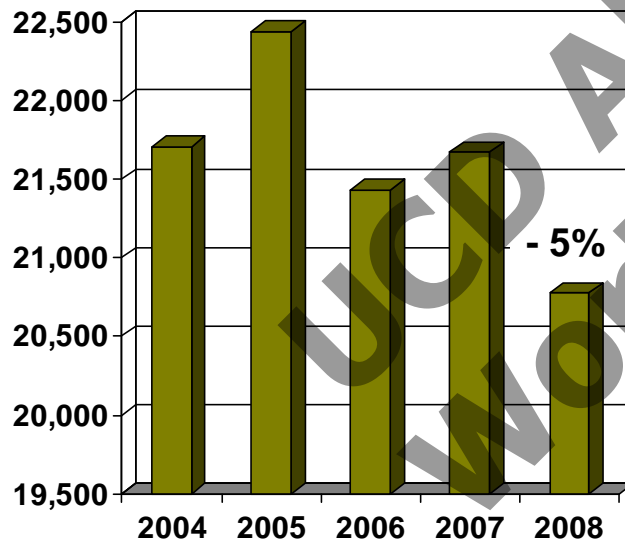
- Seed
- Hay



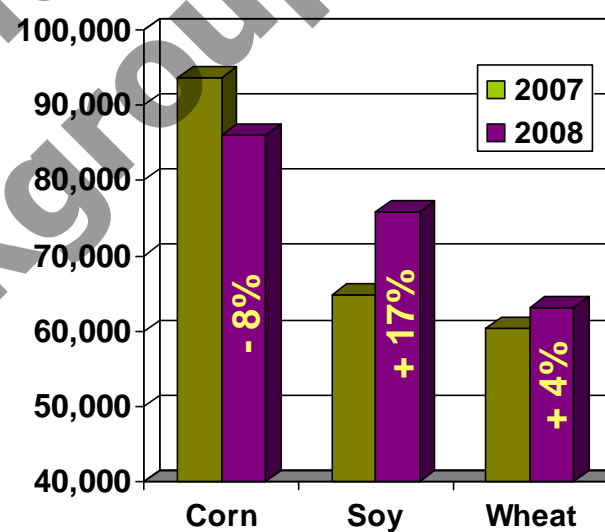


Acres Planted/Harvested

Alfalfa Dry Hay Acres Harvested (thousands)



Intended Planting Acres (thousands)



Source: NASS (Nov 2008)

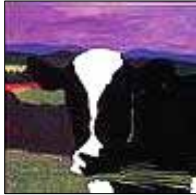




Wild Commodity Prices!

Corn futures prices





Commodity Prices

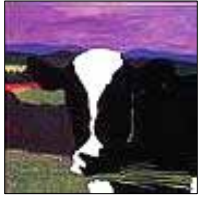
Prices relative to 1990-92

Commodity	Year			% increase
	90-92	11/07	10/08	
Alfalfa Hay	77.20	136	172	223%
Corn grain	2.30	3.44	4.37	190%
Soybeans	5.61	9.42	9.94	177%
Wheat	2.96	7.39	6.67	225%

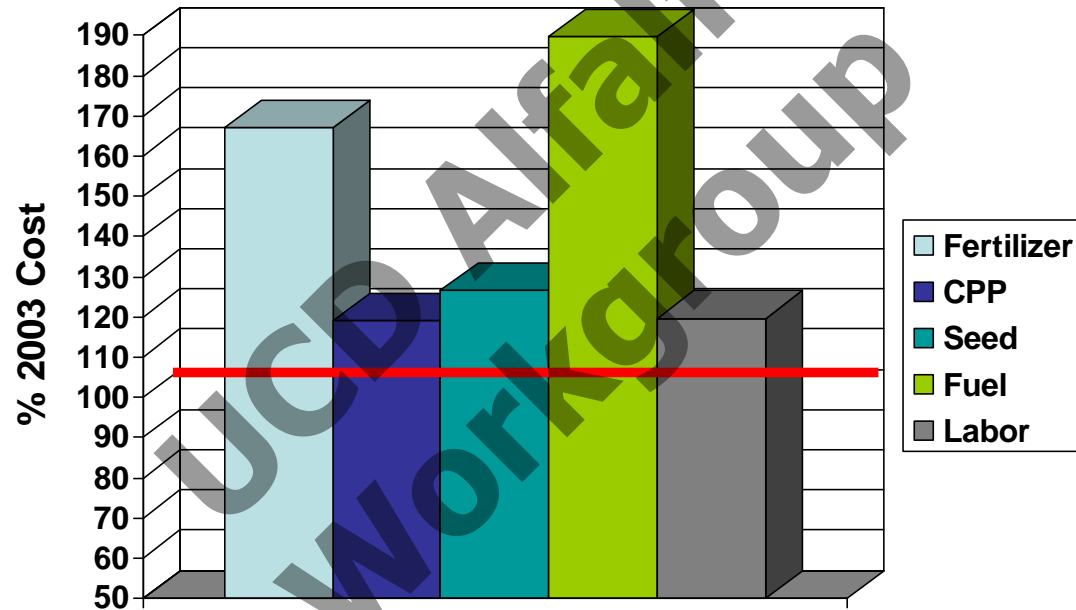
Source: NASS (Nov 2008)

