Effectiveness of Avail for Improving Potato Yield

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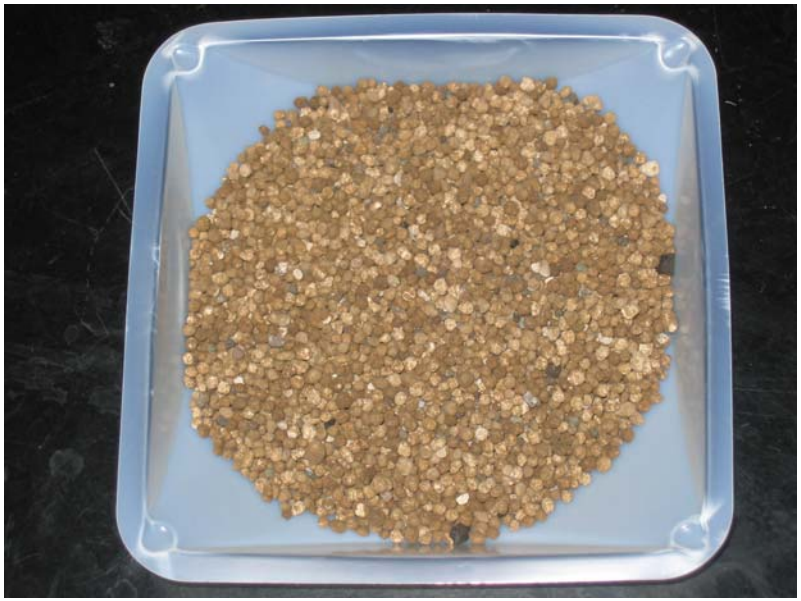
Outline

- What is Avail?
- Potato phosphorus study
- Objectives
  - Treatments and locations
- Results
  - Russet Burbank
  - Frito Lay 1867
- Conclusions

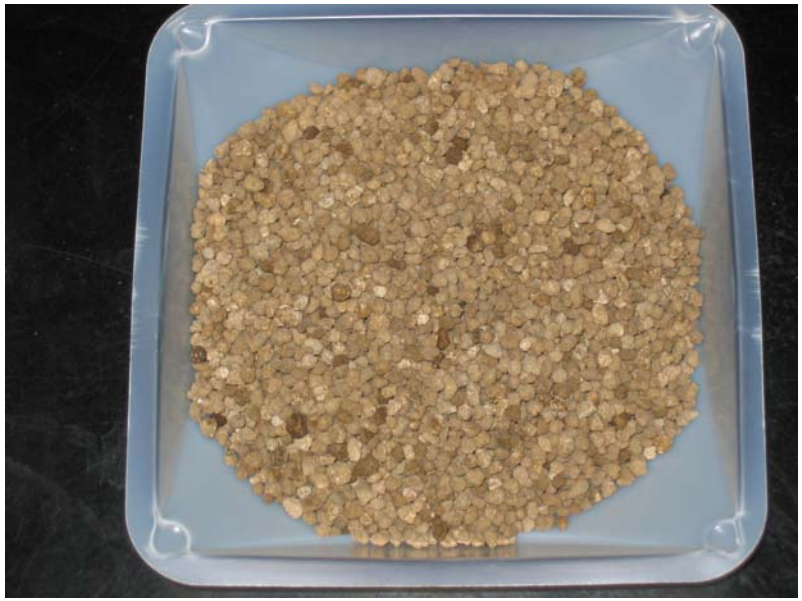
What is Avail??

- Avail
  - Maleic-itaconic copolymer
  - Avail has high CEC (1800 meq/100g) and it is hypothesized that Ca, Fe, and Al bind to Avail instead of phosphorus (P) (Murphy, 2005)
  - Formulations:
    - Coated on dry fertilizer
    - Mixed with liquid fertilizers
  - Only recently available in Wisconsin
  - Applied at 2 quarts per ton for dry fertilizer

Avail



MAP



MAP coated with Avail

Potato Phosphorus Study

Potato Phosphorus Study

- Objective:
  - To evaluate the effect of P rate and use of Avail on potato yield and quality
- Potato Varieties:
  - Russet Burbank
    - 2006
      - H6, CF, WS6, and S6
    - 2007
      - H7, WS7, and S7
  - Frito Lay 1867
    - 2006
      - A and TW
    - 2007
      - TW1 and TW2

Potato planting

2006 treatments and rates

- 2006:

  All locations except S6

  - Control
  - 65 lb P_20_5/a TSP
  - 130 lb P_2O_5/a TSP
  - 65 lb P_2O_5/a MAP+Avail

  Location S6

  - Control
  - 65 lb P_2O_5/a TSP
  - 130 lb P_2O_5/a TSP
  - 195 lb P_2O_5/a TSP
  - 260 lb P_2O_5/a TSP
  - 130 lb P_2O_5/a MAP+Avail
  - 195 lb P_2O_5/a MAP+Avail

2007 treatments and rates

- 2007:

  Locations H7 and WS7

  - Control,
  - 65 lb P_20_5/a MAP
  - 130 lb P_2O_5/a MAP
  - 65 lb P_2O_5/a MAP+Avail
  - 130 lb P_2O_5/a MAP+Avail

