Factors Affecting Relative Forage Quality in Hay and Haylage

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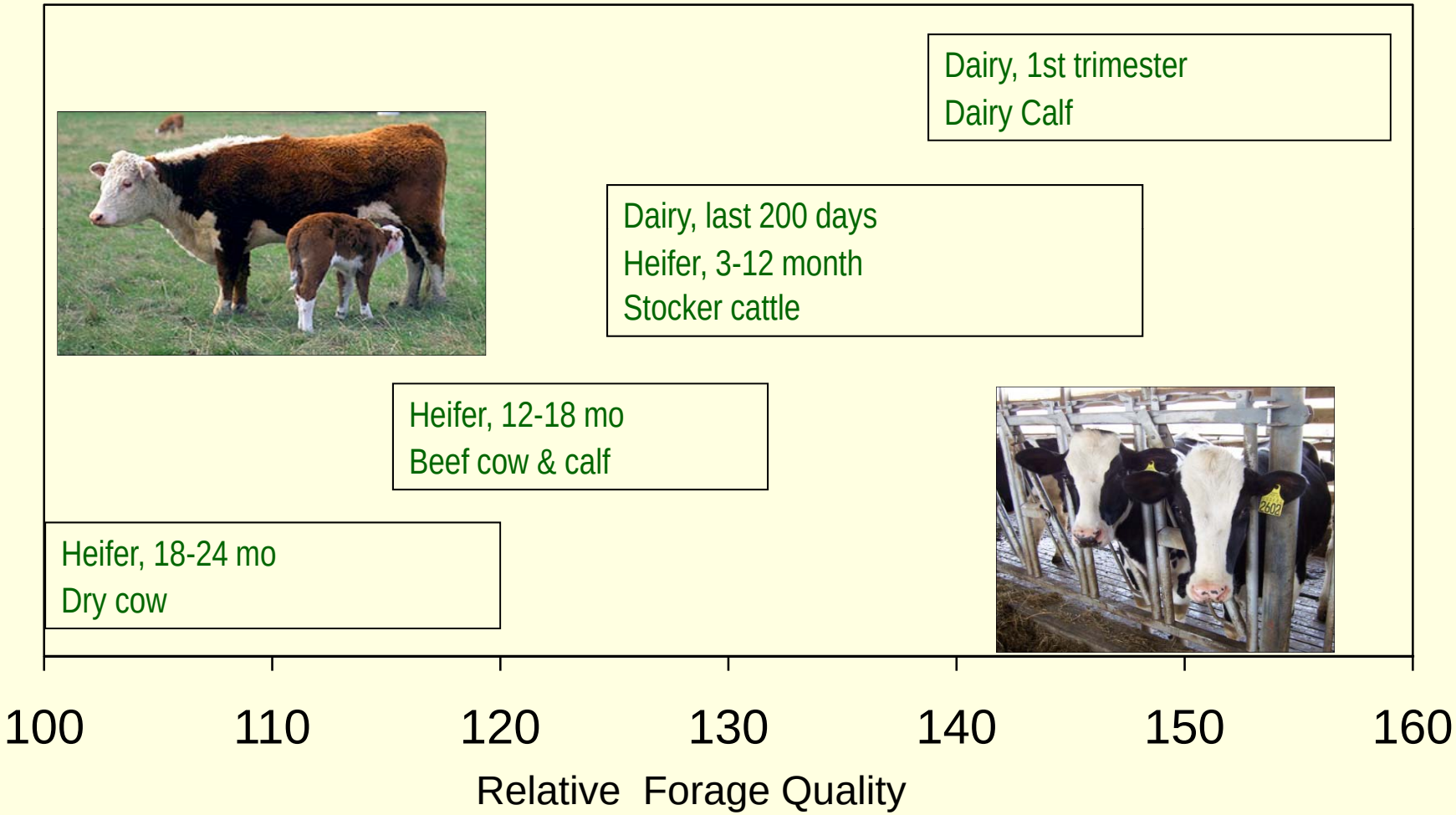
Forage Quality Needs of Animals



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Forage Quality Needs of Animals

