P and K Fertility in Tart Cherries

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Why study P and K management?

Can yield and fruit quality increase?

- Increase tonnage per acre
- Increase the market value of the fruit (example: fruit size, soluble solids, or acidity)

Does formulation matter?

- Fertilizer costs are rising
- Is one formulation more cost effective than another?

How much is needed and when?

- Rate (amount per tree)
- Timing (single or multiple applications?)

Farm Descriptions

- 5 sites selected in Utah County

- Rate response comparison at each site
- Formulation response comparison at each site

- Site A – 2010 and 2011
  - Aggressive nutrient management history
  - ~20 year old trees
- Site B – 2010 and 2011
  - Moderately aggressive nutrient management history
  - ~17 year old trees
- Site C - 2011
  - Less aggressive nutrient management history
  - ~15 year old trees
- Site D - 2011
  - Moderately aggressive nutrient management history
  - ~16 year old trees
- Site E - 2011
  - Less aggressive nutrient management history
  - ~15 year old trees

Rate Response Comparison

- Sites A and B
  - Applications made in both 2010 and 2011

Rate of 16:16:16 fertilizer	**Timing**
Control no N,P, or K applied	May
0.5 lbs. per tree	May
1.0 lb. per tree	May
2.0 lbs. per tree	May
1.0 lb. per tree 2 times	May and June

- Sites C,D, and E
  - Applications made in 2011 only
  - Uniform N across all treatments

Rate of 0:16:16 fertilizer	**Timing**
Control no P or K applied	May
0.5 lbs. per tree	May
1.0 lb. per tree	May
2.0 lbs. per tree	May
1.0 lb. per tree 2 times	May and June
2.0 lbs. per tree 2 times	May and June

Formulation Response Comparison

- Site A = 5 formulations
  - Applications made in both 2010 and 2011

N Source	P Source	K Source	Timing
No N	No P	No K	May
Urea	Steric P III™	SOP	May
Urea	Steric P III™	Steric K™	May
Urea	MAP	Steric K™	May
Urea	MAP	KMag	May
Urea	MAP	SOP	May

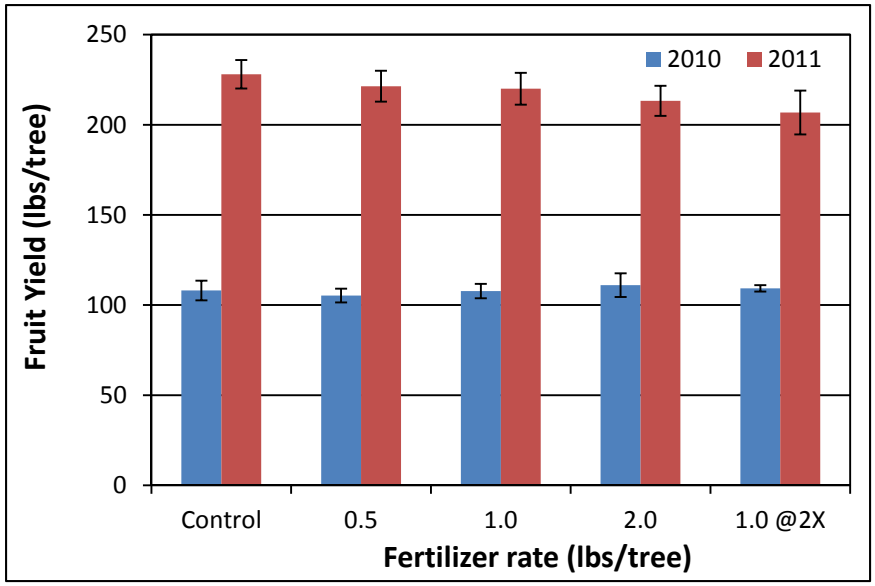
- Sites C,D, and E = 3 formulations
  - Applications made only in 2011

