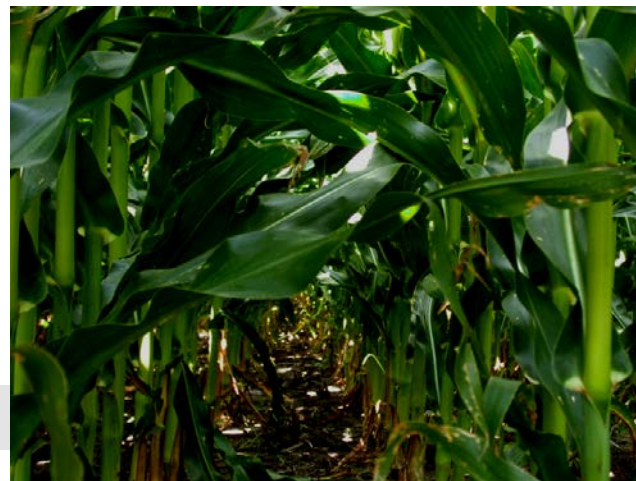


Tillage and Cropping System Approaches to Improving Nutrient Efficiency in Corn

Tony J. Vyn & Graduate Students
Agronomy Department
Purdue University



Global Maize Project (2012 -?)



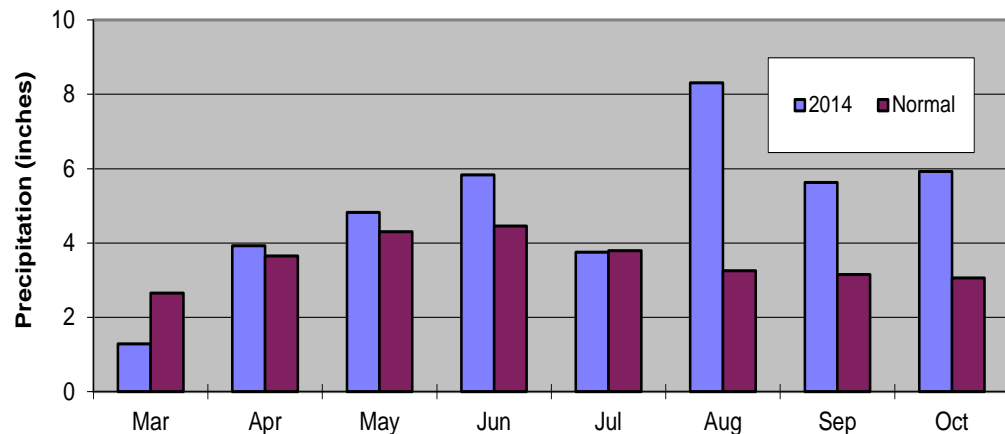
“Farmer Practice” = Normal Density of 30,000/acre and side-dress N rates of 0, 100 and 160 pounds N/acre (UAN alone)

“Ecological Intensification” = High Density of 37,500/acre and side-dress N rates of 0, 160 and 220 pounds N/acre (UAN plus Instinct plus Ammonium Sulfate applied with the first 160 pound application; 60 pounds applied at ~V8)

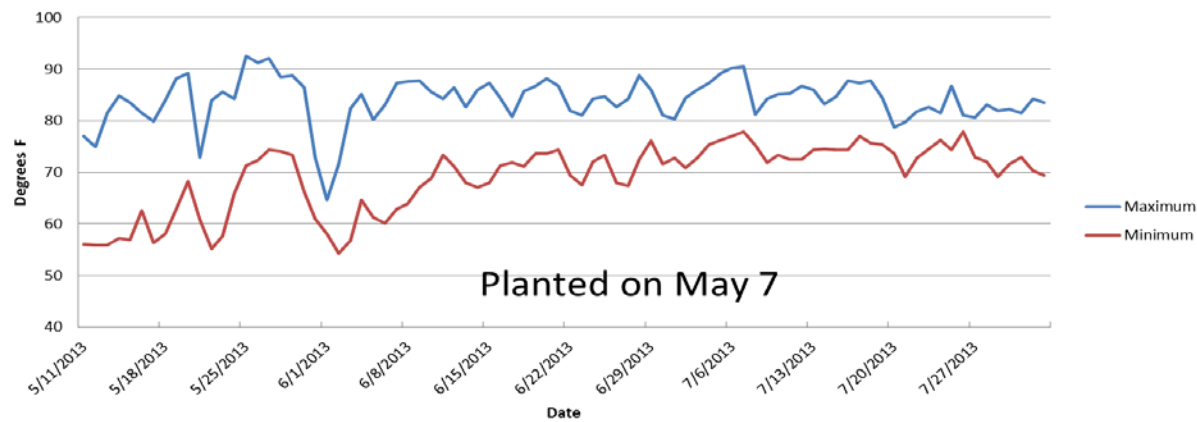
Note: Common Rotation and Tillage System: No-till soybean in 15” rows followed by Fall Strip-till for Corn in 30” rows.

Precipitation and Soil Temperatures in 2014 for Global Maize Study

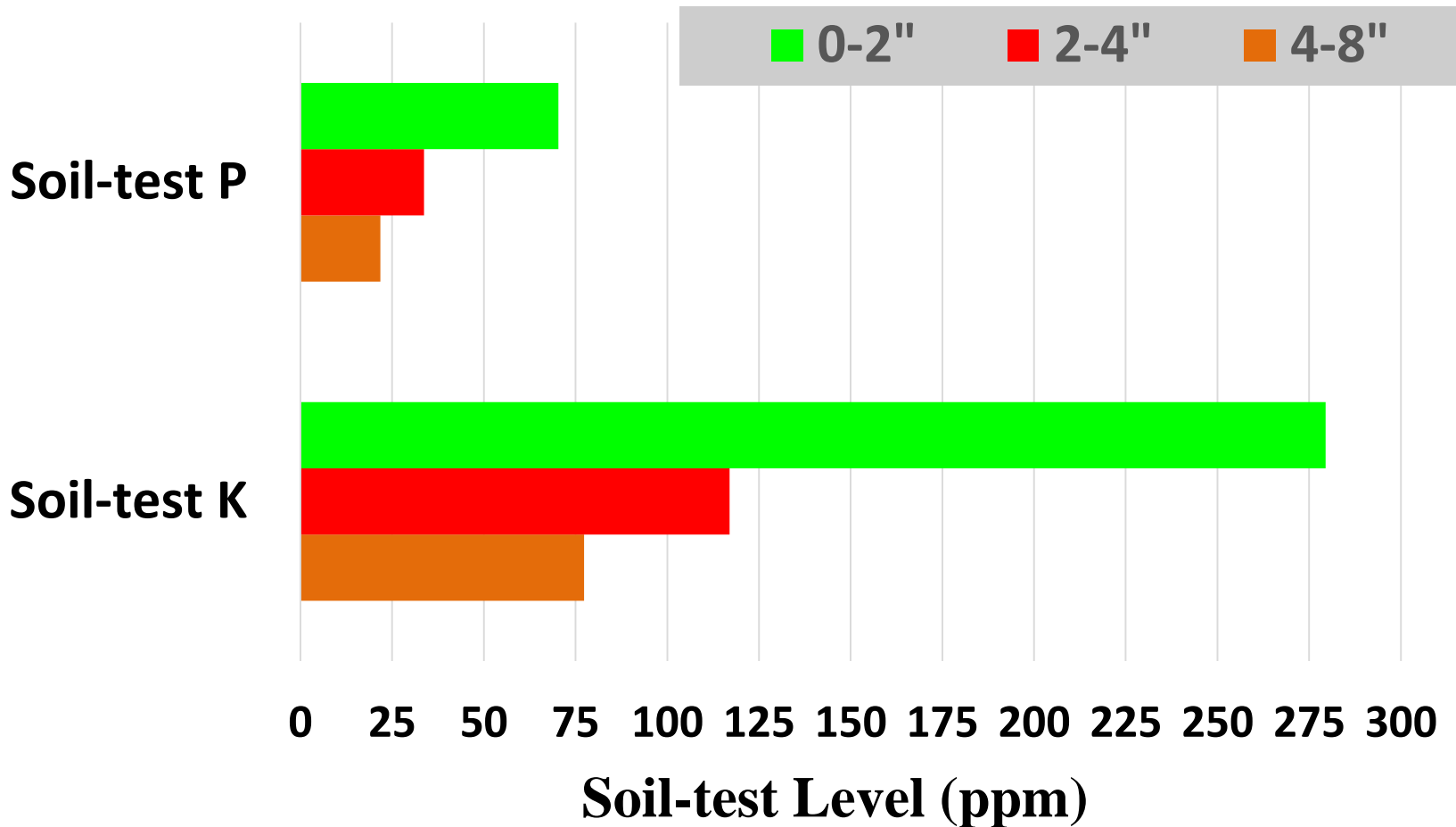
Figure 1. Monthly precipitation for March through October, 2014 compared to normal, ACRE.