2008 Alfalfa Seed Prices up ~40% over 2007



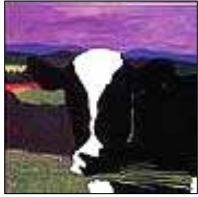


2007 Input Costs (% 2003)



Source: NASS (Nov 2008)





Import/Export Updates

✘ Seed import

- Canada

- Australia

✘ Seed export

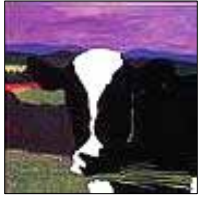
- Mexico

- Argentina

- Middle East

✘ Hay Export





Import/Export Updates

✘ Seed import

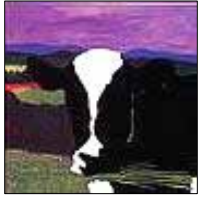
- Canada (varies by region, down slightly)
- Australia (down slightly, continued drought)

✘ Seed export

- Mexico
- Argentina
- Middle East

✘ Hay Export





Import/Export Updates

✘ Seed import

- Canada

- Australia

✘ Seed export

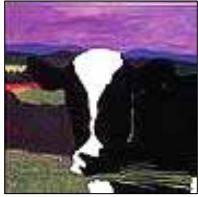
- Mexico (down slightly – pricing)

- Argentina (moderately down – pricing)

- Middle East (down – pricing/govt programs)

✘ Hay Export





Import/Export Updates

✘ Seed import

- Canada

- Australia

✘ Seed export

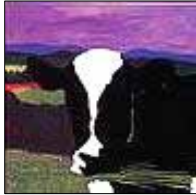
- Mexico

- Argentina

- Middle East

✘ Hay Export (down slightly)

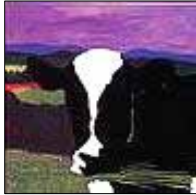




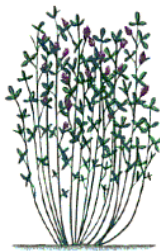
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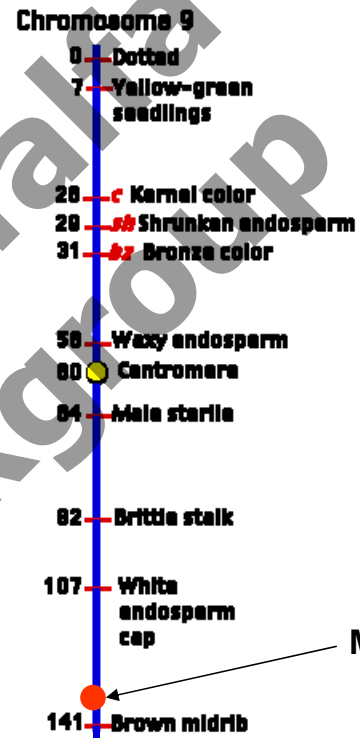


Marker Assisted Selection



PHENOTYPE

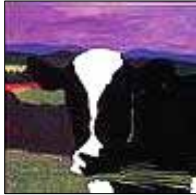
- WYSWYG
- Genotype x Environment
- Phenotype expression conditions