- Stocker cattle
- Growing lambs & kids

- Nursing mare
- Hard working horse

- Beef cow & calf
- Ewe with lamb
- Doe with kid

- Ewe/doe, not lactating
- Idle horse

100 110 120 130 140 150 160

Relative Forage Quality

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Relative Forage Quality (RFQ)

$$RFV = \frac{\text{Intake potential} * DDM}{1.29} = \frac{120/NDF * [88.9 - (0.779*ADF)]}{1.29}$$

$$RFQ = \frac{\text{dIntake potential} * dTDN}{1.23}$$

$$= \frac{[NDF+((dNDF-\text{avg } dNDF)*.374)] * [dNFC+dCP+dFA*2.25+dNDF-7]}{1.23}$$

Relative Forage Quality Change

RFQ changes as following change:

- NDF
- digestible fiber (dNDF)
- Crude protein
- Nonfibrous carbohydrate

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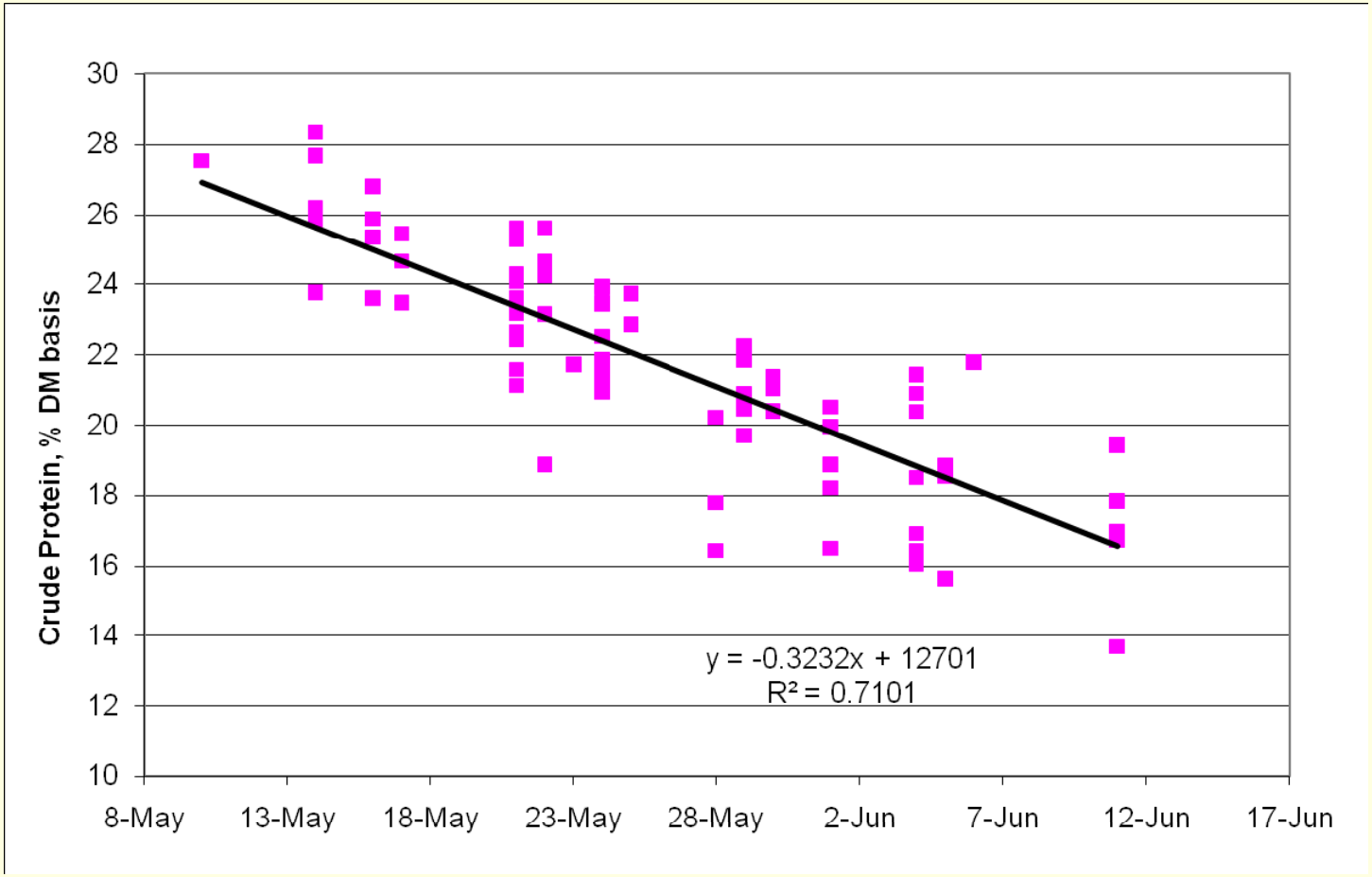
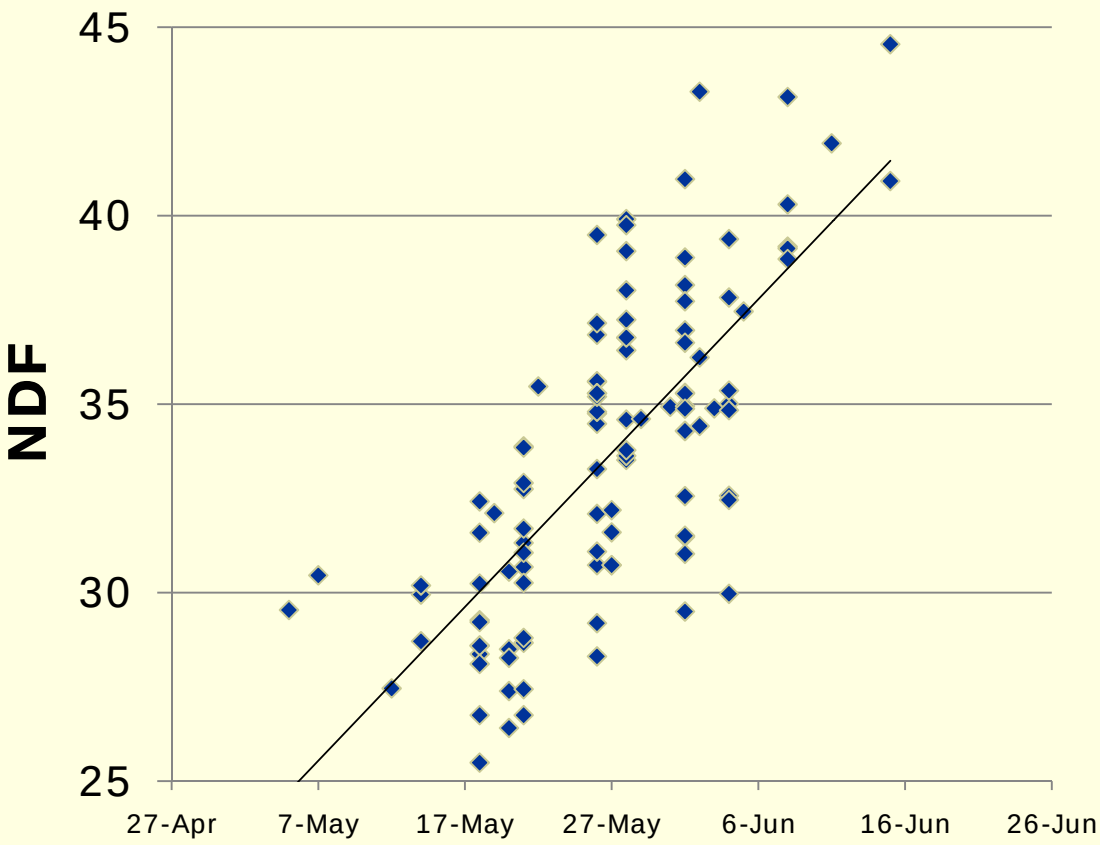
Crude Protein Change over Time