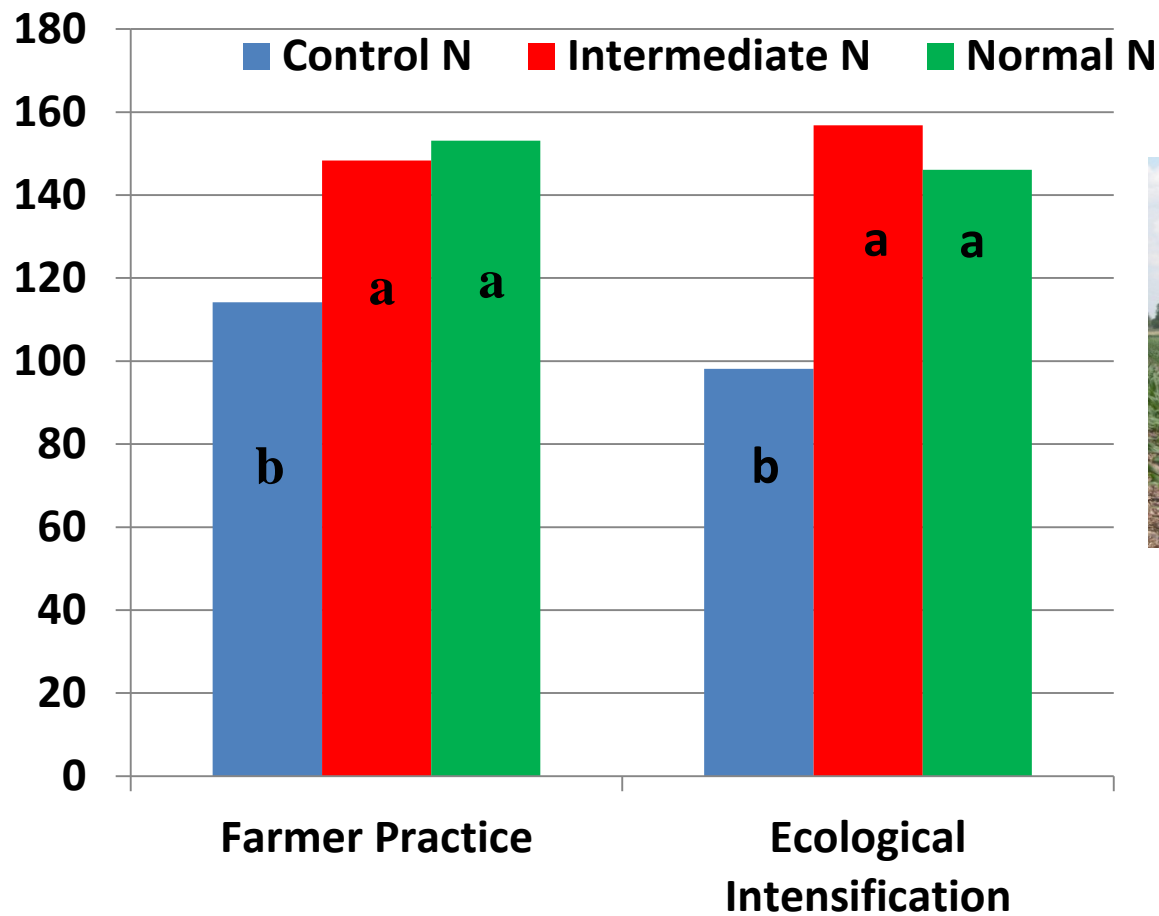
Maximum and Minimum Soil Temperatures, Global Maize Study, ACRE, 2013



Stratification for P and K in Strip-till Corn and No-till Soybean Rotation with only Starter P (corn) and no Broadcast P or K in 4 Years