  Locations TW1, TW2, and S7

  - Control,
  - 65 lb P_2O_5/a MAP
  - 130 lb P_2O_5/a MAP
  - 195 lb P_2O_5/a MAP
  - 65 lb P2O5/a MAP+Avail
  - 130 lb P_2O_5/a MAP+Avail
  - 195 lb P_2O_5/a MAP+Avail

Location	Soil texture	P	P Interpretation	P fert. Recommend.
		ppm	Category	lb P_2O_5/a
2006				
H6	Sand	62	Low	130
CF	Loamy sand	246	Ex. high	30
WS6	Loamy sand	186	Ex. high	30
S6	Loamy sand	35	Very low	155
A	Silt loam	265	High	75
TW	Silt loam	242	High	75
2007				
H7	Sand	48	Very low	155
WS7	Sand	152	High	75
S7	Sandy loam	90	Very low	250
TW1	Silt loam	140	Low	190
TW2	Silt loam	180	Optimum	90

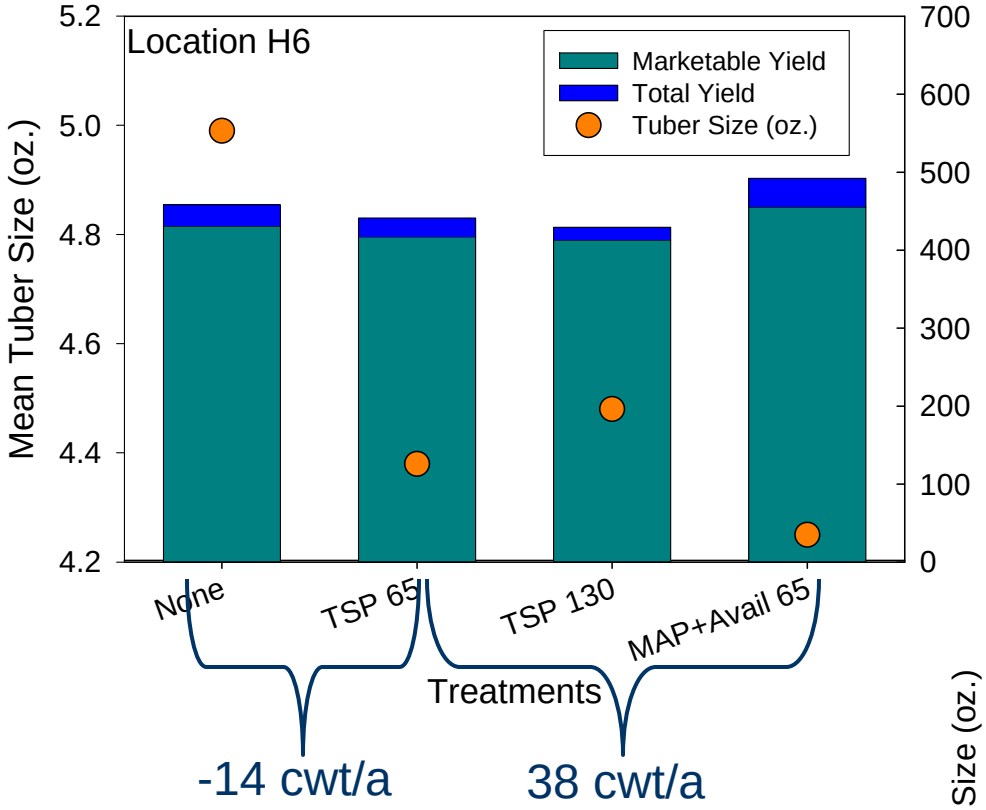
Results

Results

- Potato terms
  - Total yield= all tuber size classes
  - Marketable yield= total yield - culls
  - Mean tuber size (oz.)= weighed average tuber size based on the proportion of marketable yield in each size class (7 classes)
  - Statistically significant at 90% confidence level
- Results
  - Russet Burbank
    - 2006
    - 2007
  - Frito Lay 1867
    - 2006
    - 2007