NDF Change over Time



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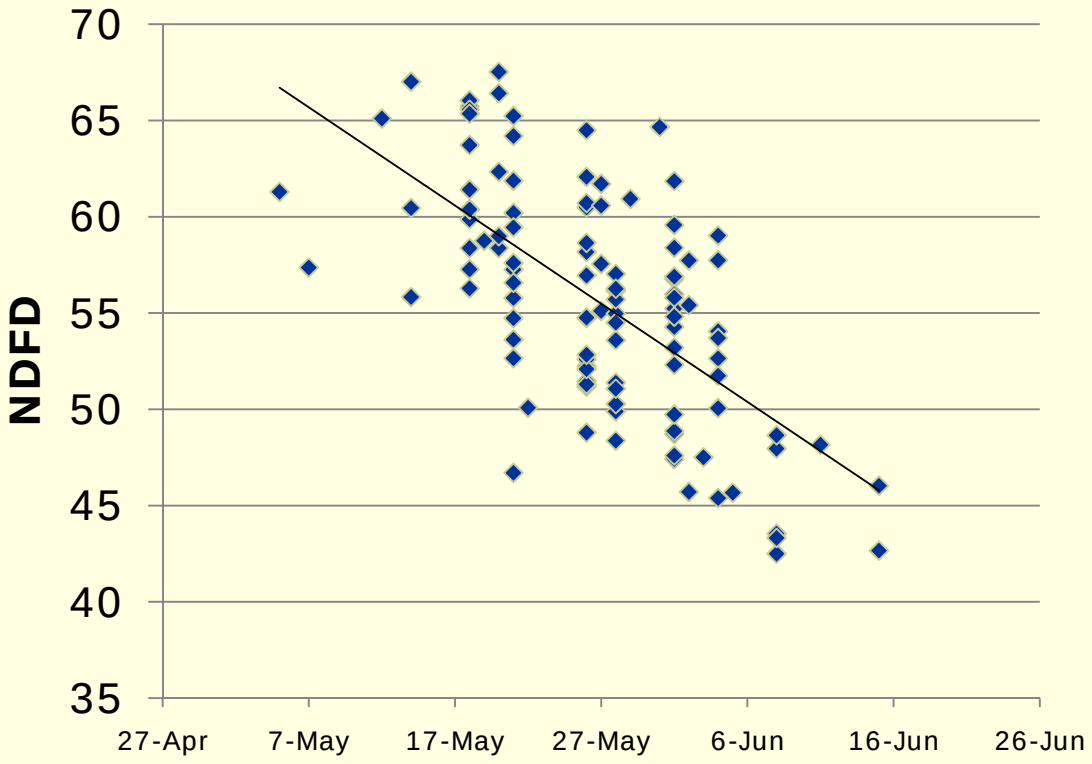
Change in NDFD over time



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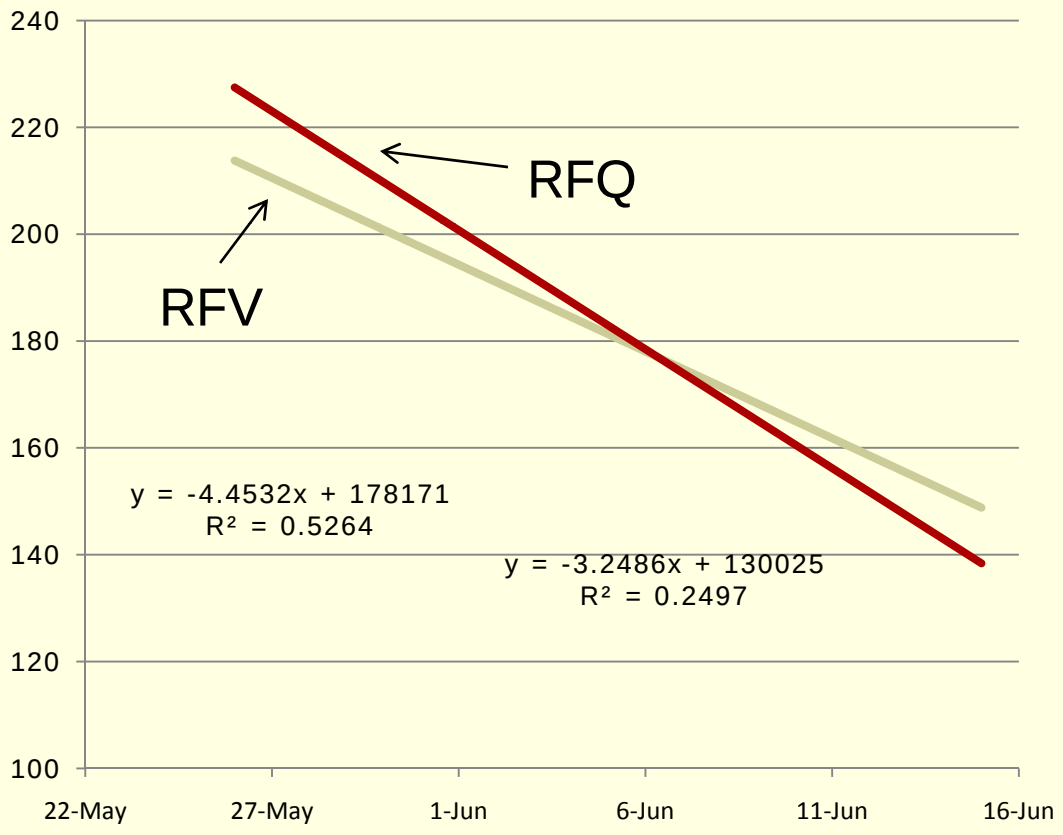
Change in RFV and RFQ over time



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Timely harvest

- The largest single effect on forage quality is date of harvest.