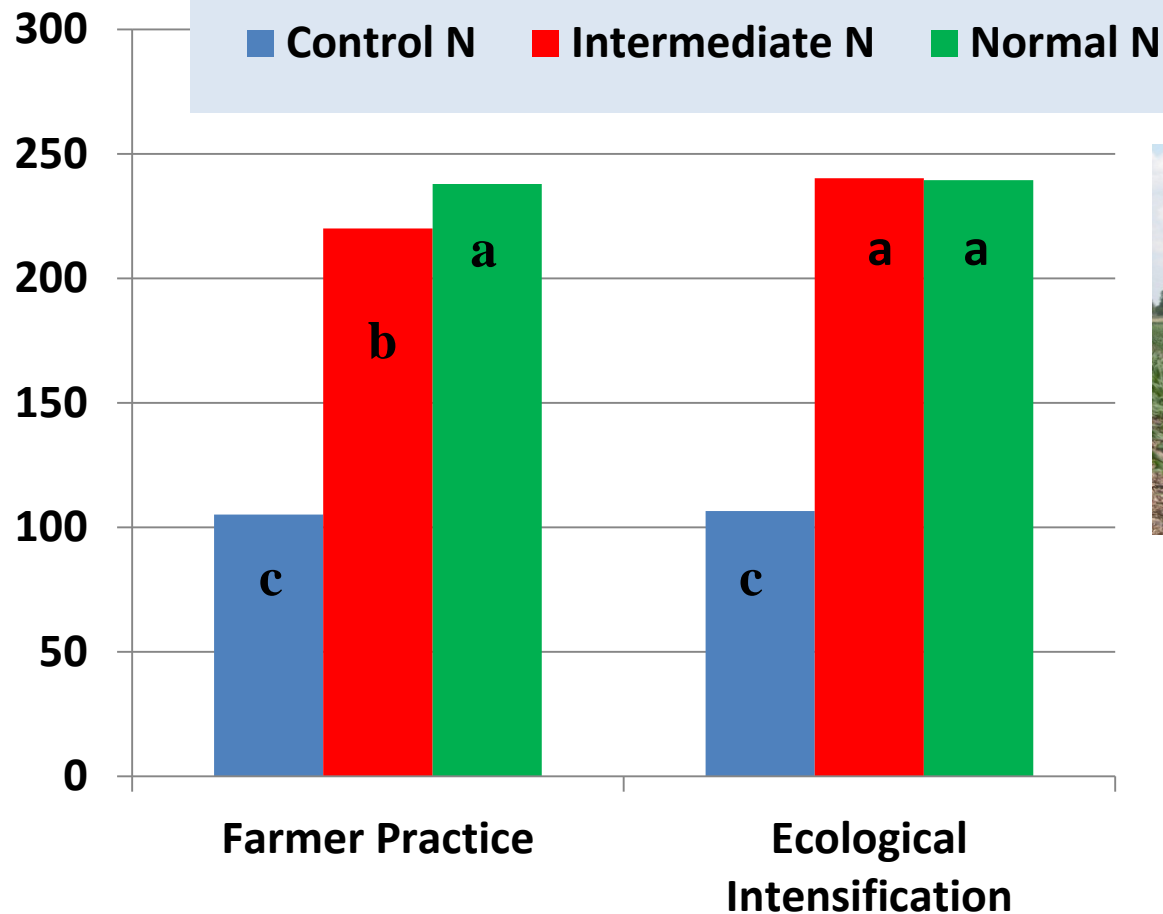


Corn Yield Results 2012



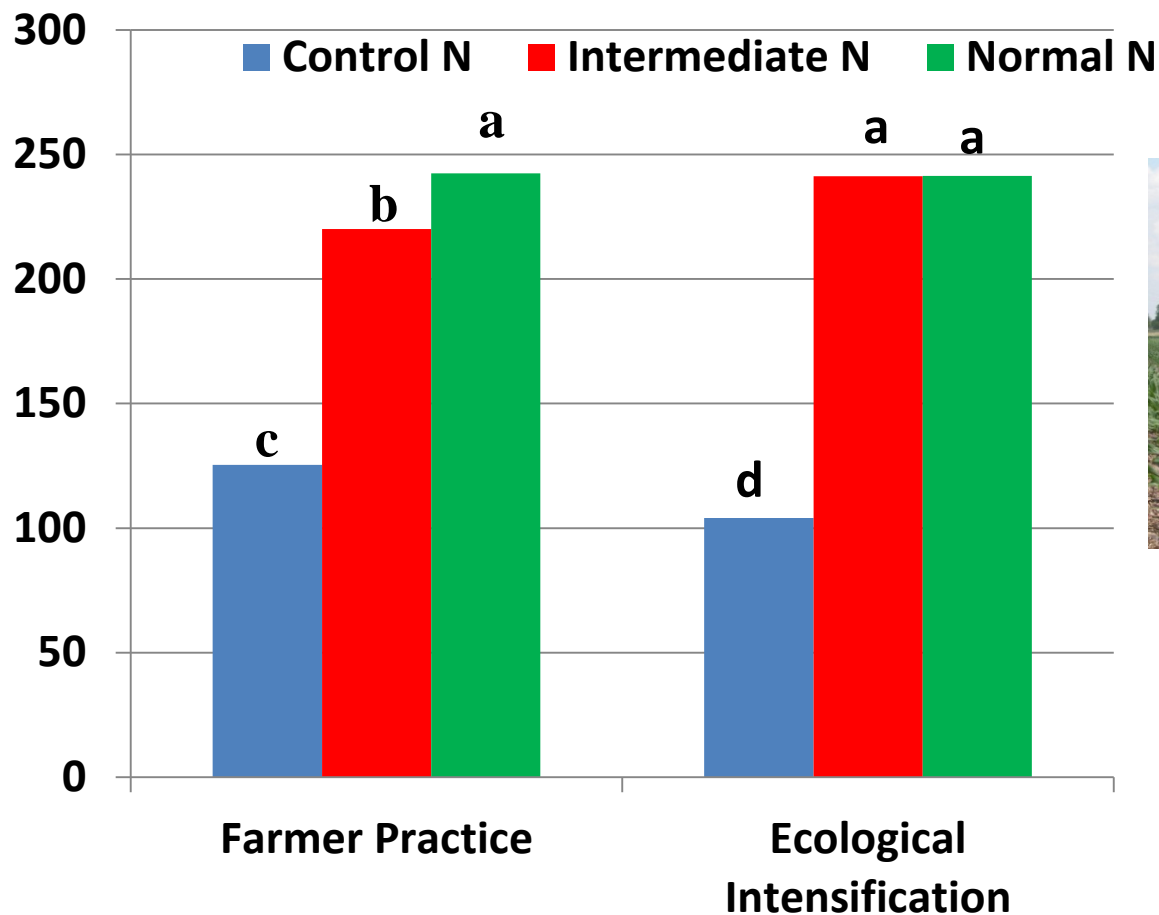
Common Hybrid = AQUAmax P1498

Corn Yield Results 2013



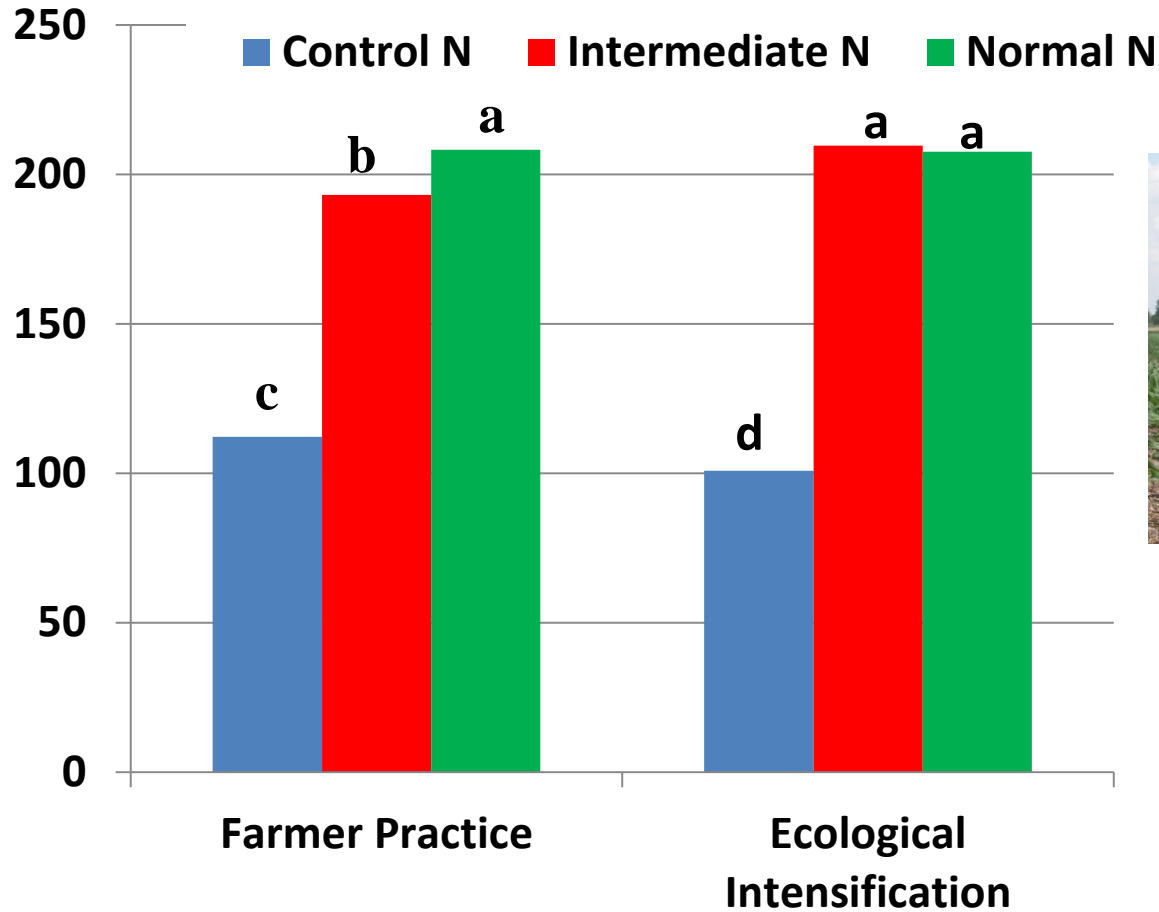
Common Hybrid = AQUAmax P1498

Corn Yield Results 2014



Common Hybrid = AQUAmax P1498

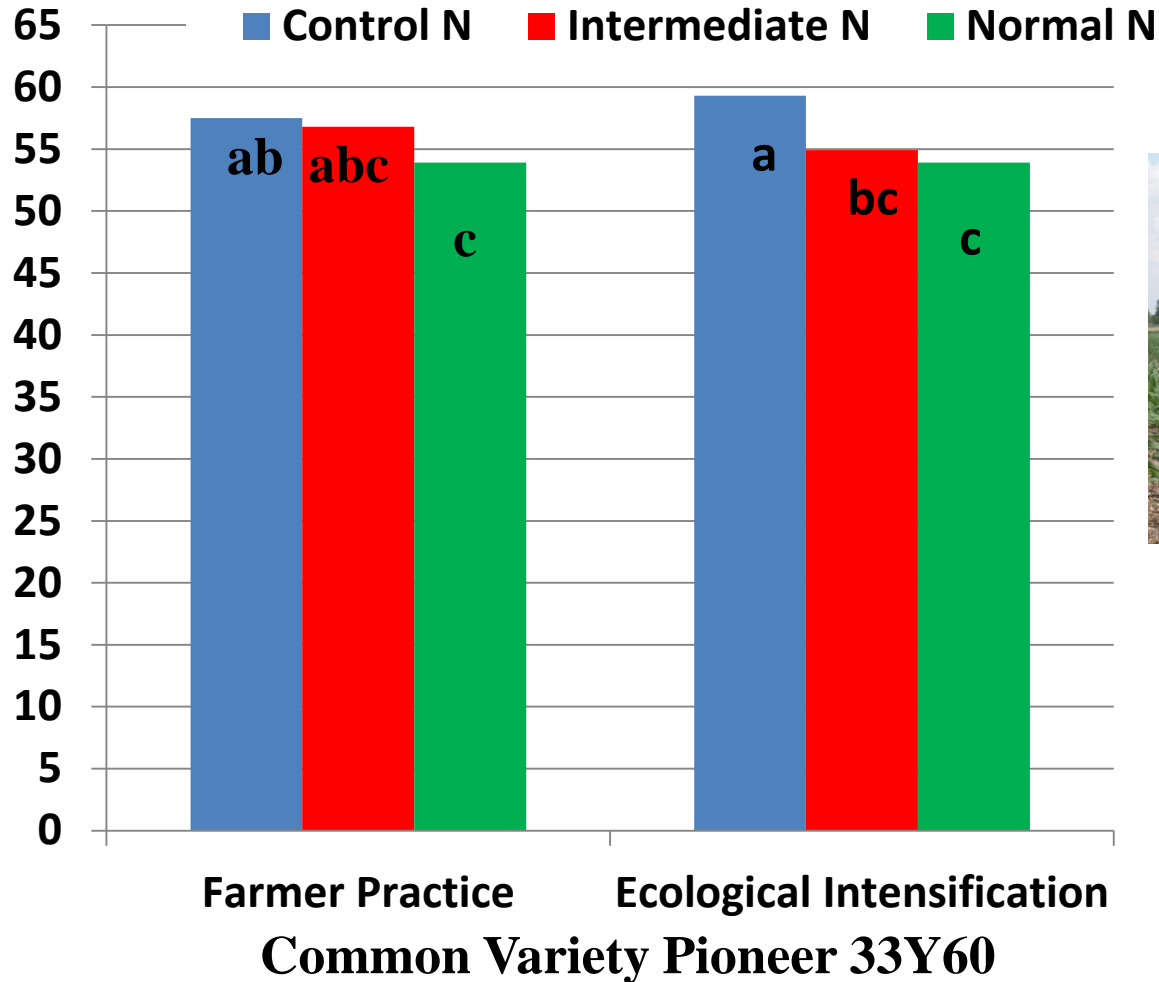
