Fertility Management of Irrigated Sunflowers

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Fertility Management???

- Majority of work on rainfed sunflowers
  - Limited yield potential as compared to irrigated
  - Potential for more residual Nitrogen
- How does water management impact N use
  - Limited water
    - encourage root growth
    - Limit deep percolation of N

Future Prices of Fertilizer?????

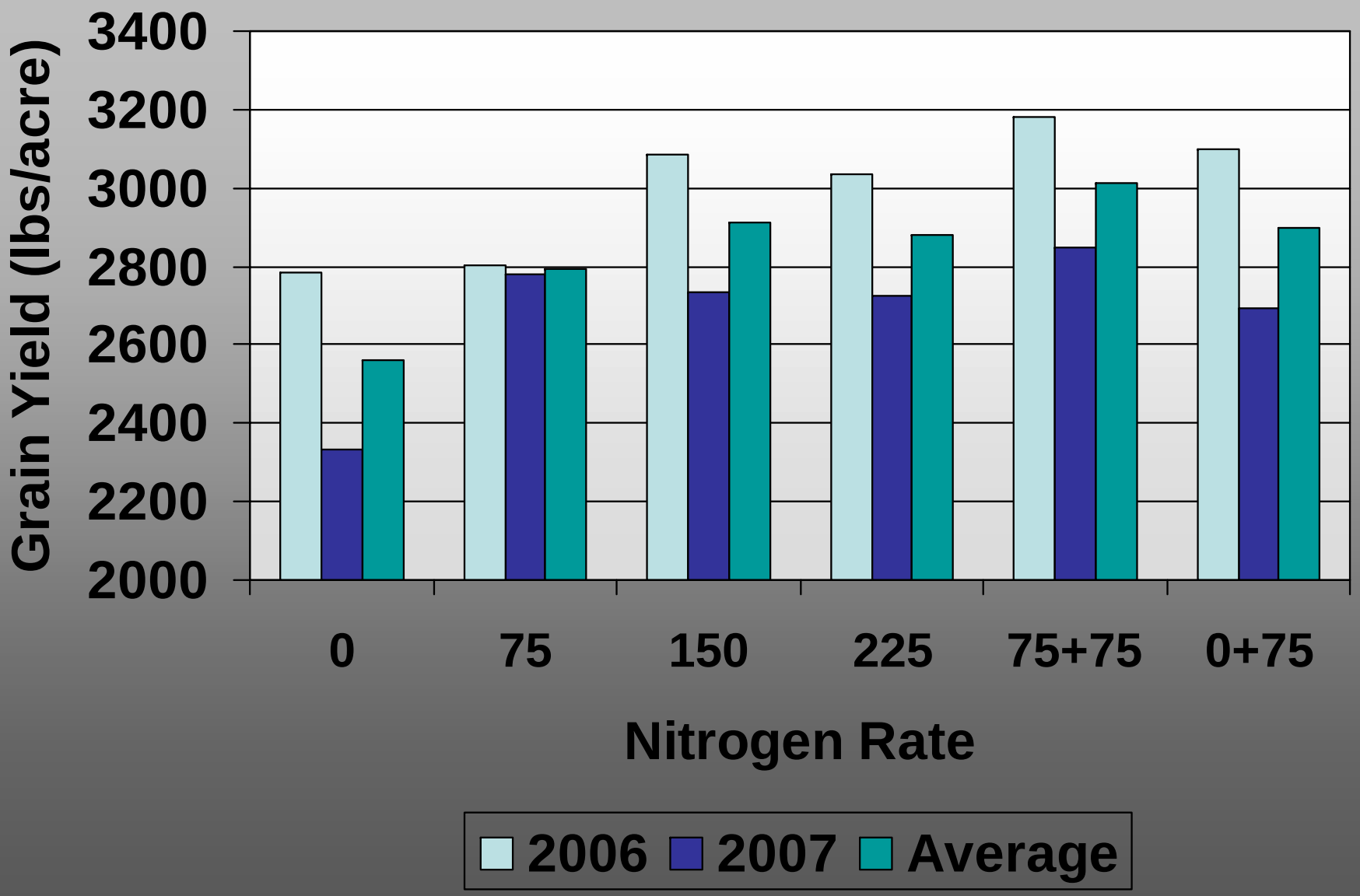
Fertility Management

- Project initiated at Burlington, CO
  - Part of large scale demonstration for water conservation
- Irrigation management
  - Full irrigation – as needed
  - Allocation – 5 inches maximum
- Fertilizer Management
  - Pre-plant
  - Combination of pre-plant and fertigation

