Nitrogen Management

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Current Issue

- Nitrogen prices continue to increase (almost on a weekly basis)
- Short-term forecasts reveal that higher prices will be the norm
- Commodity prices are still rising, but with higher nitrogen prices – economic management of nitrogen inputs still key

Overview

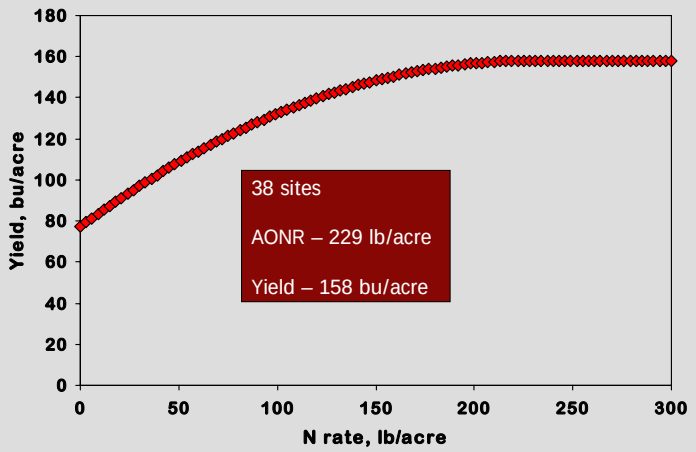
- Nitrogen response - an historic perspective
- Economic-based nitrogen recommendations
- New (and some old) technologies for nitrogen management
  - Nutrisphere and agrotain

Nitrogen Response

- How have things changed?
  - Nitrogen response (on average has not changed that dramatically)
    - Corn is still responsive (but we are achieving higher yields than we have historically with less nitrogen)
      - Hybrid improvement
        - Transgenics
      - Improved agronomic practices