Daily Rate of Forage Quality Change in Spring

Component	2006 -2009
Crude Protein	-0.25
Acid Detergent Fiber	0.36
Neutral Detergent Fiber	0.43
NDFD	-0.43
RFV	-2.9
RFQ	-3.6

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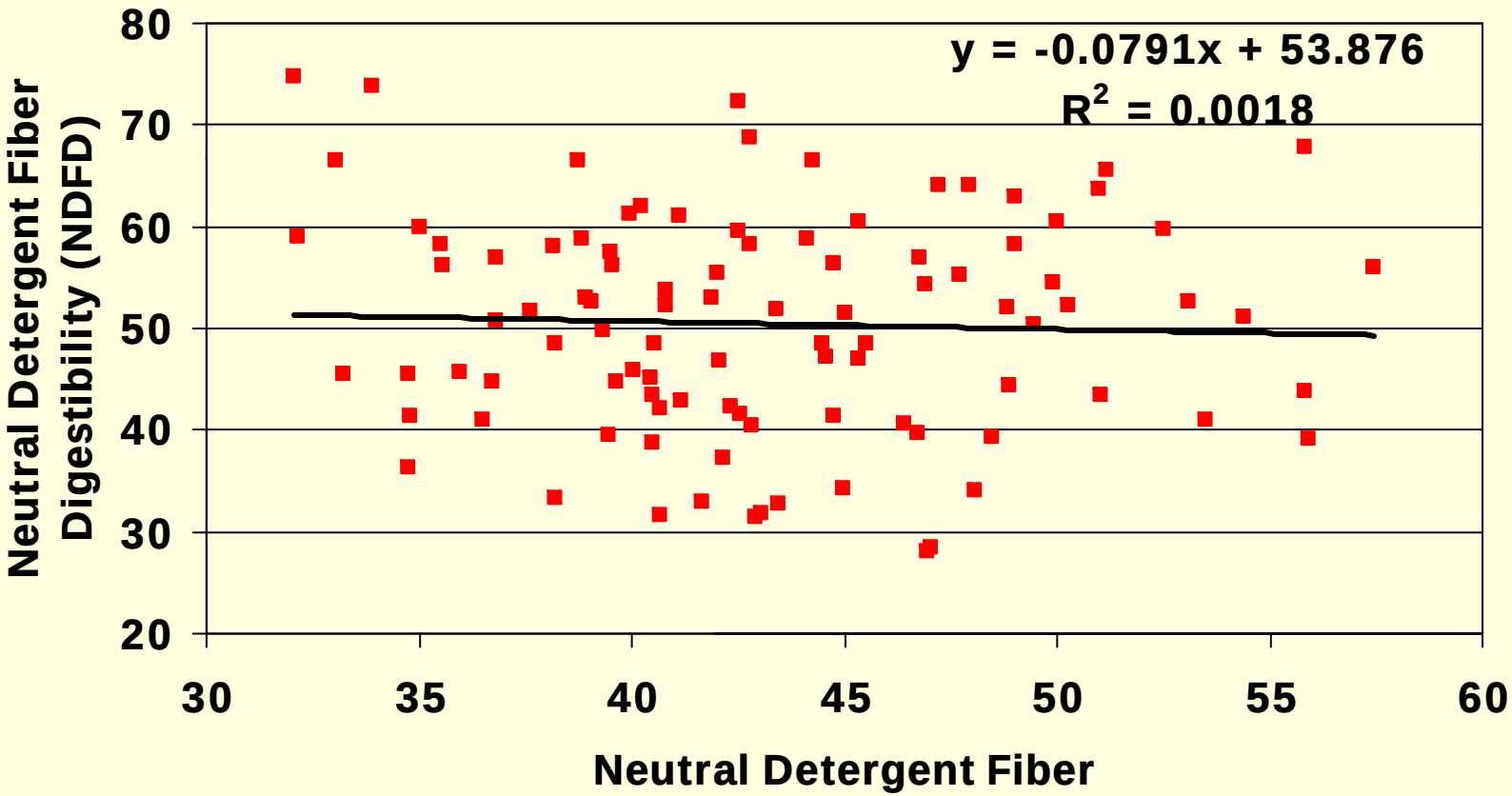
Relationship of NDF Content to NDF Digestibility