GENOTYPE

Molecular marker





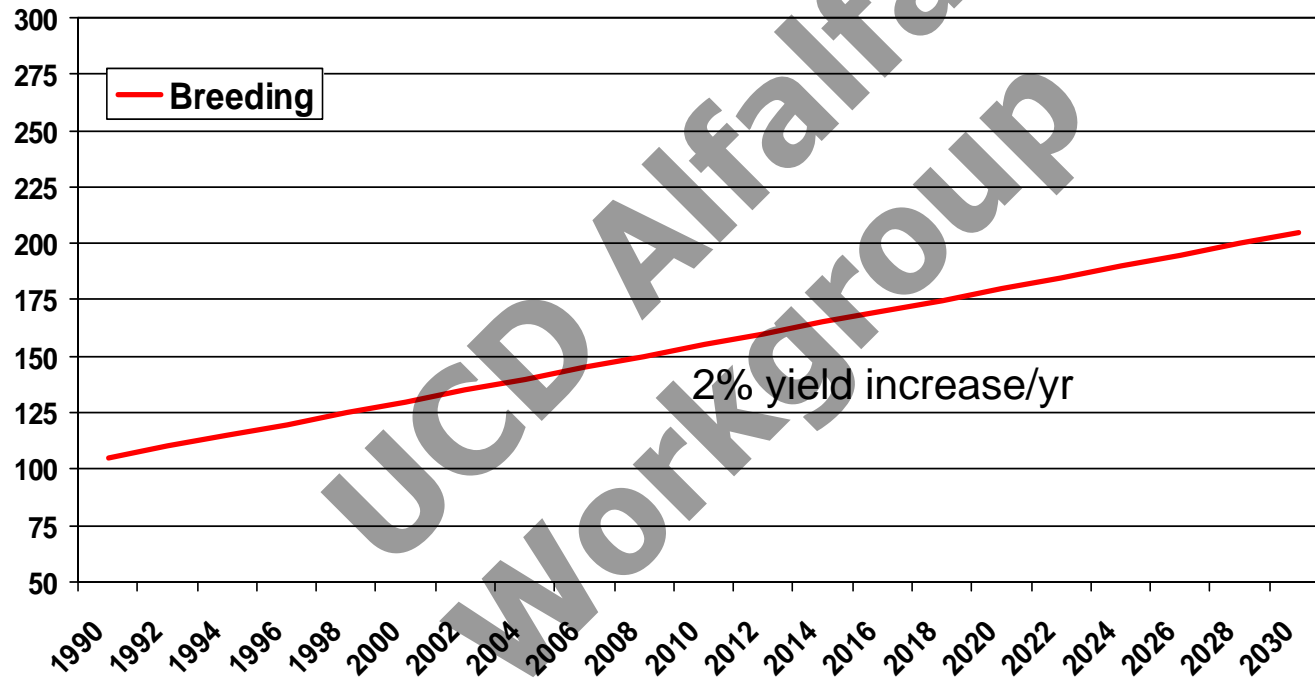
Marker Assisted Selection

- ✘ Molecular markers associated with desirable traits are being used to increase efficiency of breeding programs in corn and soybeans.
- ✘ These tools are being developed in alfalfa, and will be applied in the next few years.
 - Sequencing project w/ *M. truncatula*
 - Marker strategies from soy/corn