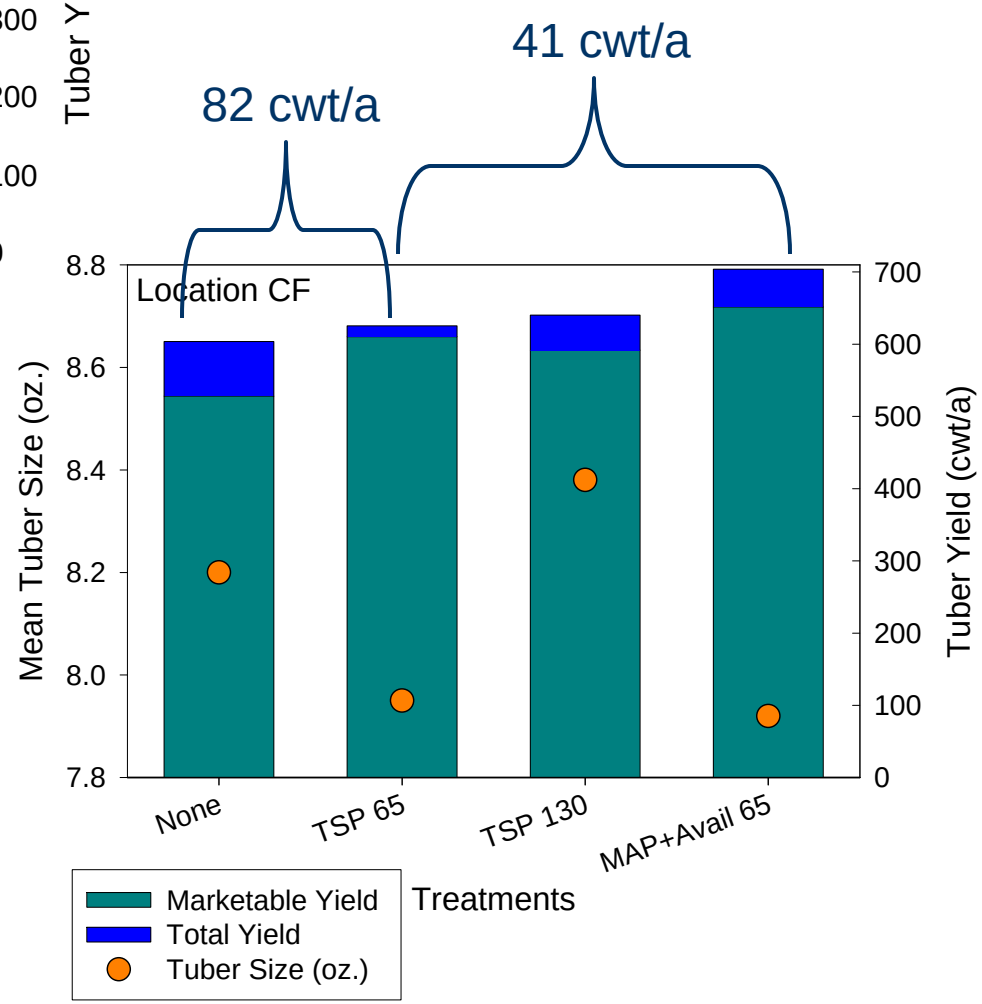
Russet Burbank 2006

Hancock 06



No significant effect of P source or rate

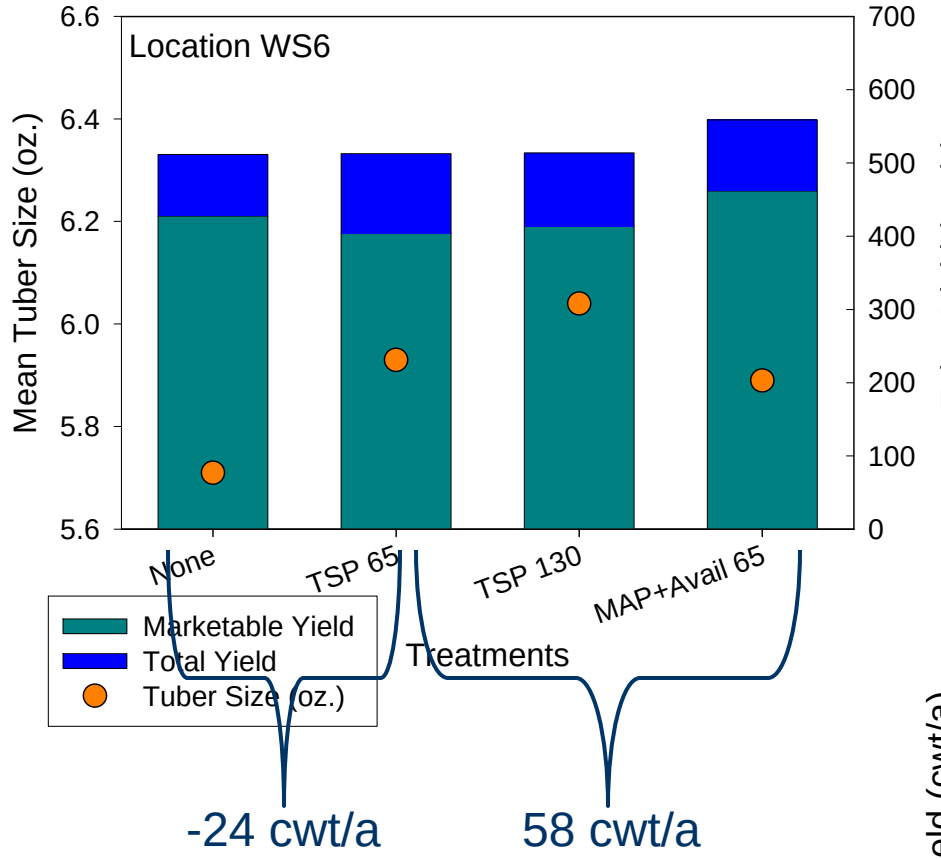
*Tubers did not have a chance to bulk properly at location H6