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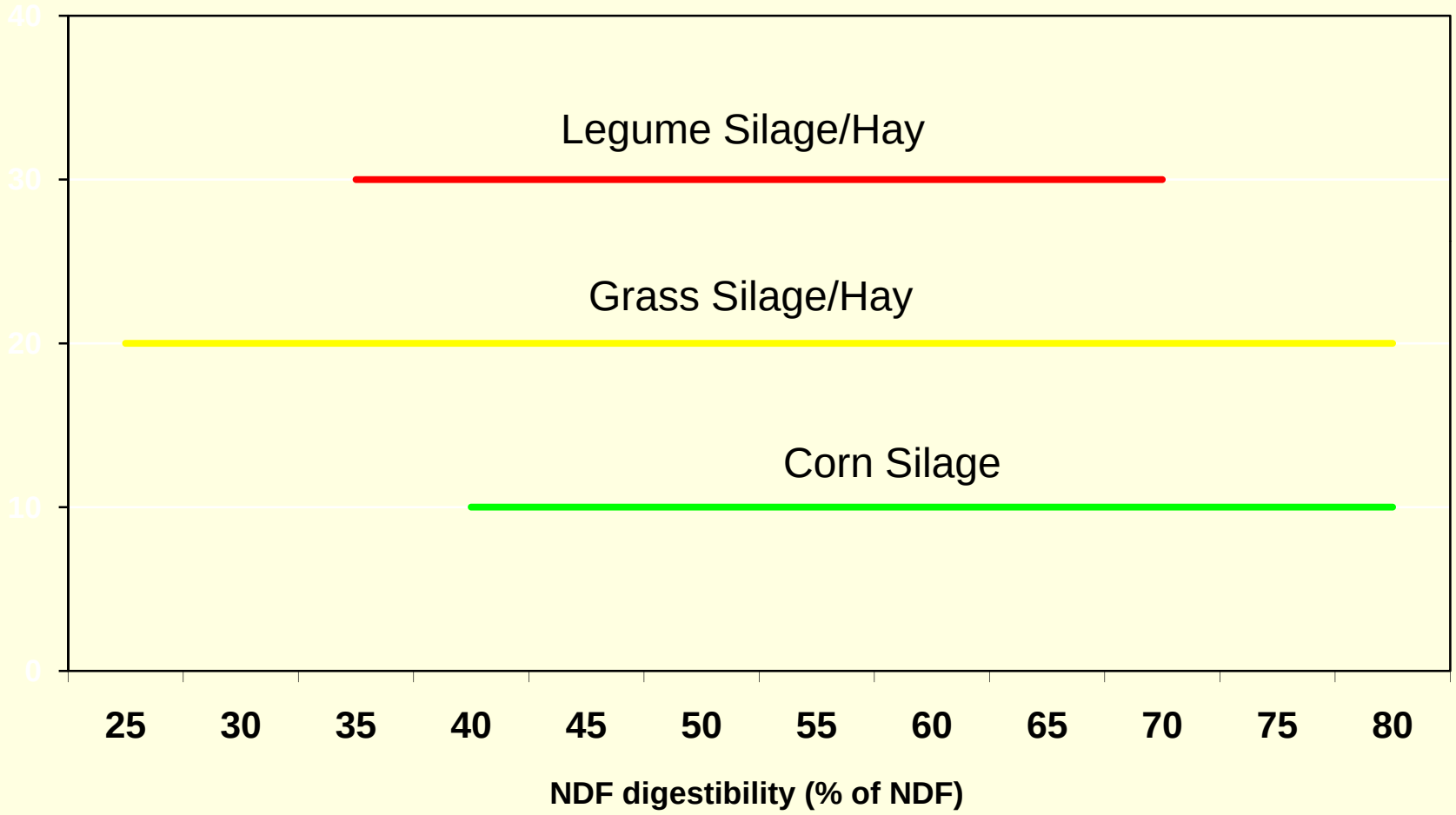
Range of digestibility of Common Forages



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Minimize Ash Content

Ash Content of 2010 Superbowl Forage Samples	
Average	12.7
Minimum	7.9
Maximum	16.9

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Minimize Ash Content

- Cutting height ≥3 inches
- Disc mower blade angle
- Swath on top of stubble, not on ground
- Rake so tines do not touch ground