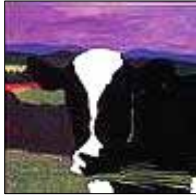


Projected Corn Yield

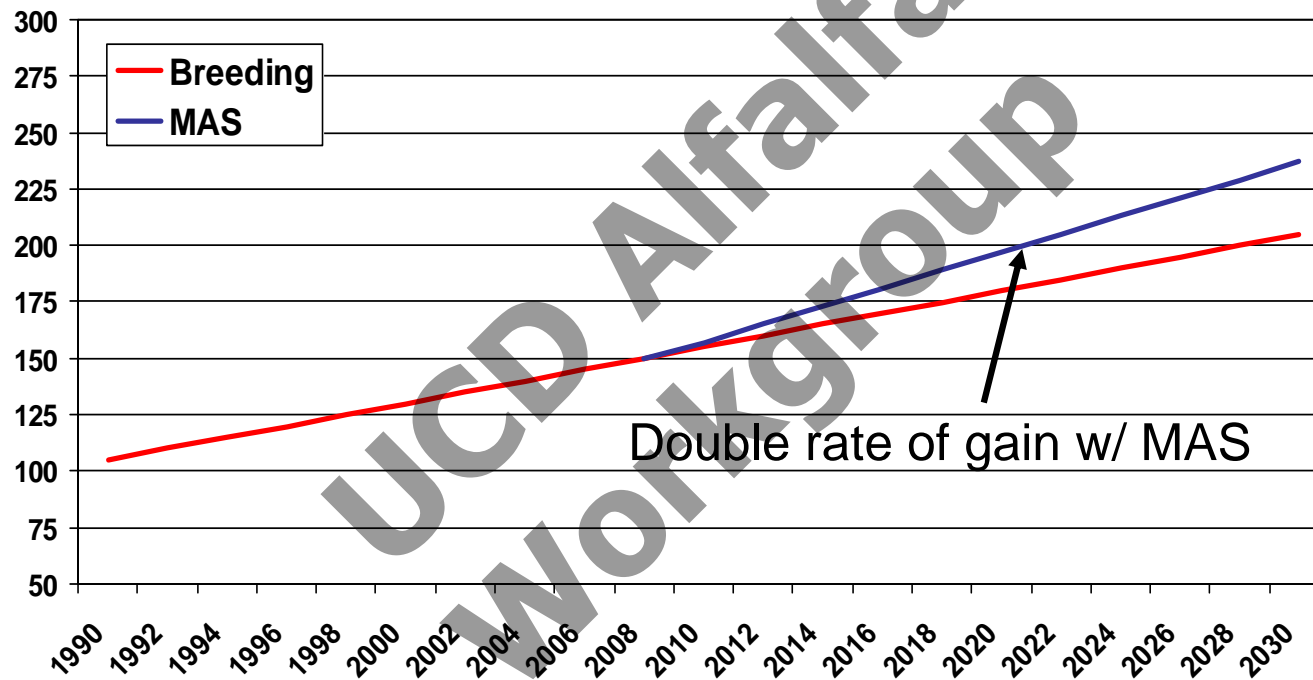


Source: 2008 ASTA/USDA/CSREES Workshop on Doubling Crop Yields





Projected Corn Yield

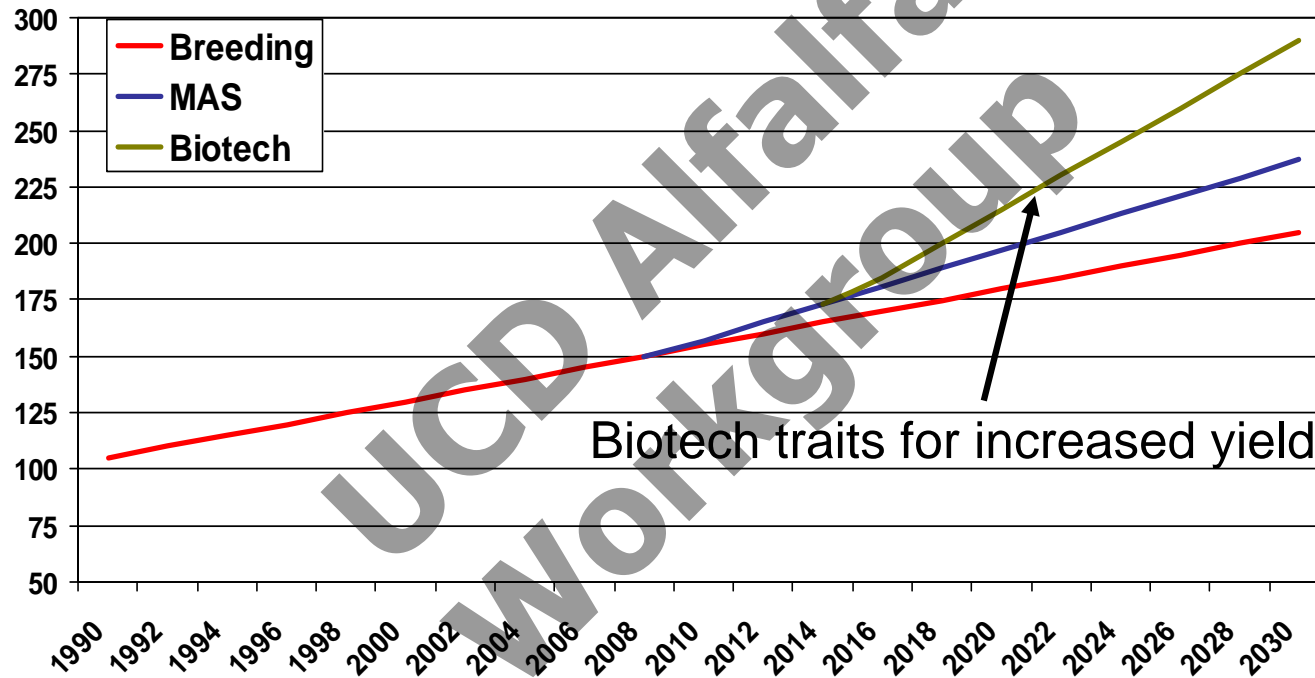


Source: 2008 ASTA/USDA/CSREES Workshop on Doubling Crop Yields



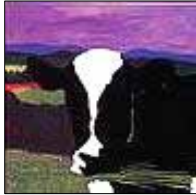


Projected Corn Yield



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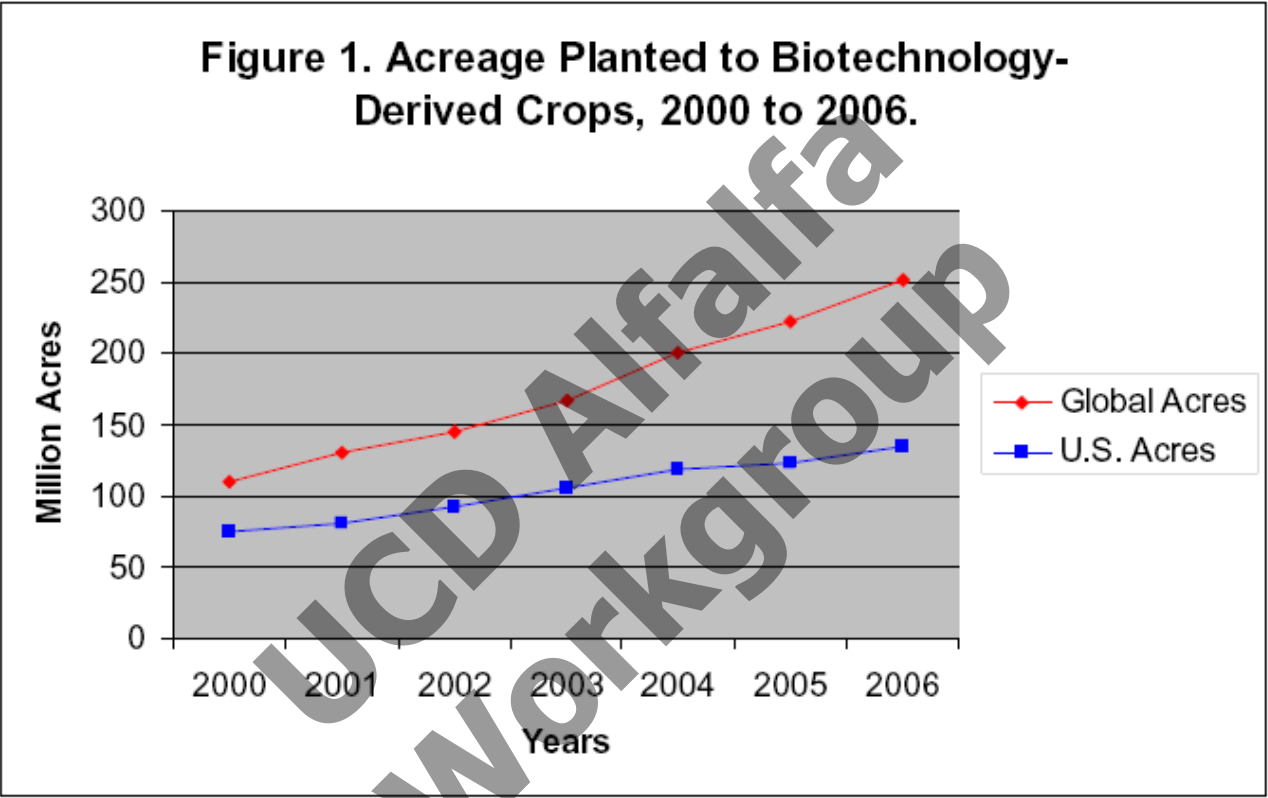




Biotech Traits

- ✘ Wide adoption of current traits
 - Higher yield, lower inputs, increased \$/A
- ✘ Genomics-based gene discovery
 - >\$1B/yr in private/public investment
 - Input and Output traits
- ✘ Alfalfa will benefit
 - Forage only traits (Reduced Lignin)
 - Broadly applied input traits (WUE)



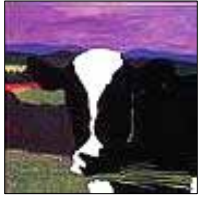


Source: Quantification of the Impacts in U.S. Agriculture of Biotech-derived crops in 2006 – National Center for Food and Agricultural Policy.