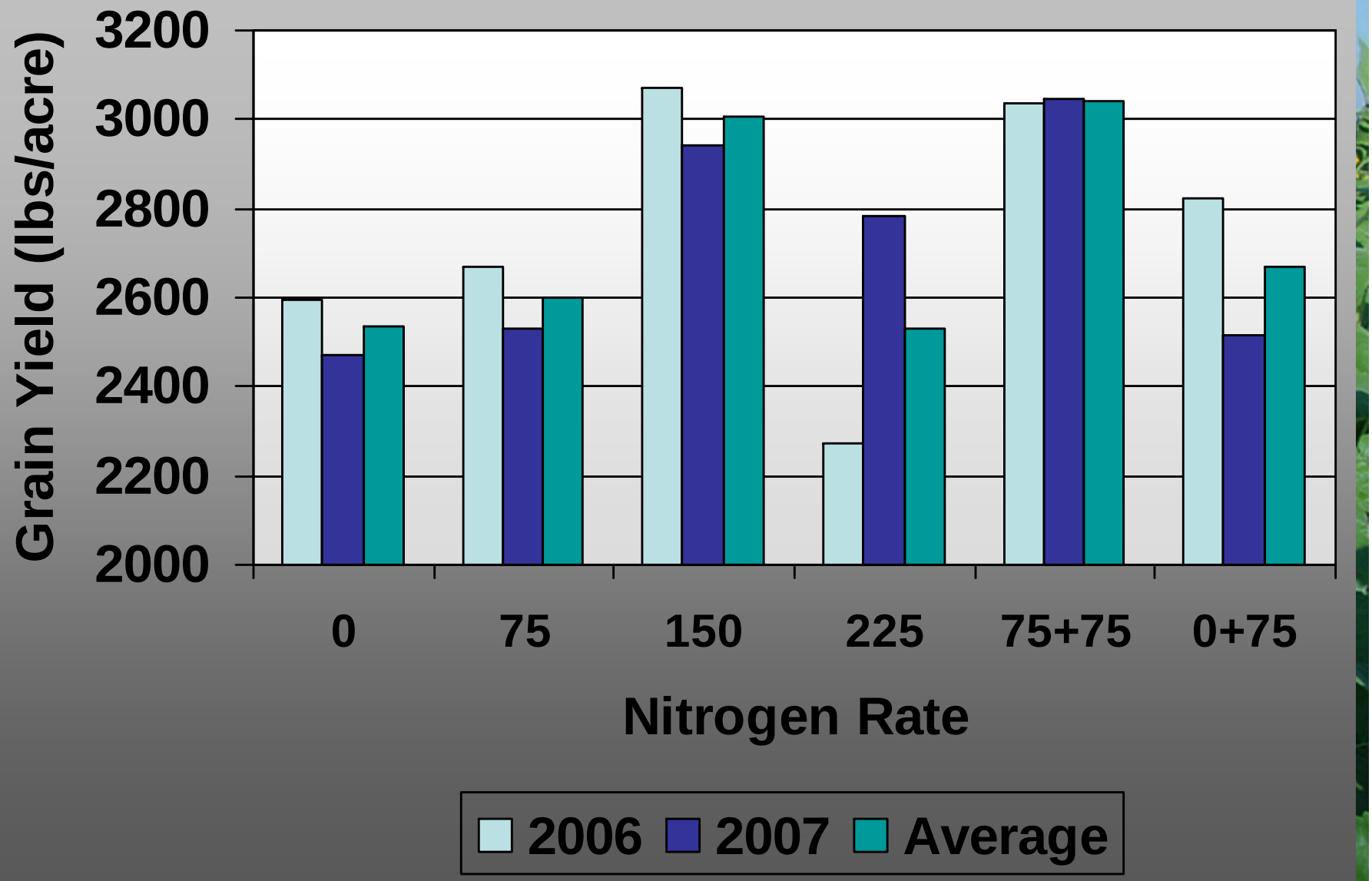
Fertility Management

- Measurements
  - Grain Yield
  - Soil Nitrogen
  - Chlorophyll Readings (SPAD)
    - Hand measurement
    - Relative greenness of crop
    - Indication of nitrogen stress
    - Used in corn production
- Economics