Corn Yield Results 2012-2014



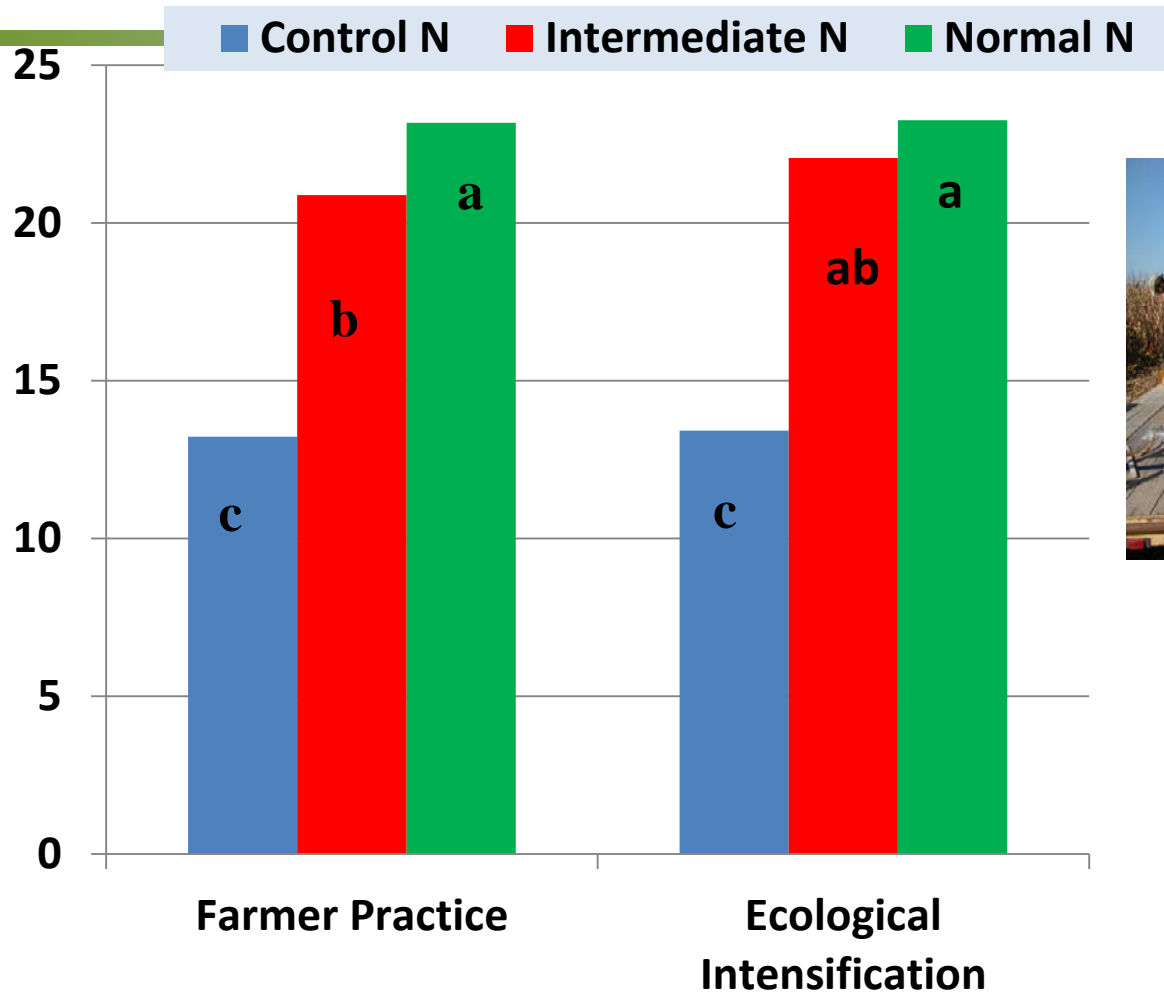
Common Hybrid = AQUAmax P1498



Soybean Yield Results 2014



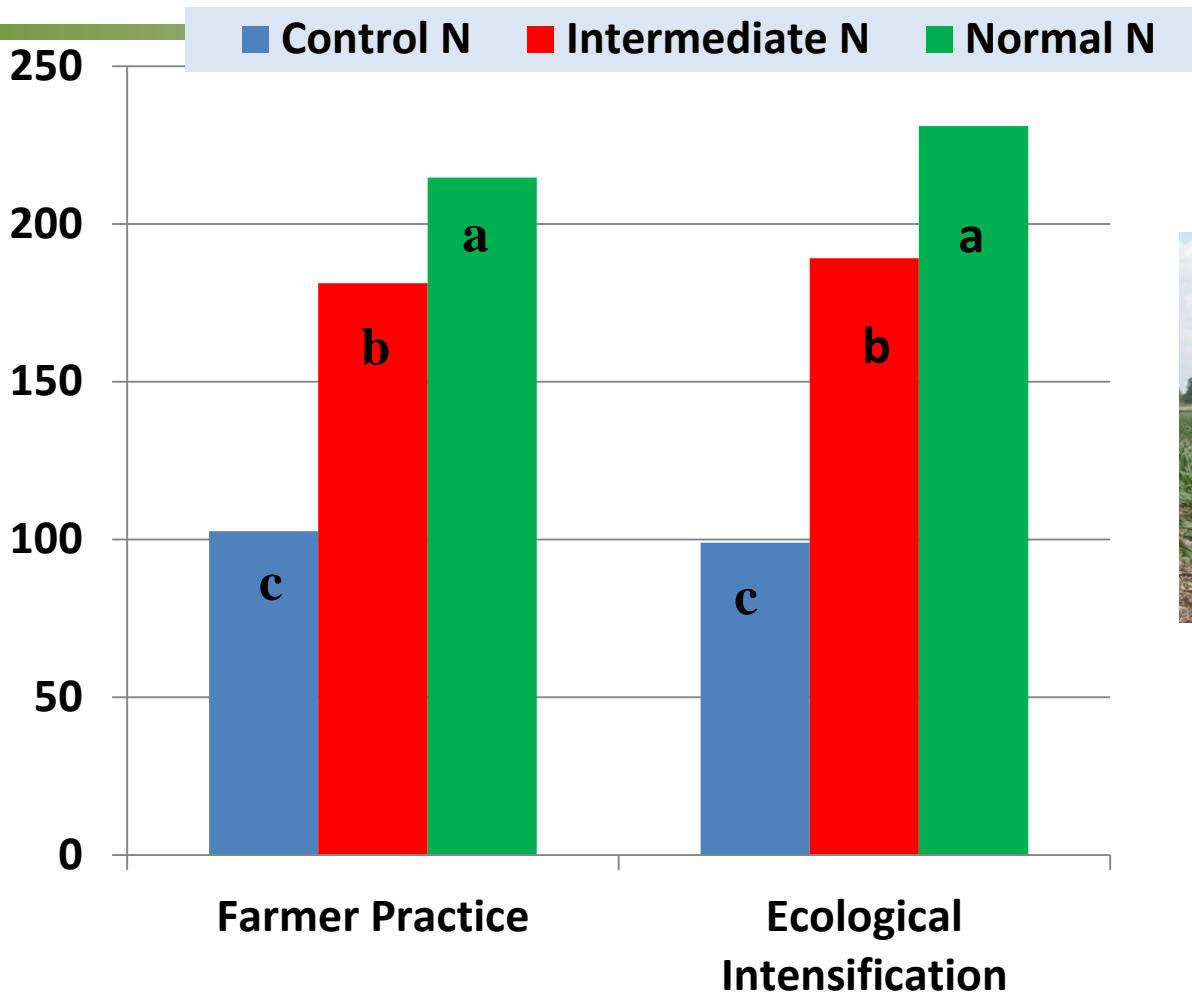
Corn Biomass Yield (Mg/ha) at R6 2013



Common Hybrid = AQUAmax P1498

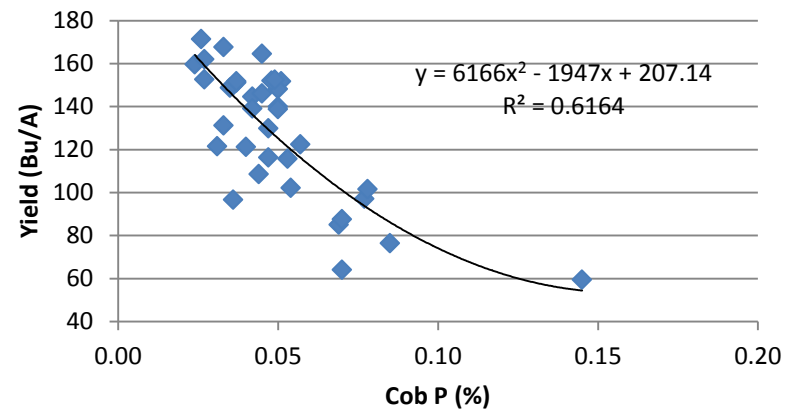