Herbicide Tolerance Benefits

Herbicide Tolerant Crop	Production Costs Decrease		Herbicide Use Decrease	
	per acre	Total	per acre	Total
Corn	7.69	315,535K	1.85	59,294K
Soy	22.05	1,561,545K	0.50	23,075K
Cotton	17.44	230,133K	1.44	24,446K

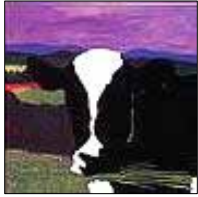
Source: Quantification of the Impacts in U.S. Agriculture of Biotech-derived crops in 2006 – National Center for Food and Agricultural Policy.



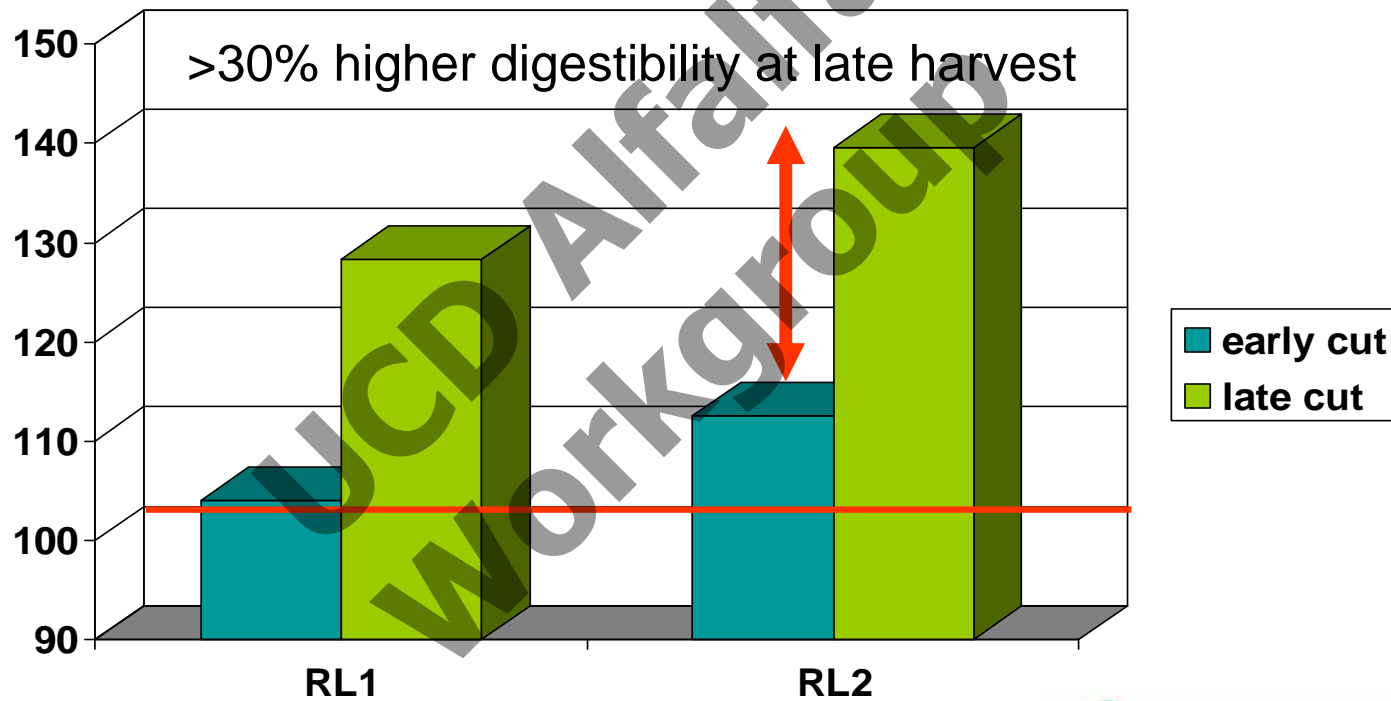
Biotech Traits in Alfalfa

- ✘ Roundup Ready
- ✘ Reduced Lignin
- ✘ Protein Improvement
- ✘ Increased Biomass
- ✘ Delayed Flowering
- ✘ Delayed Senescence
- ✘ Alfalfa Weevil Resistance
- ✘ Abiotic Stress Tolerance
 - Drought
 - Salt
 - Low pH