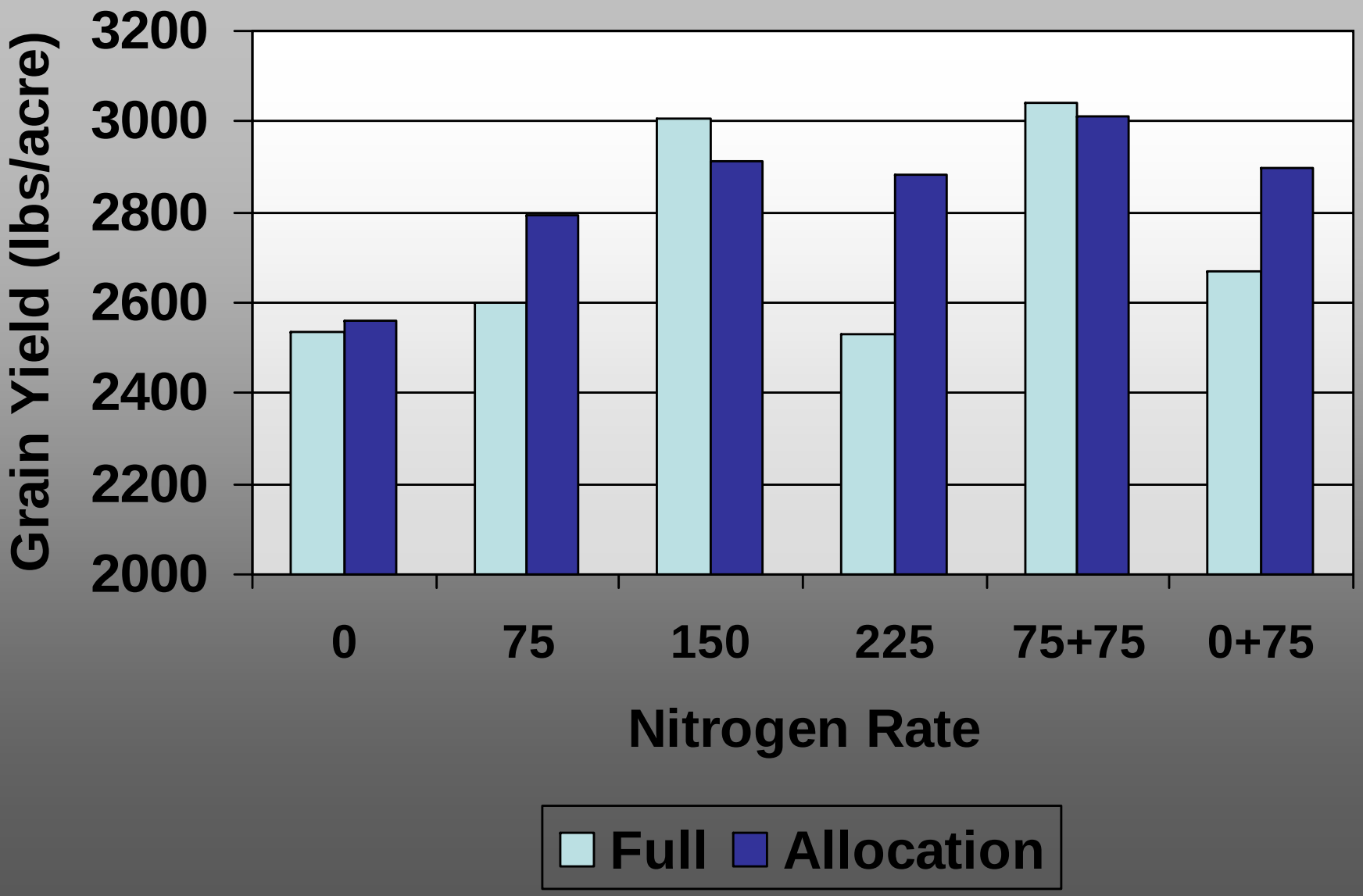
Grain Yields - Allocation



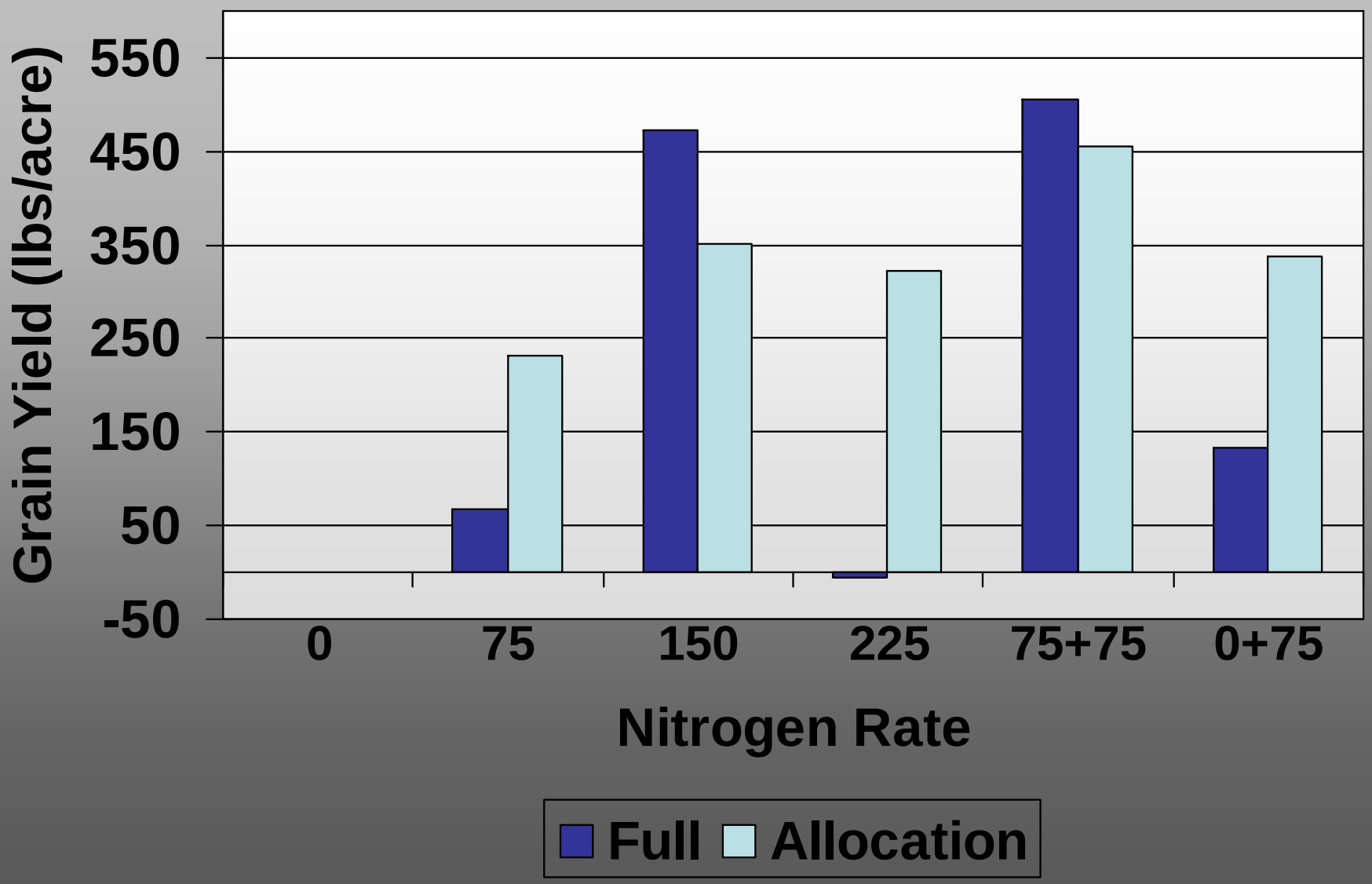
Grain Yields – Full Irrigation