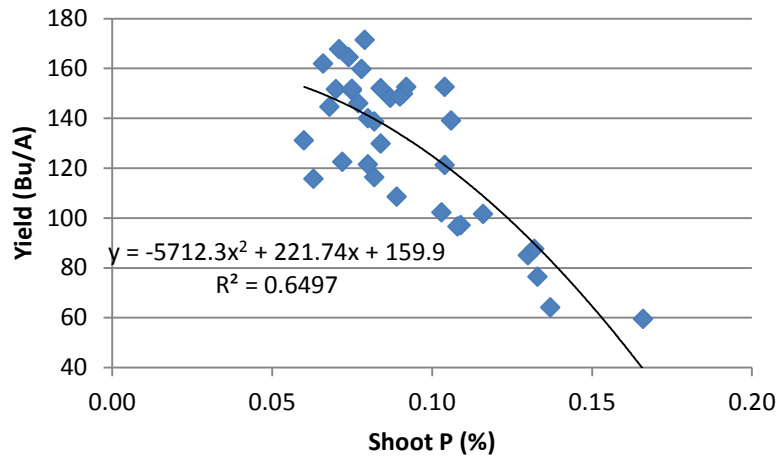
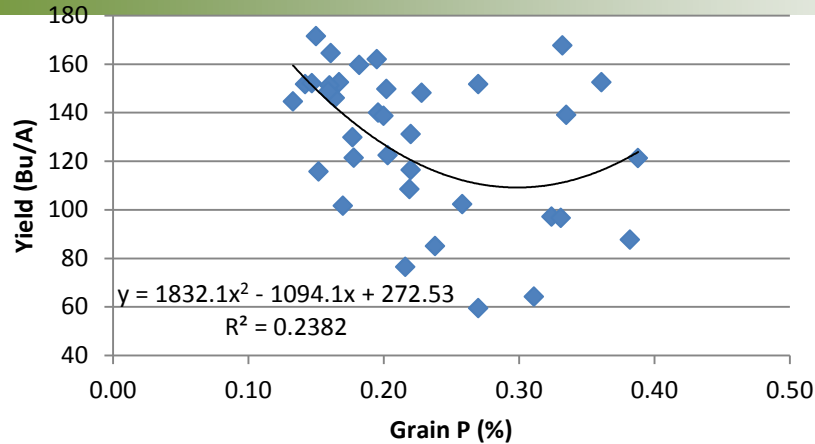


Corn Total Plant N Content (kg/ha) at R6, 2013

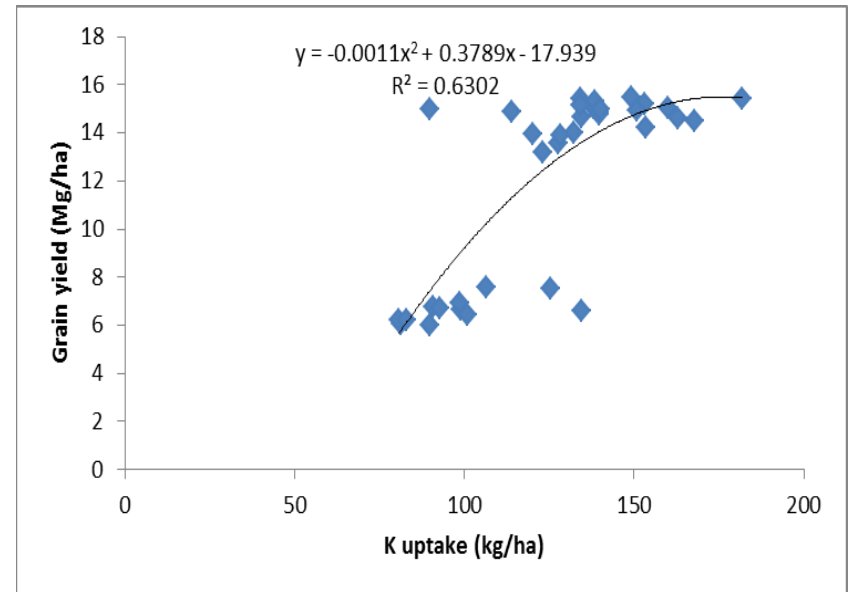
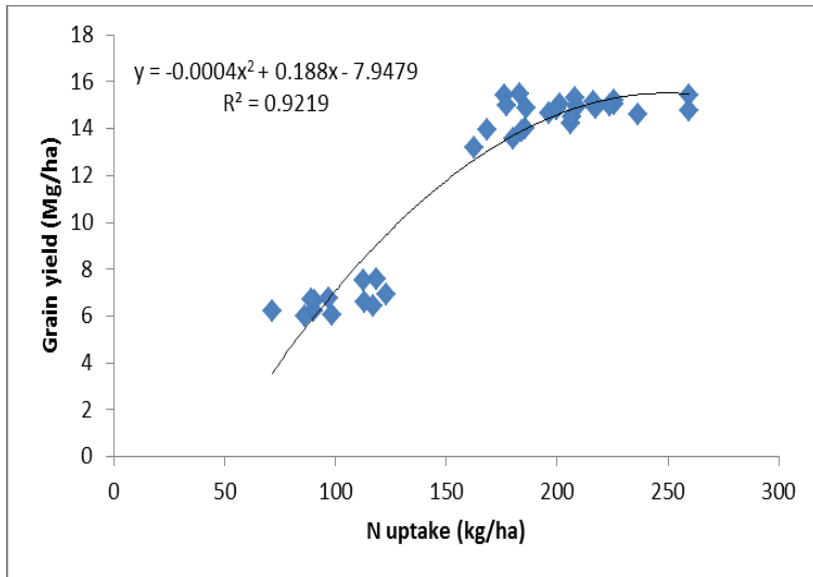


Common Hybrid = AQUAmax P1498

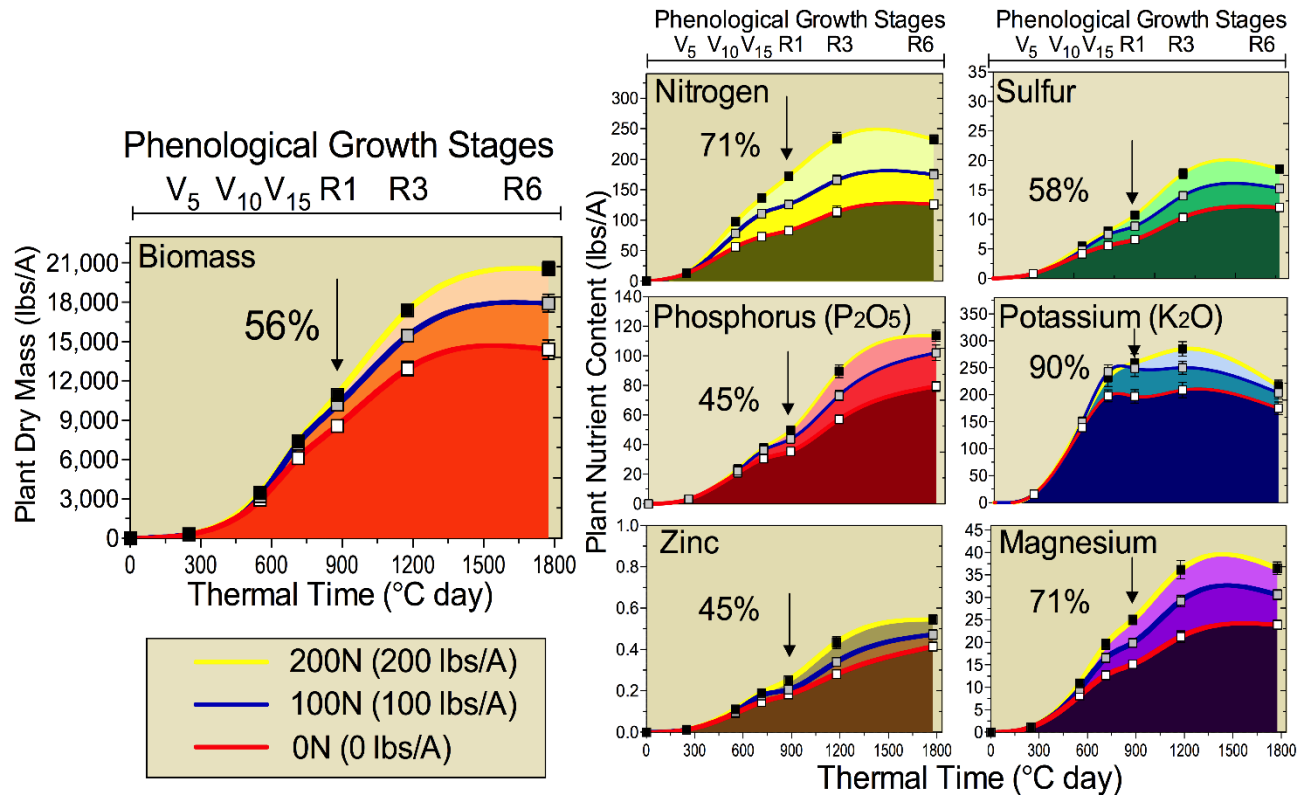
Grain Yield and Plant P Concentrations at Maturity