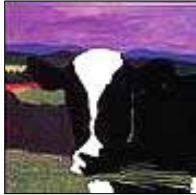


DMD (RL as % null) 3rd cut early vs late

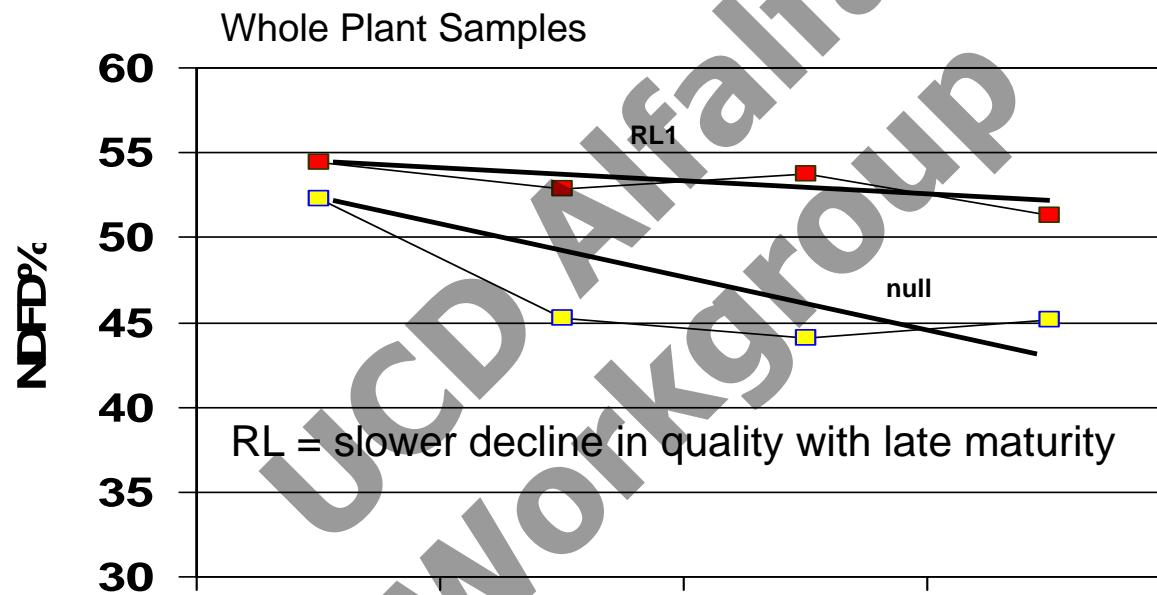


(Getachew, et.al., unpublished)



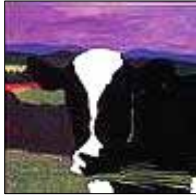


RL1 Changes in NDFD First Harvest



NDFD = digestibility of the NDF (fiber) fraction
RNAi CCOMT F1 Syn1 (combination of 6 events)
Null F1 Syn1

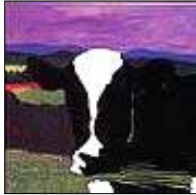




Seed Treatments

- ✘ Increased research/testing focus
 - Micro-nutrients
 - Growth regulators
 - Fungicides/insecticides
 - Seed coatings
- ✘ 2nd generation products now available
- ✘ There's more to come

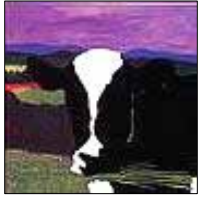




Consolidation

- ✘ Consolidation in all sectors
 - USDA/ARS
 - Universities
 - Private industry
- ✘ Impact of Consolidation
 - Realization that we're all in this together
 - CAI – ARS/Noble Fdn/Industry
 - NAFA RRA Best Practices
 - Clear focus of limited resources
 - Stable ownership = long term commitment





Conclusions

- ✘ Incredible potential for the crop
 - Higher forage yield
 - Higher value (increased quality)
 - Potential new uses
- ✘ Speaking with one voice
 - Importance of NAFA/CAFA
- ✘ Alfalfa is the tail, not the dog
 - Commodity/energy prices will impact crop