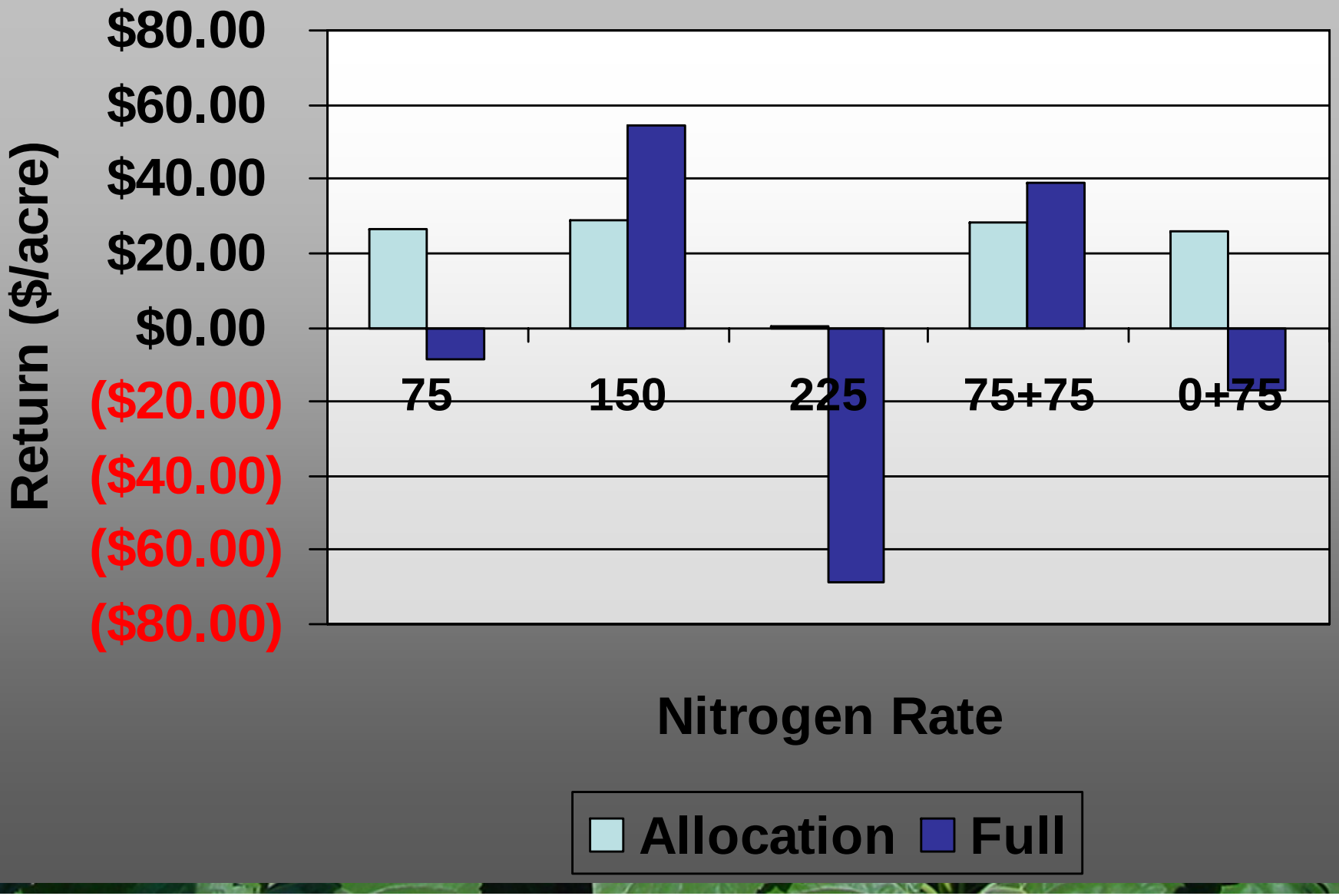
Grain Yields



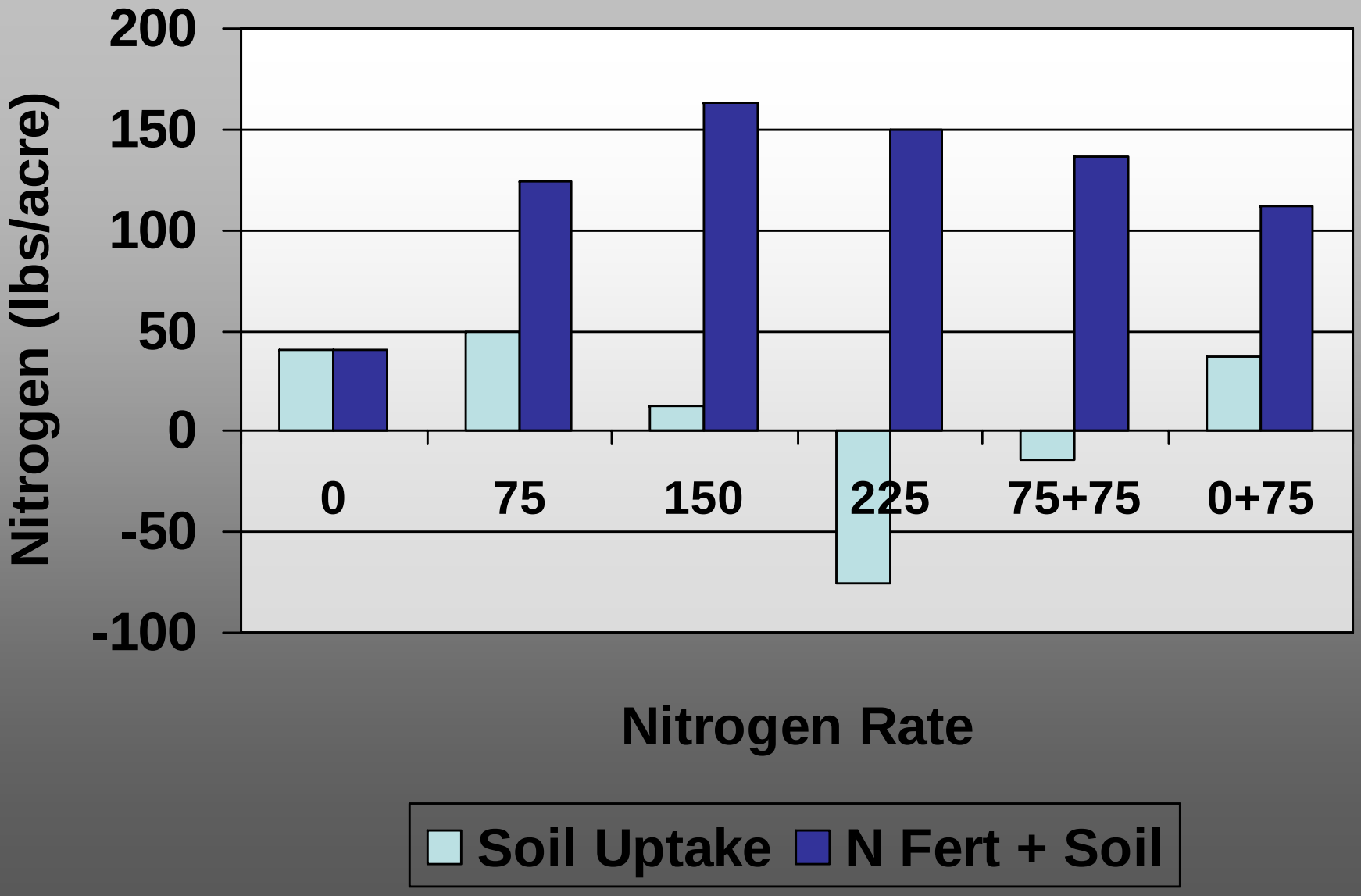
Increase in Grain Yields



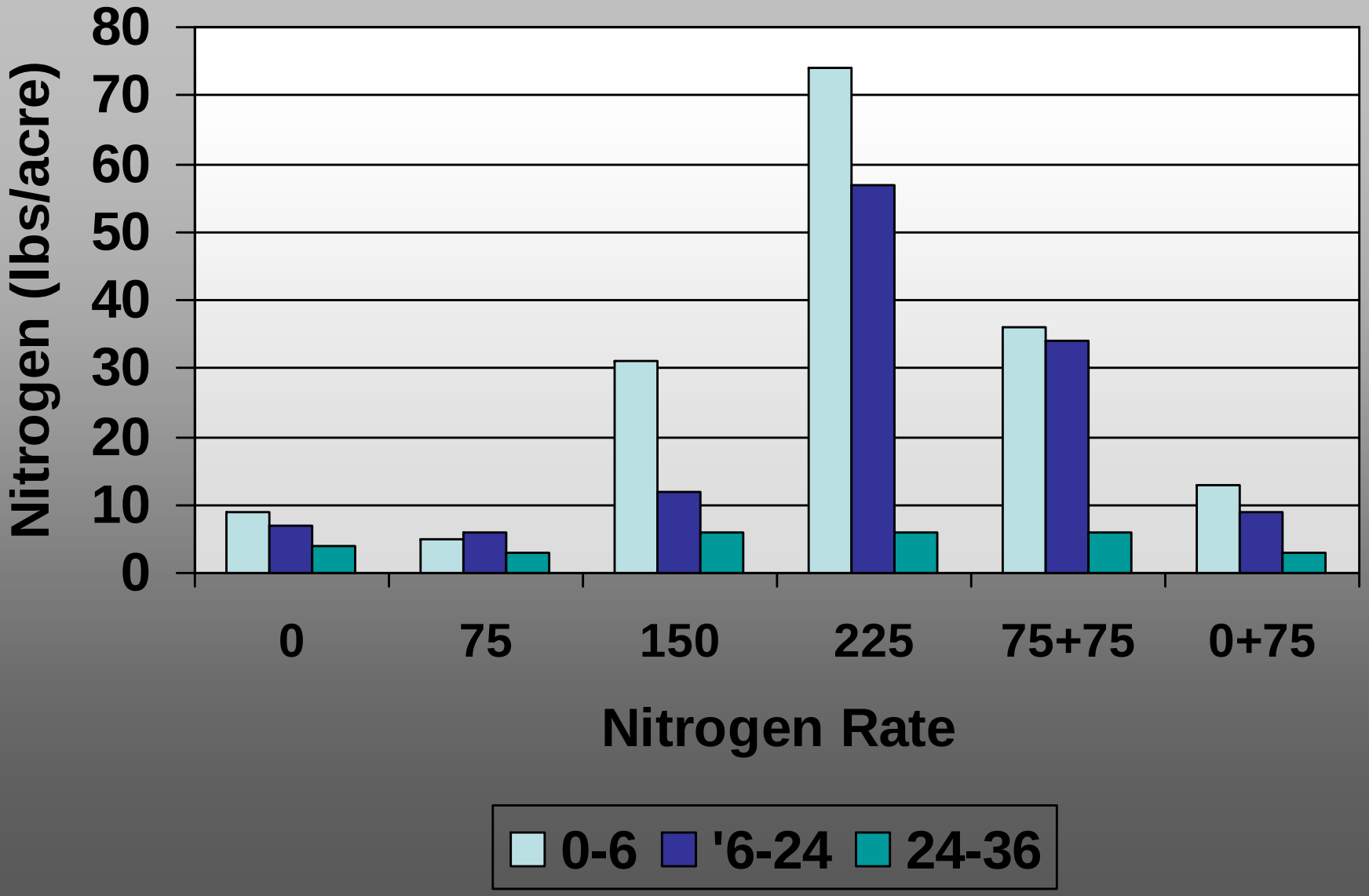