CF 06

Rate had a significant effect on marketable yield

Russet Burbank 2006

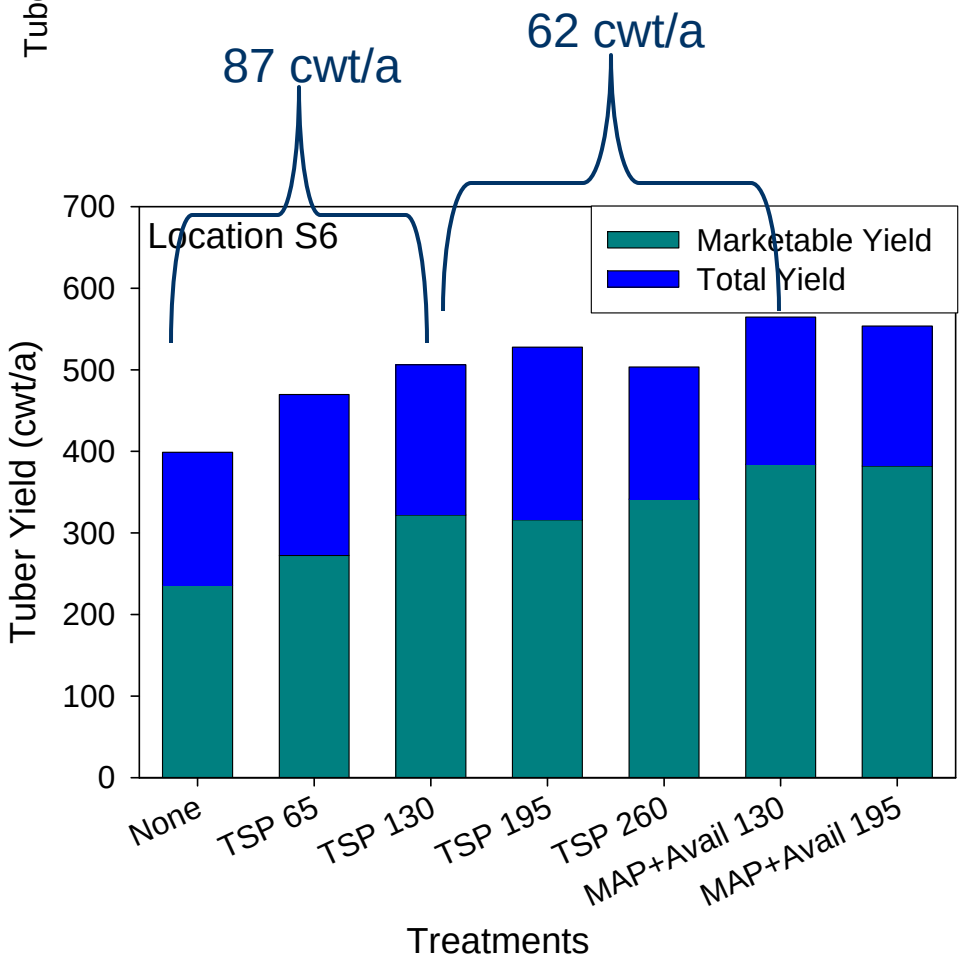


Spooner 06

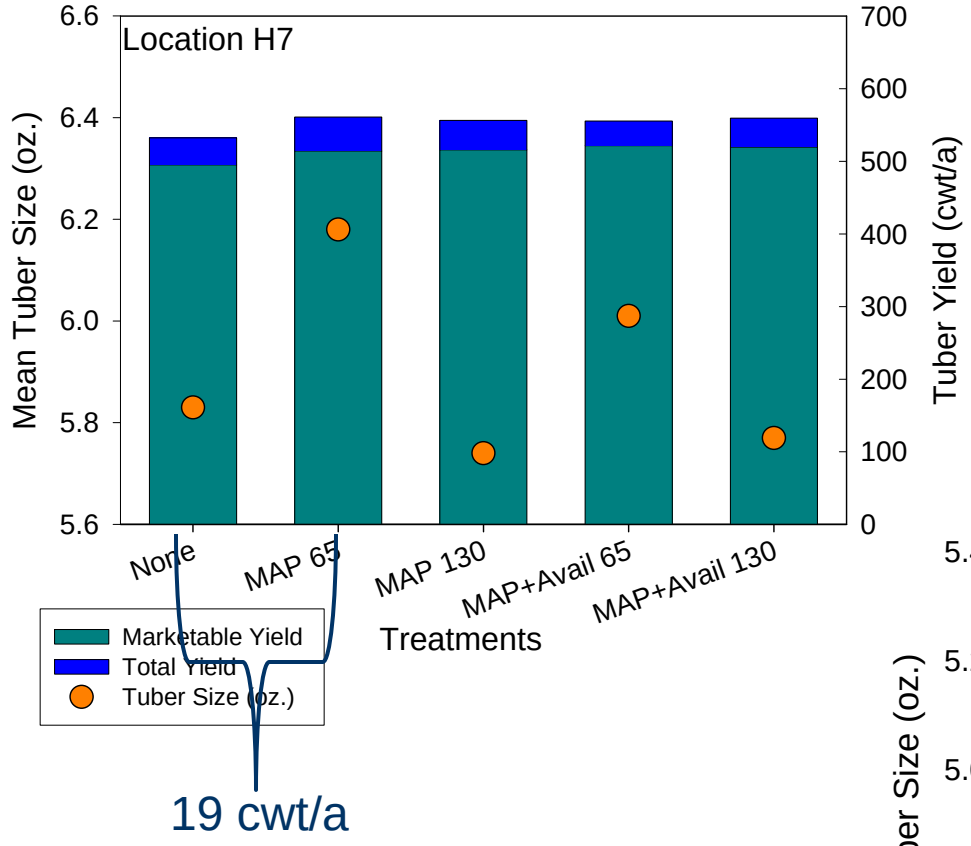
Rate and source were significant for total and marketable yield