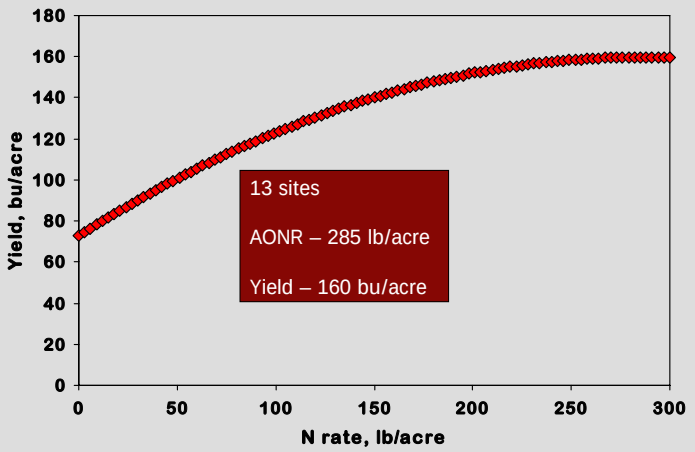
Nitrogen Response

Corn response in the 70s



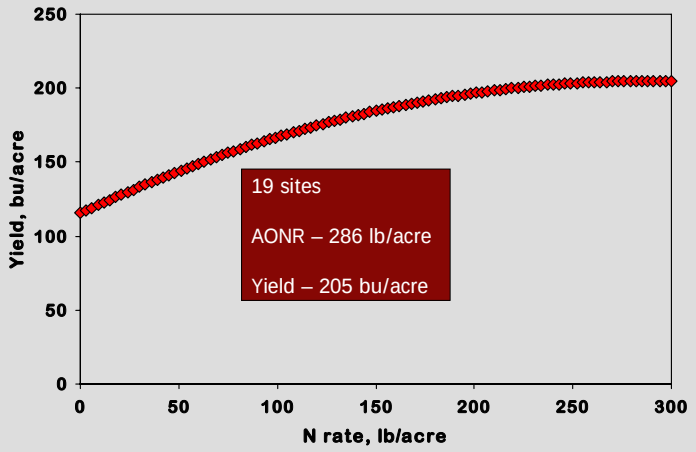
Nitrogen Response

Corn response in the 80s



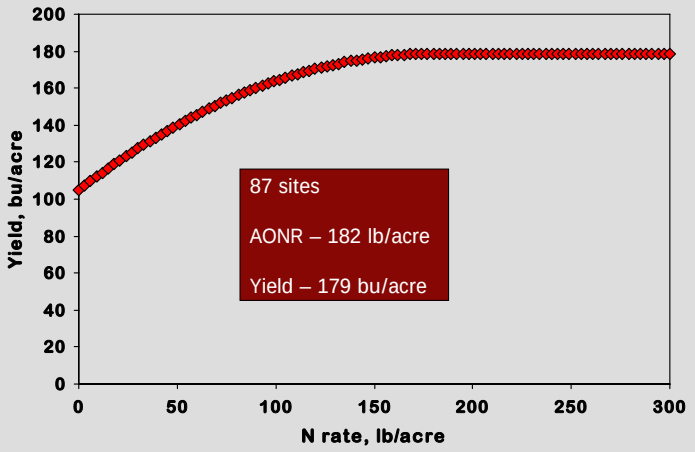
Nitrogen Response

Corn response in the 90s



Nitrogen Response

Corn response in the last 10 years

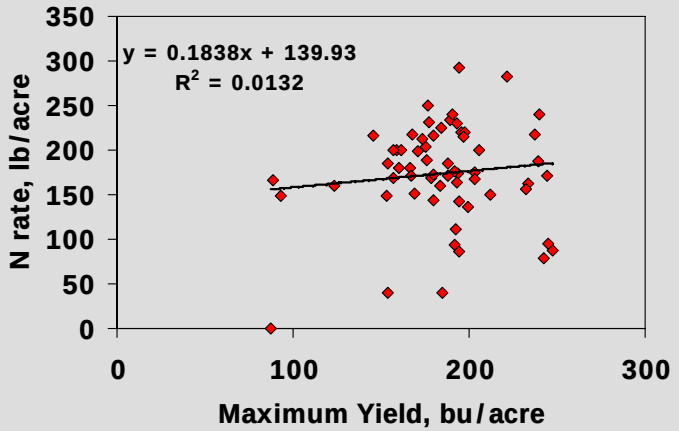


Nitrogen Response

- We have discovered that yield goal (potential) is not a good way to pick N rates

Nitrogen Response

- Corn after soybeans, 1998-2007



Economic Changes

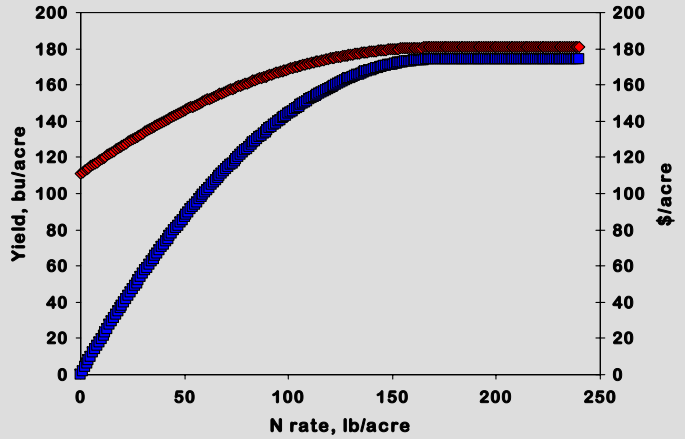
- Not only has nitrogen response changed, but so have economic realities
  - Nitrogen prices near (or exceeding) $0.60 - $0.70 per pound (some sources are higher)
    - High natural gas prices (not necessarily the only player anymore)
    - Global demand
    - Weak dollar
  - Commodity prices at record levels
    - Biofuels
    - Increased demand for animal feed globally

A "Brave" New World

- What does this mean for you?
  - Consider economics of your decision
  - Make the best economic choice
    - i.e. utilize our new economic recommendations