Return to Fertilizer
$21 per cwt



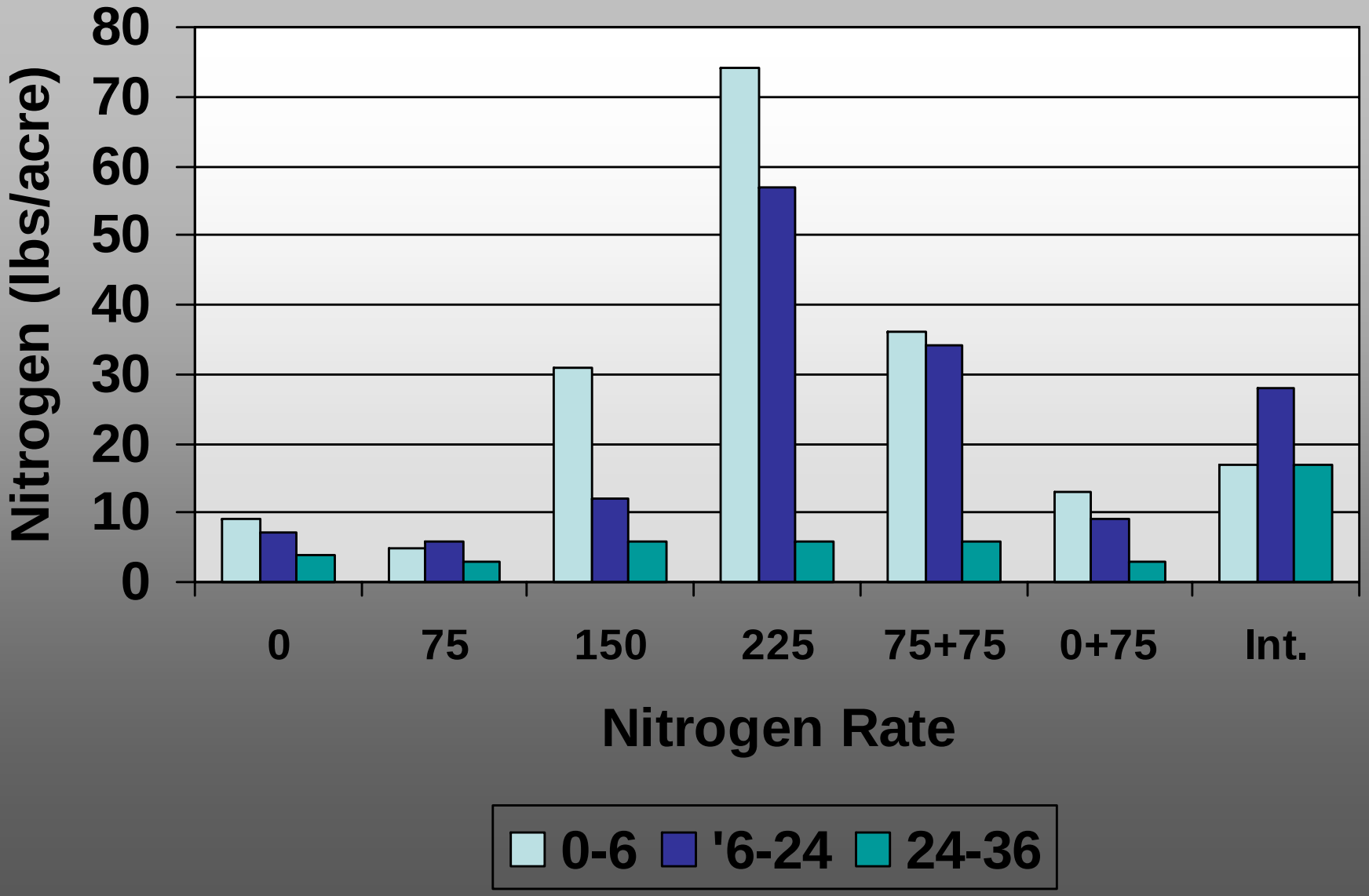
Nitrogen Uptake Allocation

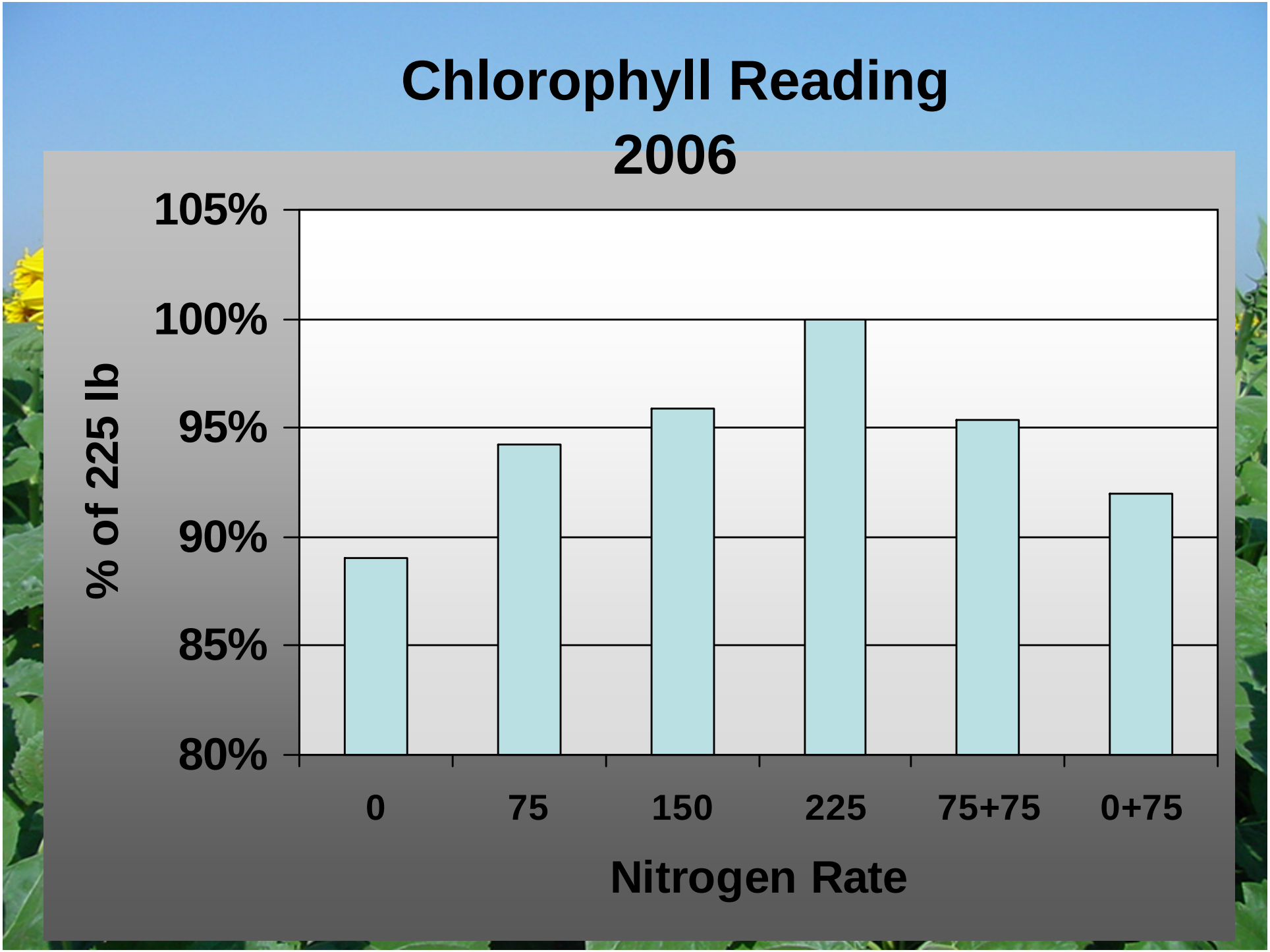


Nitrogen Residual Allocation



Nitrogen Residual Allocation




Chlorophyll Reading
2006
105%
100%
95%
90%
85%
80%
% of 225 lb
0
75
150
225
75+75
0+75
Nitrogen Rate

Conclusions

- Irrigation management influences fertility needs
  - Greater yields with limited water and 0 nitrogen applied
  - Full irrigation – 210 lbs/acre available
  - Limited irrigation – 140 lbs/acre available
- Sunflowers with less than 150 lbs/acre N applied reduced soil N residual to 3 feet