WS6 06

No significant effect of P source or rate

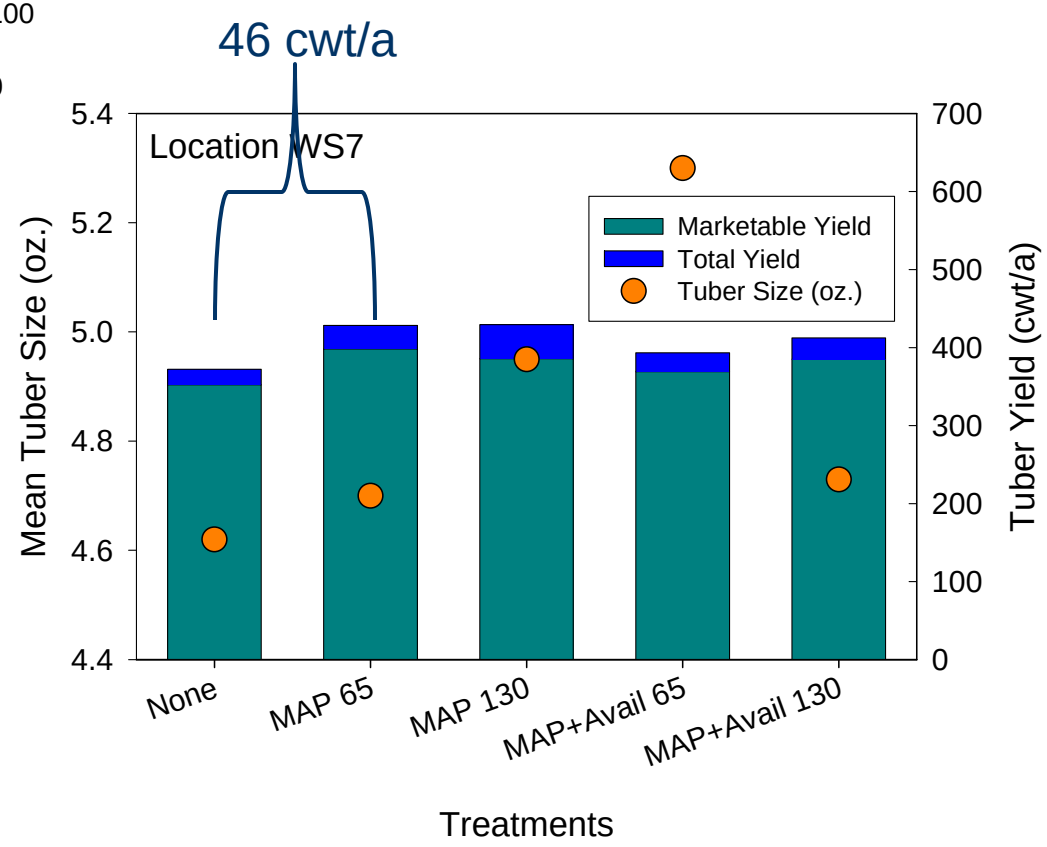


Russet Burbank 2007



Hancock 07

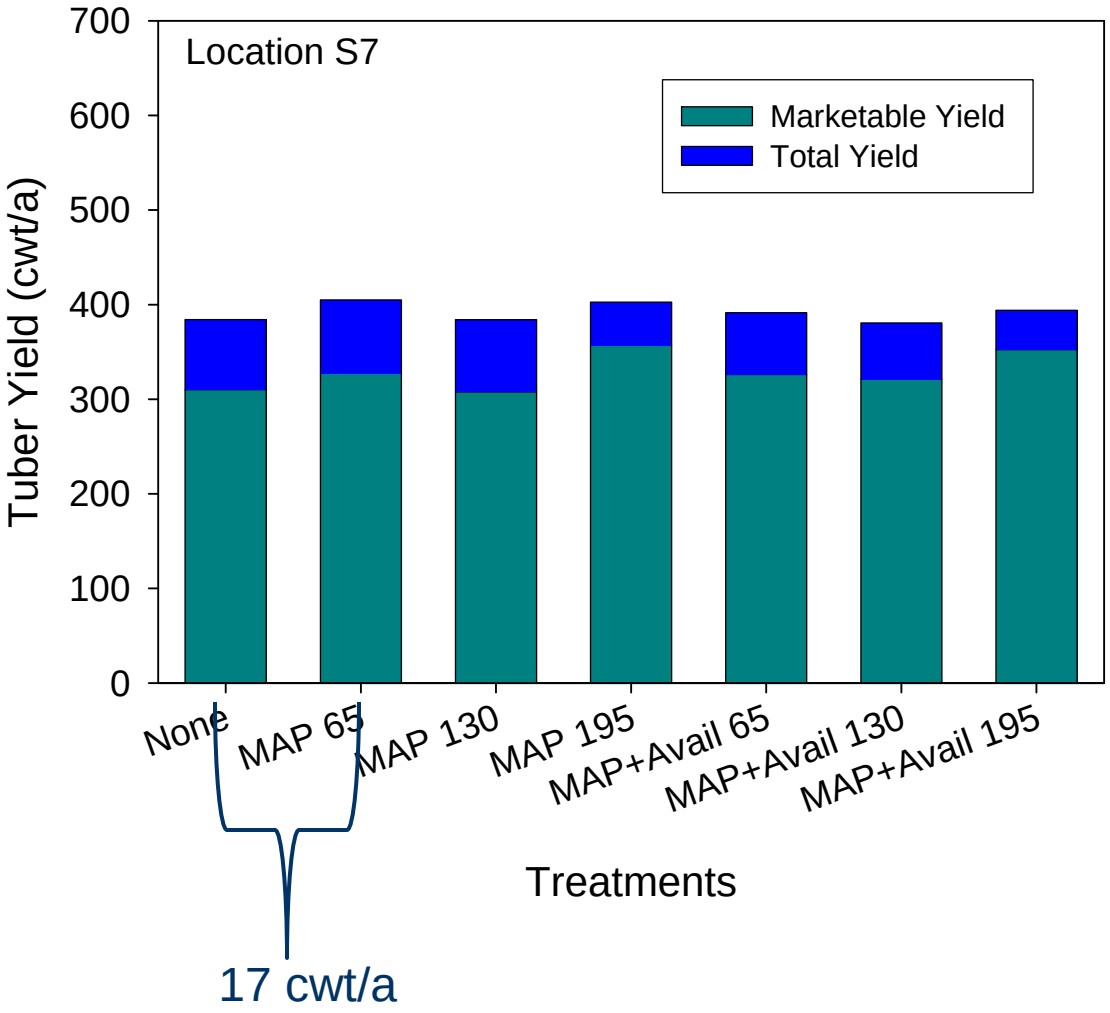
No significant effect
of P source or rate