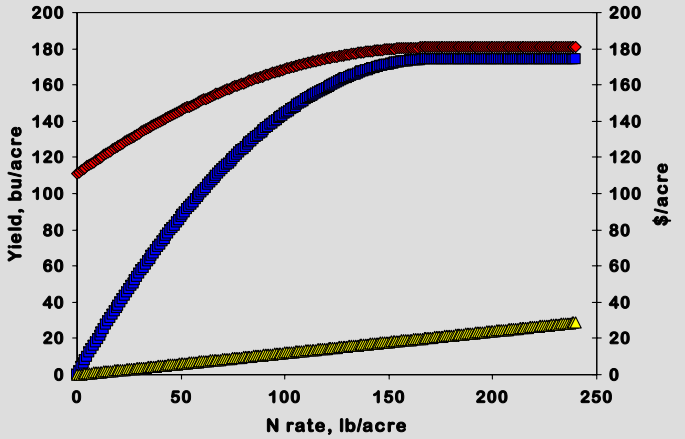
Circa 1997

- Corn prices of $2.50/bu



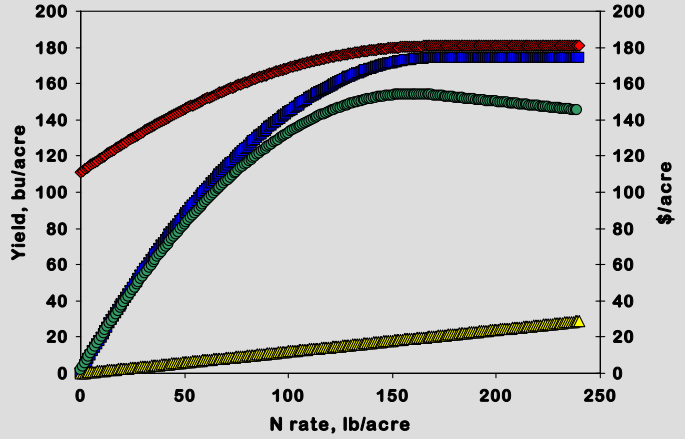
Circa 1997

- Nitrogen input cost - $0.12/lb N



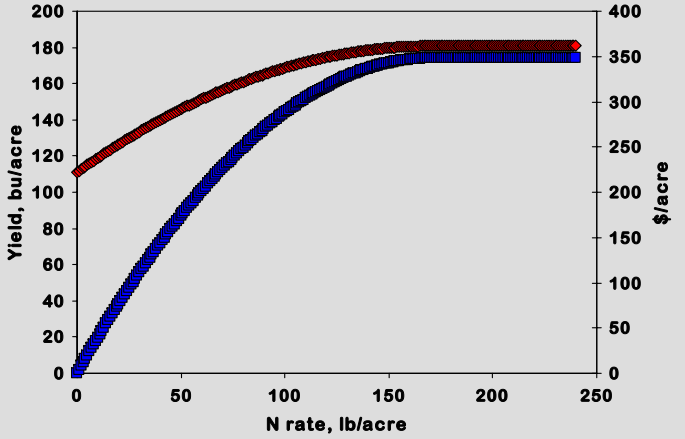
Circa 1997

- Net return to nitrogen investment



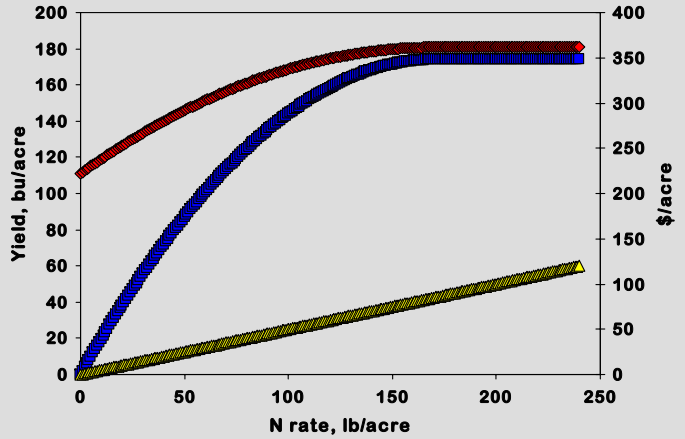
Today

- Assuming a corn price of $5/bu



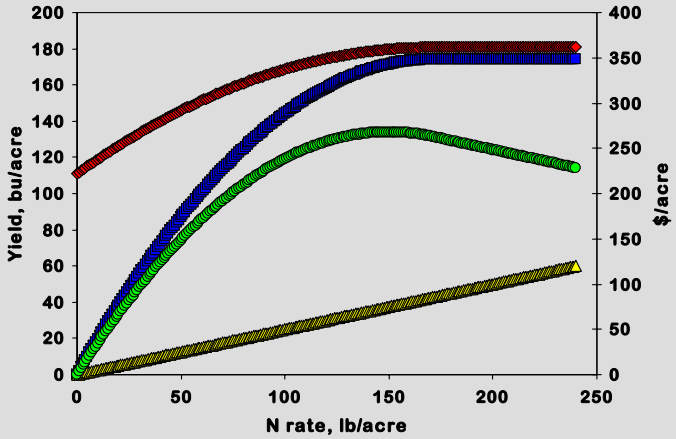
Today

- Assuming N costs $0.50/lb of N



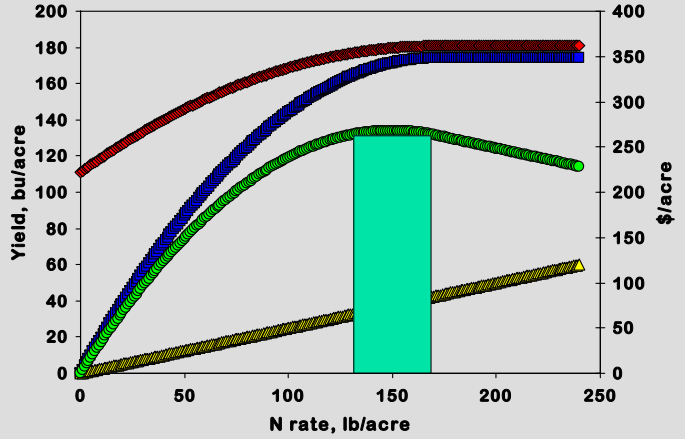
Today

- Return to nitrogen



Today

- Based on $1 less than the optimum point



New Technologies

- Do any of the new (and some old) products offer hope?
  - Nutrisphere
  - Agrotain

Research Results

- Western Research Station, 2006
- All nitrogen materials applied preplant without incorporation in no-till systems

Nitrogen source	Nitrogen rate, lb/acre	Yield, bu/acre
Check	0	94
Urea	100	165
Nutrisphere	100	178
UAN	100	159
UAN+Nutrisphere	100	169
Urea+Agrotain	100	178
UAN+Agrotain	100	157
$LSD_{0.1}$		23

Research Results

- An inch of rain fell within three days of nitrogen application
  - Should have minimized risk of nitrogen loss

Research Results

- Western Research Station, 2007
- Again, all nitrogen materials applied preplant without incorporation in no-till systems

Nitrogen source	Application method	Yield, bu/acre
Check	---	157
Nutrisphere	Broadcast	218
UAN+Nutrisphere	Broadcast	181
UAN+Nutrisphere	Dribble	200
Urea+Agrotain	Broadcast	243
Urea	Broadcast	224
UAN	Dribble	212
$LSD_{0.1}$		16

Research Results

- Western Research Station, 2007

Nitrogen source	Application method	Yield, bu/acre