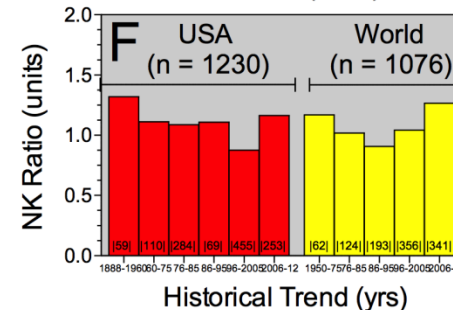
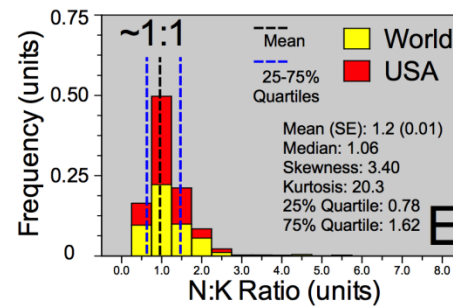
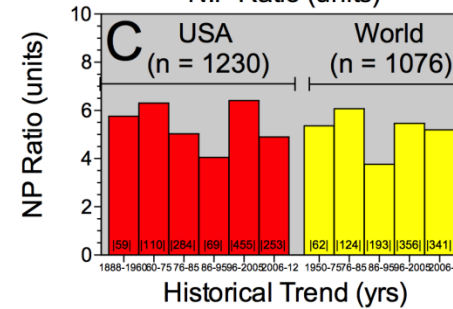
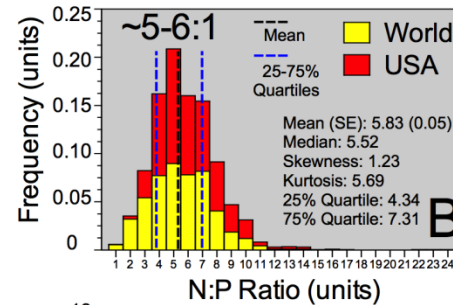
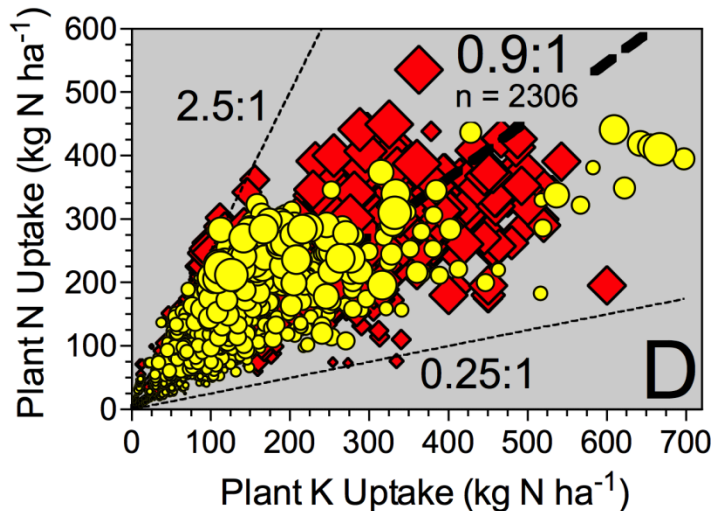
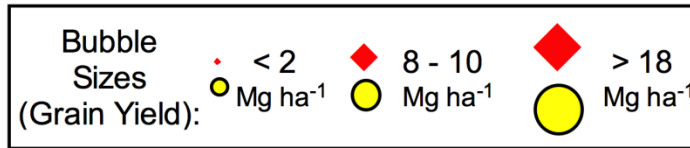
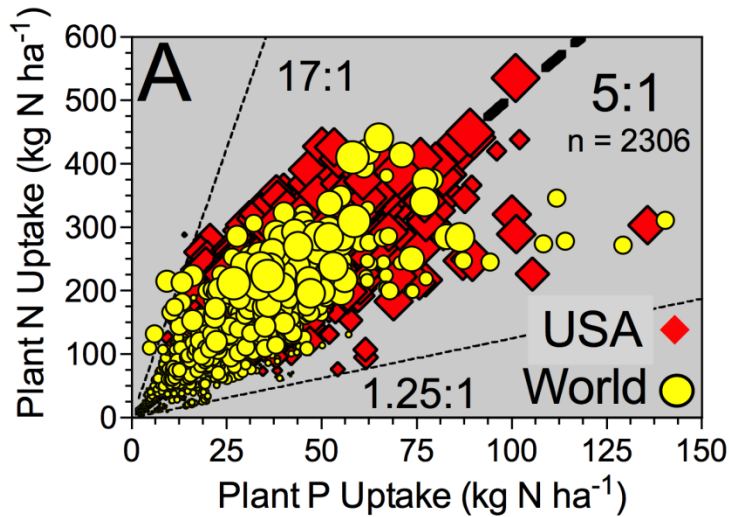
Grain Yield Relationships to Whole-plant Nutrient Uptake in 2013



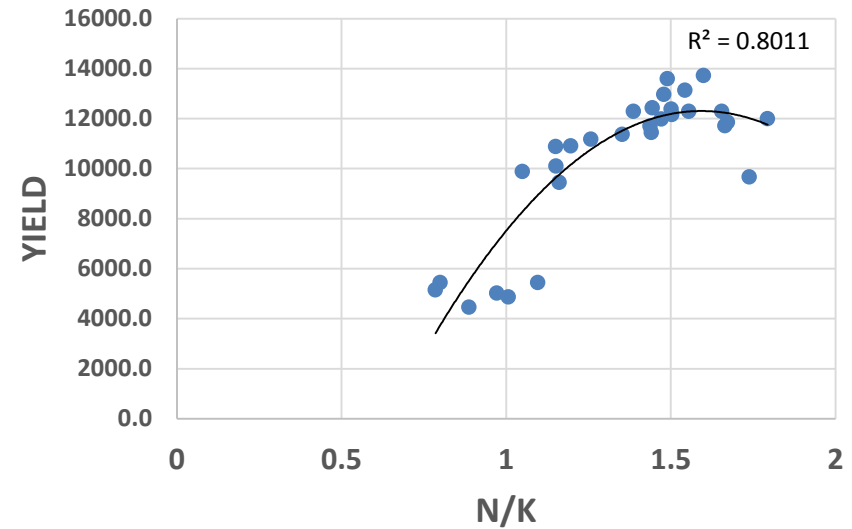
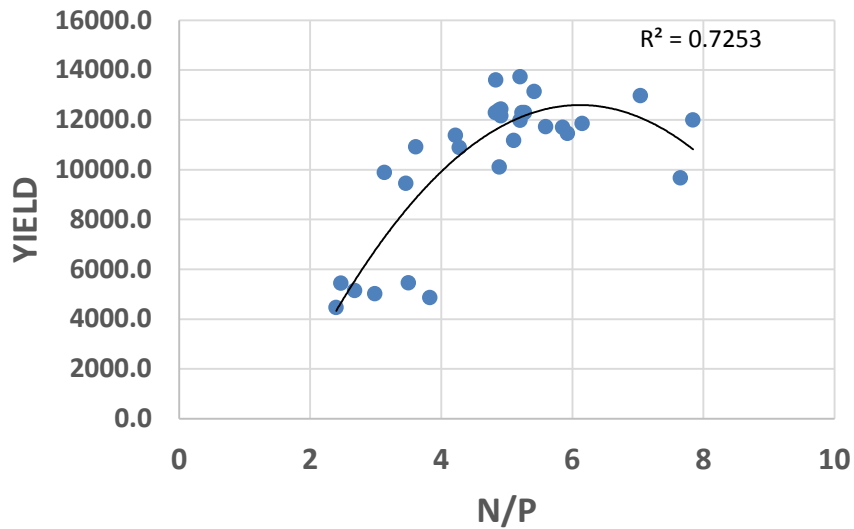
Biomass and nutrient accumulation at three N rates for a population of 32,000 plants/acre