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Select a High Quality Variety

- High forage quality variety
- Disease resistance
- Fertilize to meet nutrient needs

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Factors affecting Fiber Digestibility

- Maturity
- Genetics
- Cool Weather
  - First cutting vs later cuttings
  - Cool weather over summer

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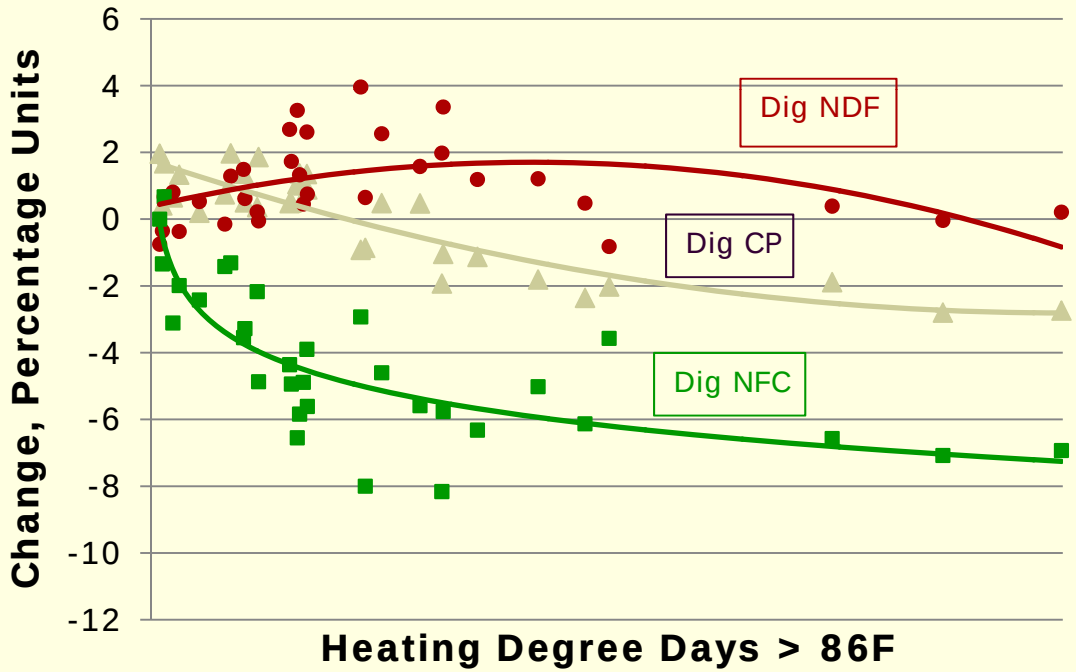
Harvesting/storage moisture