Check	---	157
Nitamin (conc. 1)	Dribble	215
Nitamin (conc. 2)	Dribble	211
UAN	Dribble	212
$LSD_{0.1}$		17

Nitrogen source	Application method	Yield, bu/acre
Check	---	157 c
UAN+Agrotain	Broadcast	195 b
UAN+Agrotain	Dribble	235 a
UAN	Dribble	231 a

Research Results

- It did not rain for 11 days after the application
  - Essentially a worst case scenario for nitrogen loss after urea application

Research Results

- Northwest Research Station, 2007
- Fall tillage only (treatments were not incorporated)

Nitrogen source	Application method	Yield, bu/acre
Check	---	116
Nutrisphere	Broadcast	137
UAN+Nutrisphere	Broadcast	120
UAN+Nutrisphere	Dribble	128
Urea+Agrotain	Broadcast	129
Urea	Broadcast	122
UAN	Dribble	132
$LSD_{0.1}$		10

Research Results

- Northwest Research Station, 2007

Nitrogen source	Application method	Yield, bu/acre
Check	---	116 b
UAN+Agrotain	Broadcast	135 a
UAN+Agrotain	Dribble	133 a
UAN	Dribble	134 a

Research Results

- Rained a quarter of an inch within 6 days of application
  - Again worst case scenario for nitrogen loss

Summary of Research

- No clear advantage of using these products at all locations
- Not something that I would recommend widespread
  - Additive rules
    - More likely to see benefit from surface applied urea in no-till
    - If using an additive, decrease your nitrogen application rate
    - Incorporated or injected urea unlikely to need a stabilizer

Questions?

- Thanks.
- For more agronomic information checkout:

- http://agcrops.osu.edu/
- http://agcrops.osu.edu/fertility/

- http://corn.osu.edu/