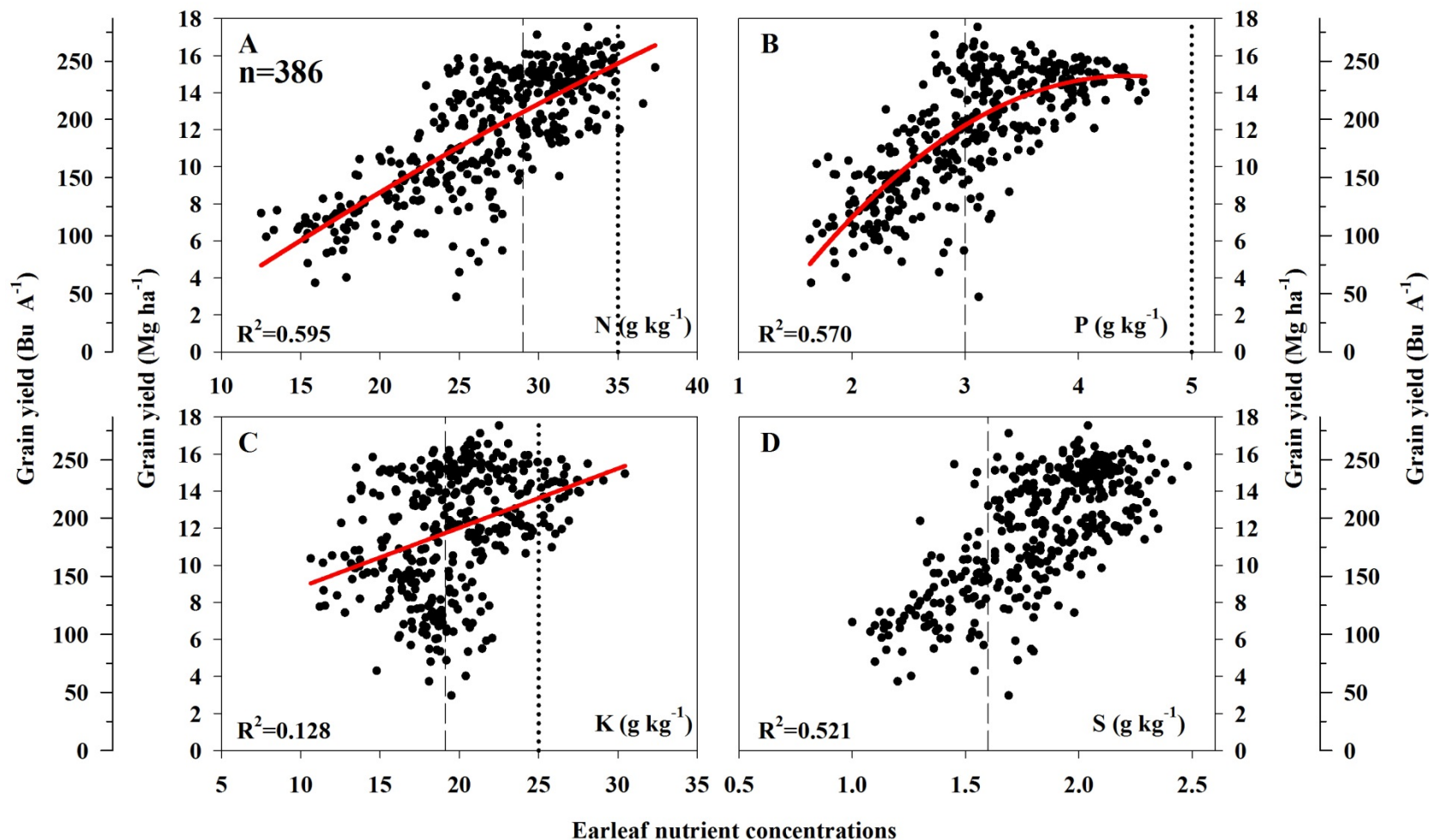
Importance of N/P and N/K ratios?



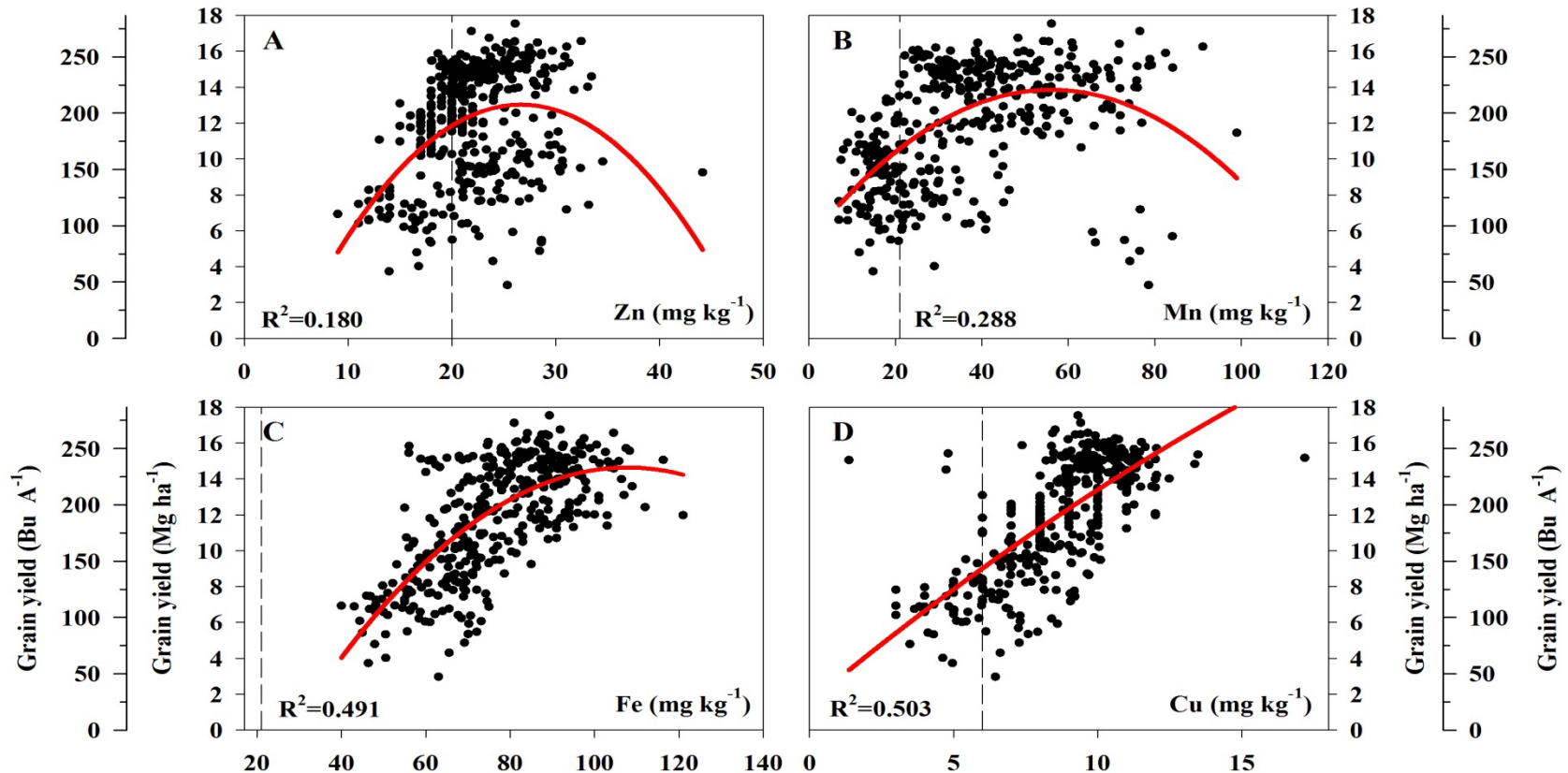
Relationship of final grain yield to whole-plant nutrient ratios at maturity? (e.g. 2013)



Recent Corn Yields Relative to Ear-leaf Sufficiency Levels for N, P, K, and S (West Lafayette, IN, 2010-2014)

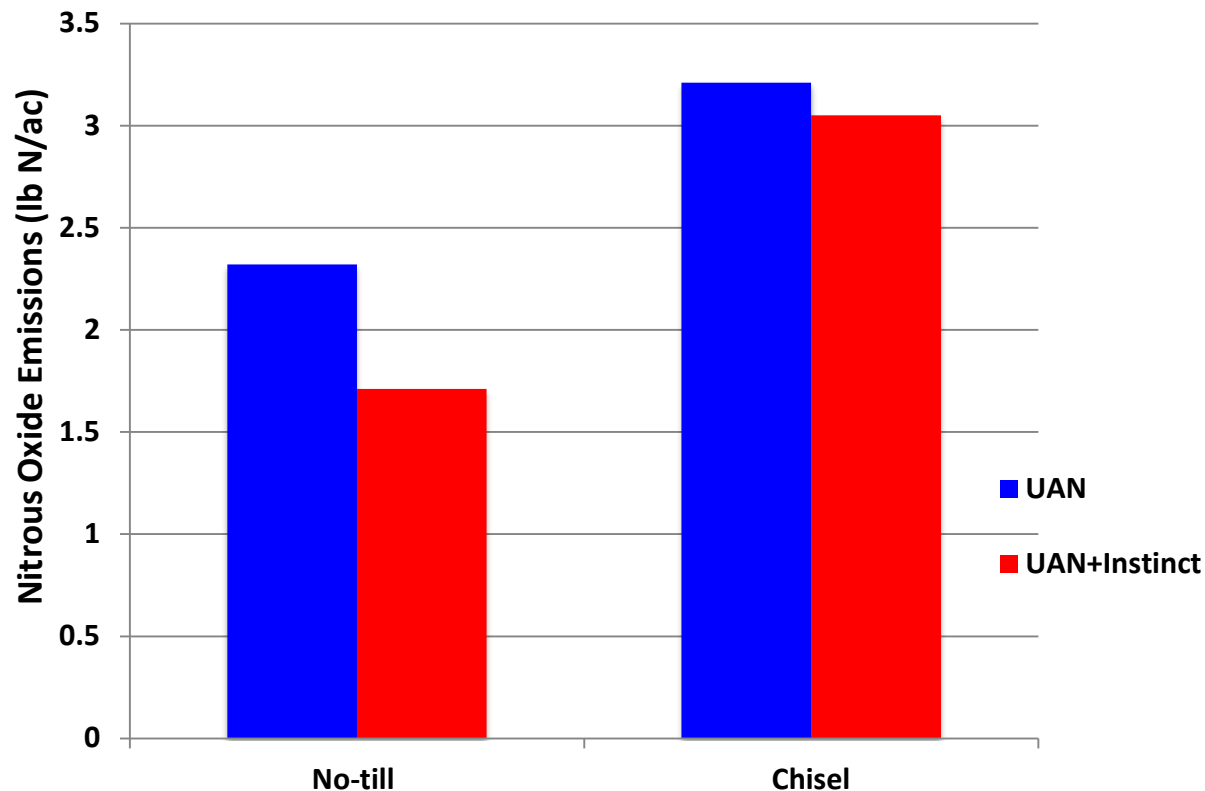


Recent Corn Yields Relative to Ear-leaf Sufficiency Levels for Zn, Mn, Fe, and Cu (West Lafayette, IN, 2010-2014)