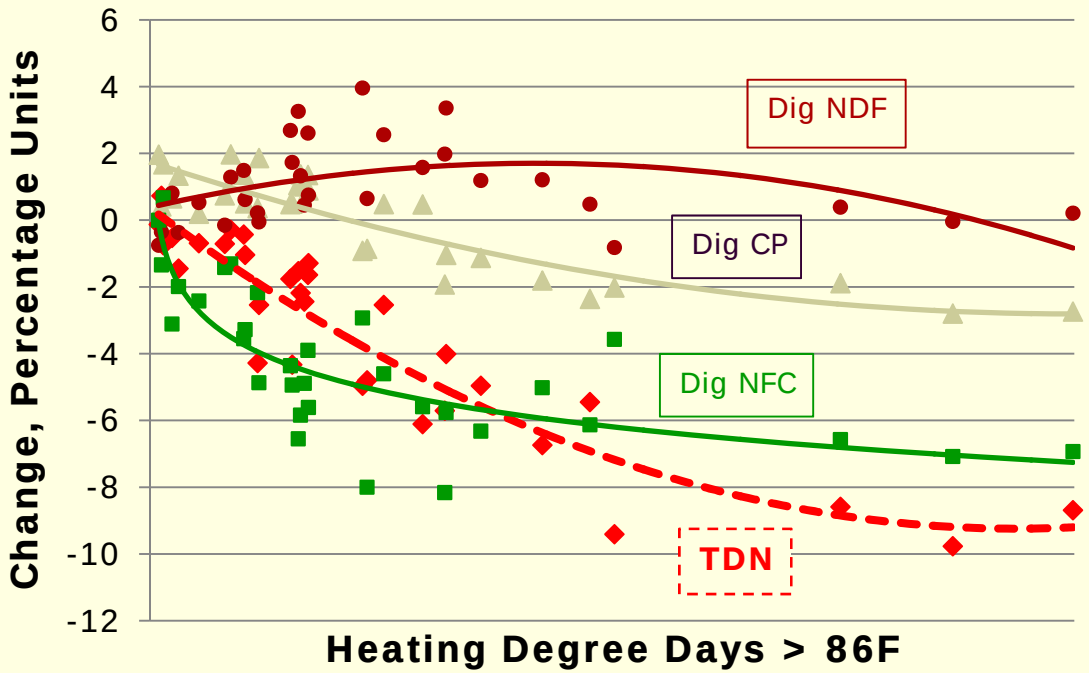
- Heat damage to hay haylage



Source: Coblentz, 2008, USDA -ARS

Hay Preservation – Results of Malliard Reaction

- TDN = dNFC + dCP+ 2.25*FA + dNDF - 7



Source: Coblentz, 2008, USDA -ARS

High Nonfibrous Carbohydrate

- Good Growing Conditions
  - Adequate soil fertility
  - Adequate moisture
- Sunny day before
- AM/PM harvest

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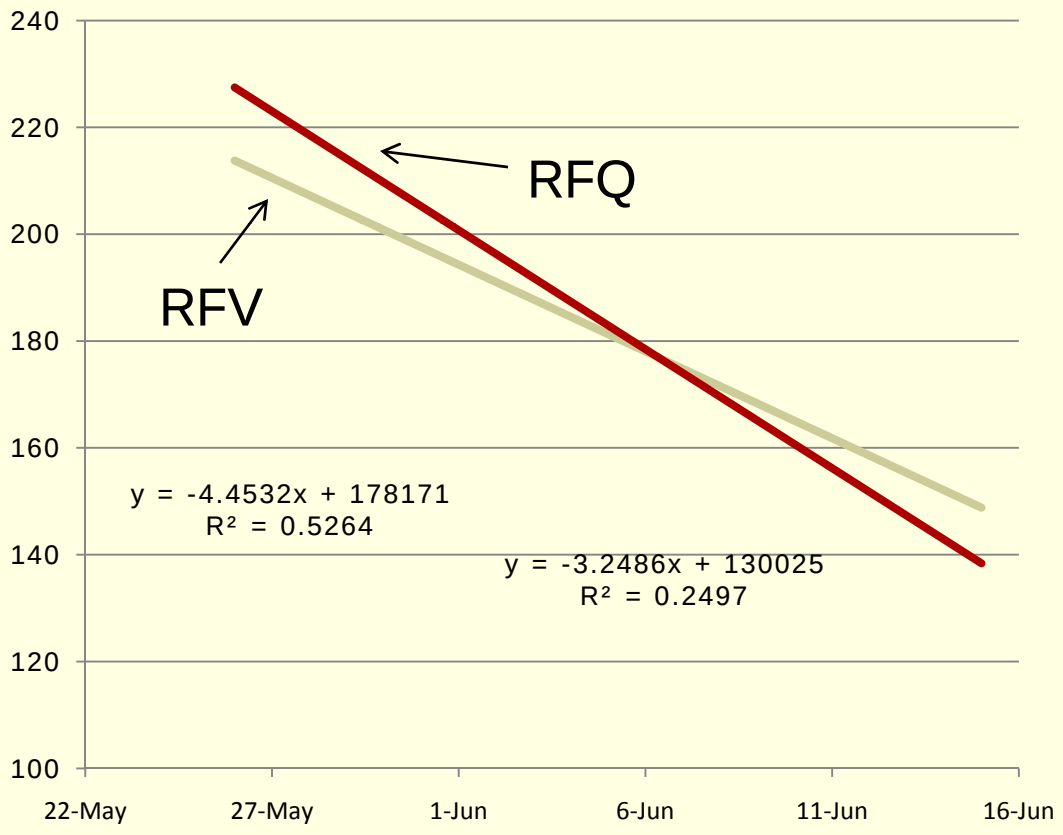
Change in RFV and RFQ over time



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Factors affecting RFQ

- Maturity at harvest
- Ash content
- Select high quality variety
  - Genetics
  - Disease Resistance
- Cool Weather
- Harvest to avoid heating
- Harvest for high NFC
  - Sunny day
  - AM/PM

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