WS 07

No significant effect
of P source or rate

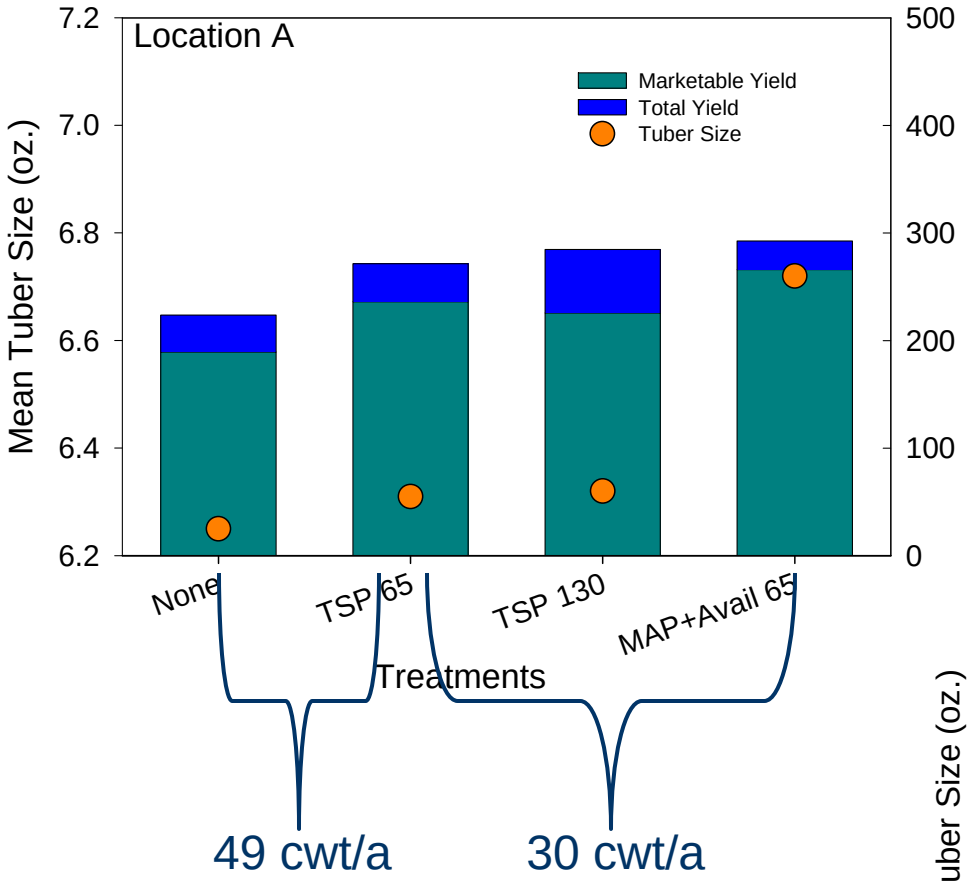
Russet Burbank 2007



Cress sandy loam

No significant effect of P source or rate

Frito Lay 1867 - 2006

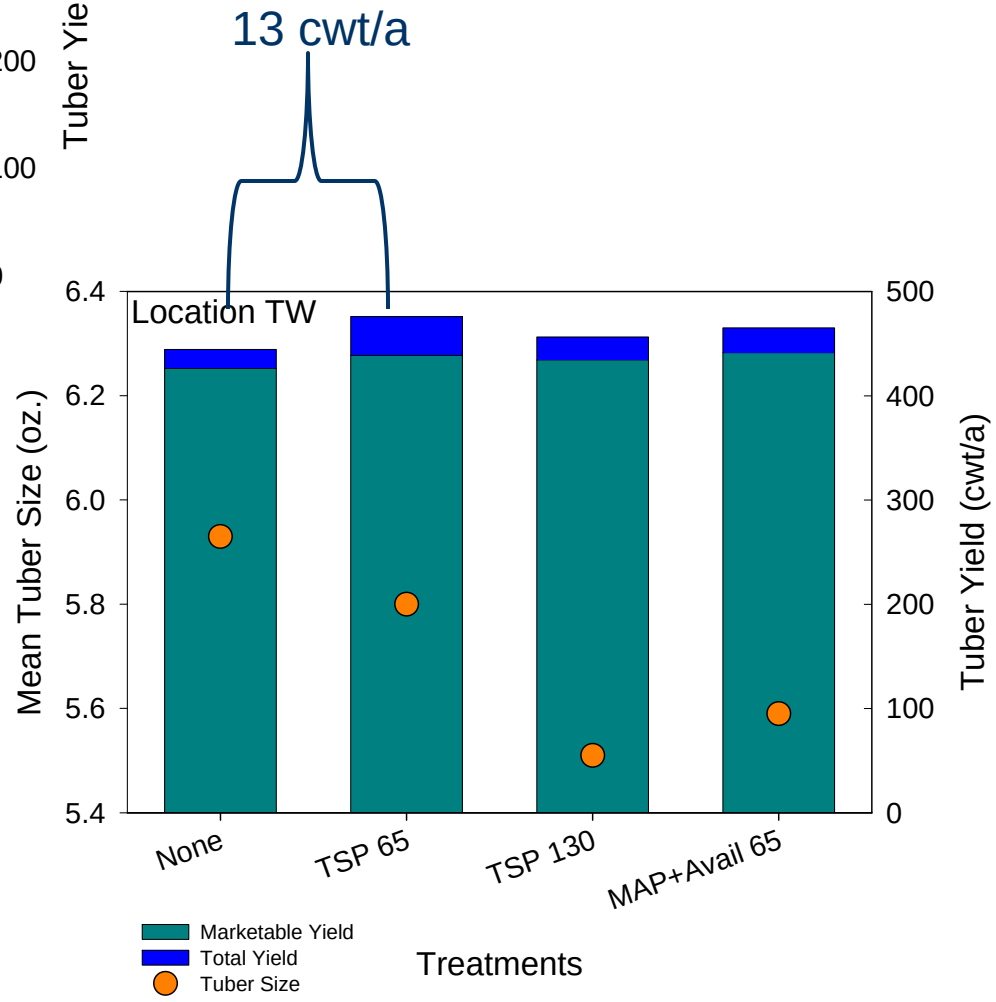


TW 06

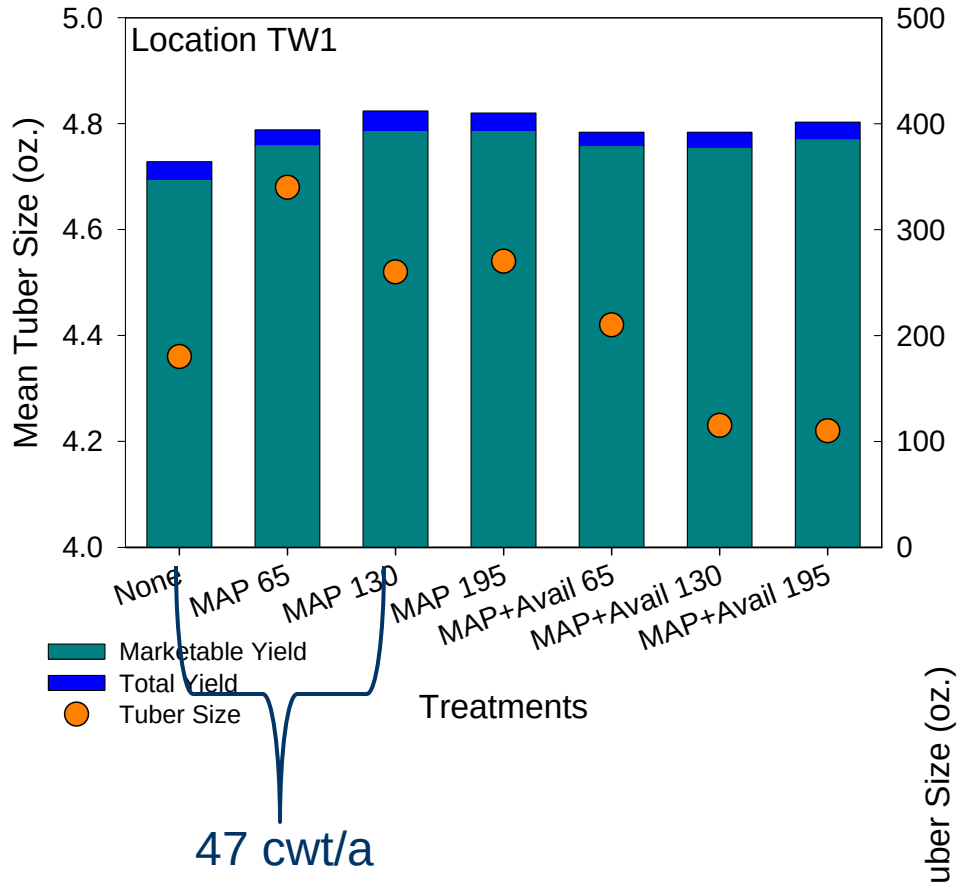
No significant effect of P source or rate

Antigo Airport 06

Rate and source were significant for marketable yield



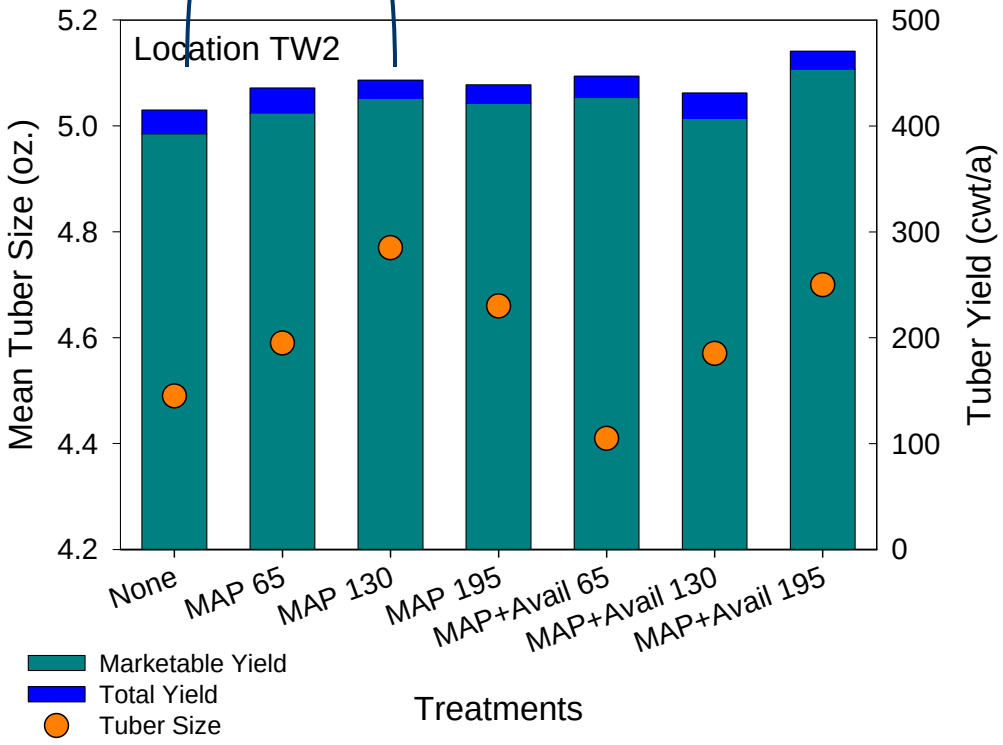
Frito Lay 1867 - 2007



TW1 07

No significant effect of P source or rate

36 cwt/a



TW2 07

Rate was significant for total and marketable yield

Conclusions Russet Burbank

- 2006 yield increases caused by MAP+Avail may have been caused by not comparing the same fertilizer materials
- 2007 yield increases were small when MAP+Avail was compared to MAP
- Avail had no significant effect on mean tuber size
- Marketable tuber yield maximized with:
  - 65 lb P_2O_5/a on coarse textured soils with soil test levels ranging from very low to excessively high

Conclusions Frito Lay 1867

- MAP+Avail compared to MAP or TSP
  - Resulted in increases and decreases in marketable yield
  - Mean tuber size was smaller at three locations, though only significant at one location
- Marketable yield maximized with:
  - 65 lb P_2O_5/a on high testing soils
  - 130 P_2O_5/a on low and optimum testing soils

Questions??

- Thanks to:
  - Aaron Burke of United Suppliers and Terry Tindall of Simplot
  - Adell Cooperative
  - The potato growers who allowed us to conduct this research on their farms
  - Everyone that has helped plant, maintain, and harvest the plots