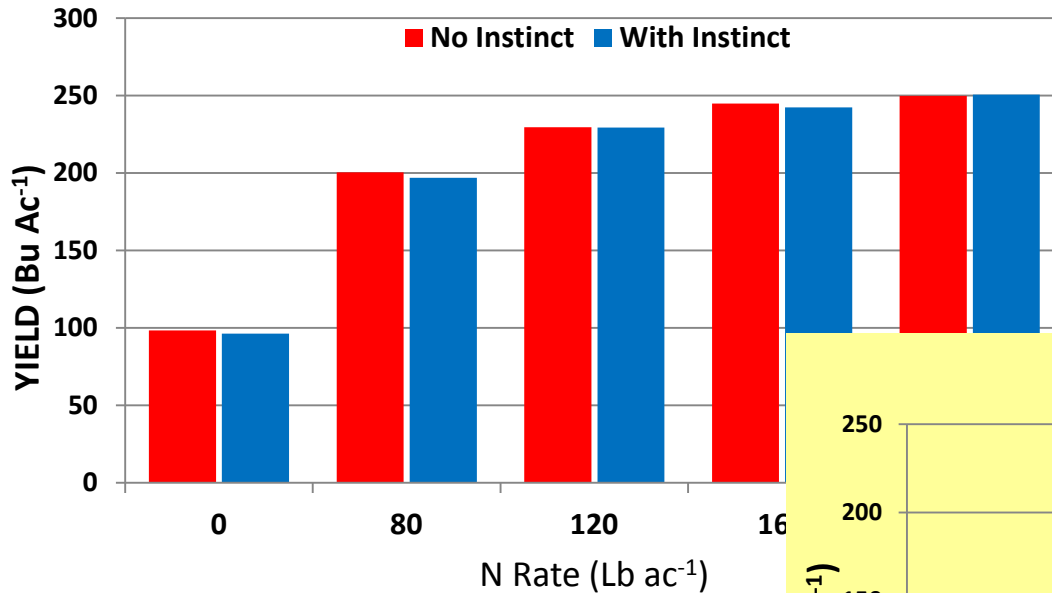
Tillage and Nitrification Inhibitor Effects on N₂O Emissions (West Lafayette, 2013)

Season's Nitrous Oxide Emissions Under Different Tillage Systems Following UAN Application With and Without Instinct (2013)

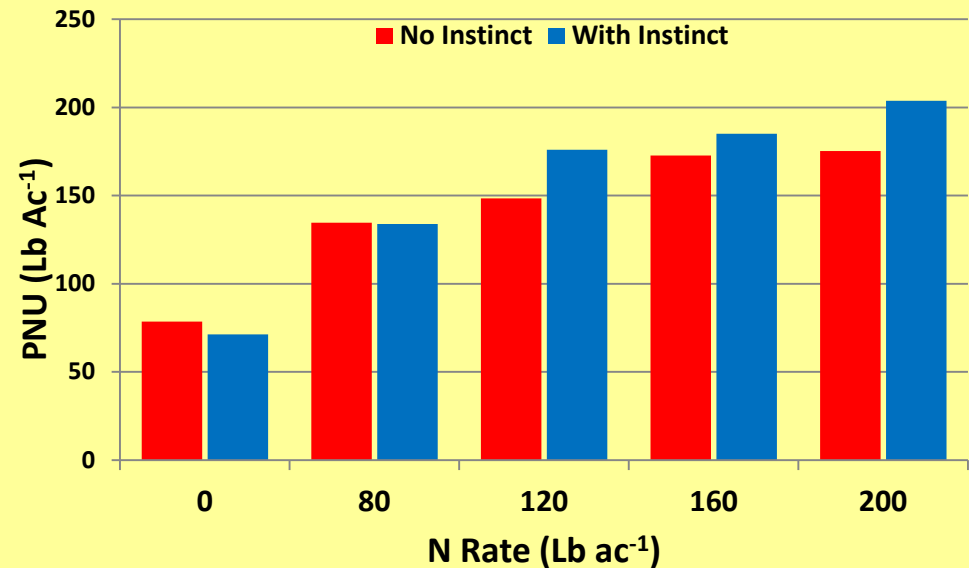


Example of Grain Yield versus Total Plant N Uptake Response to N Rate and Nitrification Inhibitor (2013)

Pioneer 1498-CHR 2013

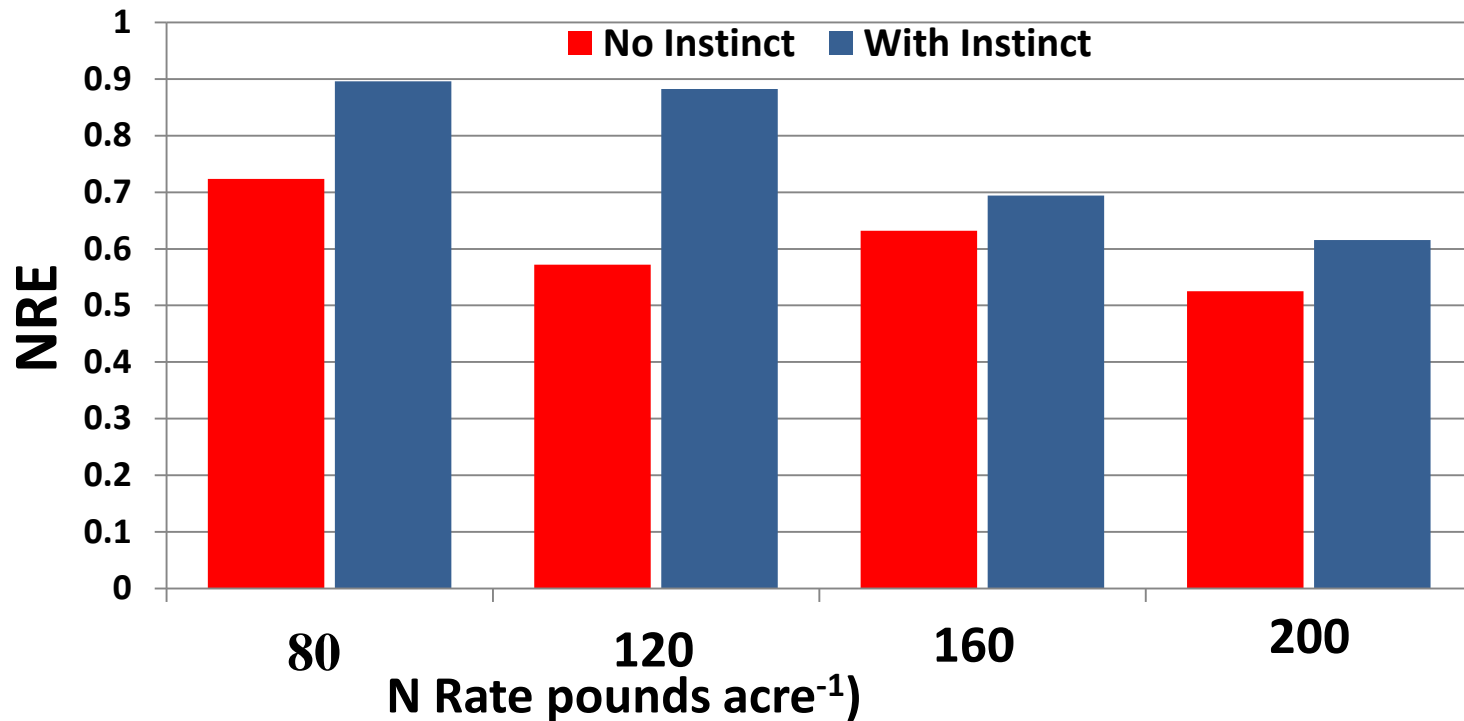


PNU Pioneer 1498-CHR 2013



Nitrogen Rate and Nitrification Inhibitor Impact on NRE (West Lafayette, IN, 2013)

NRE Pioneer 1498-CHR 2013



Thanks!

tvyn@purdue.edu

home page:

<http://www3.ag.purdue.edu/agry/Pages/tvyn.aspx>