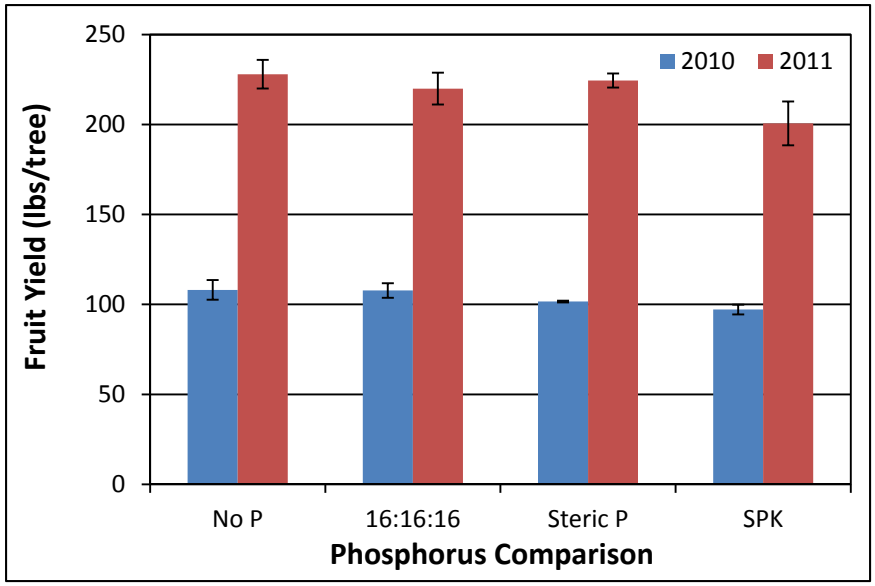
Fertilizer Formulation			
N Source	P Source	K Source	Timing
Urea	No P	No K	May
Urea	TSP	No K	May
Urea	No P	KCL	May

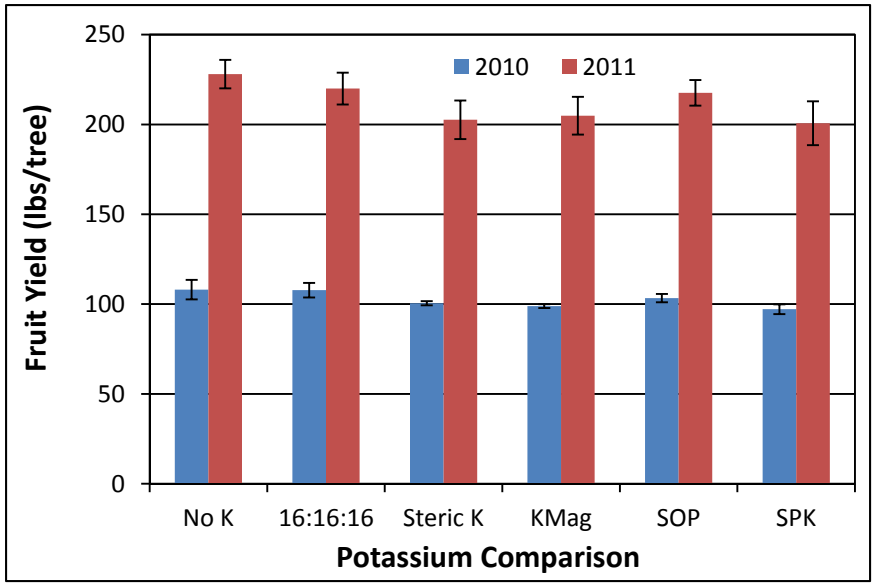
- Site B = 7 formulations
  - Applications made in both 2010 and 2011

N Source	P Source	K Source	Timing
No N	No P	No K	May
Urea	Steric P III™	SOP	May
Urea	Carbond P	SOP	May
Urea	APP	SOP	May
Urea	Steric P III™	Steric K™	May
Urea	MAP	Steric K™	May
Urea	MAP	KMag	May
Urea	MAP	SOP	May

Yield Results from Site A

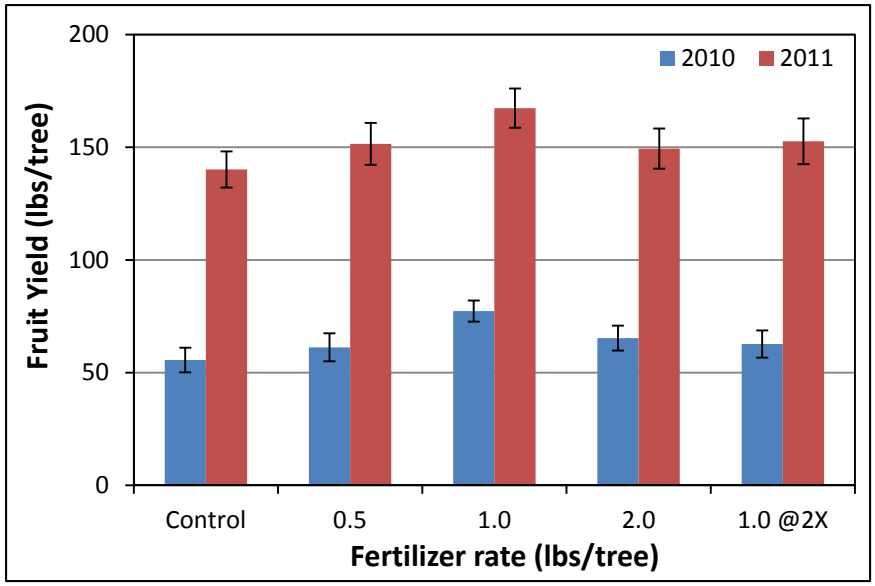


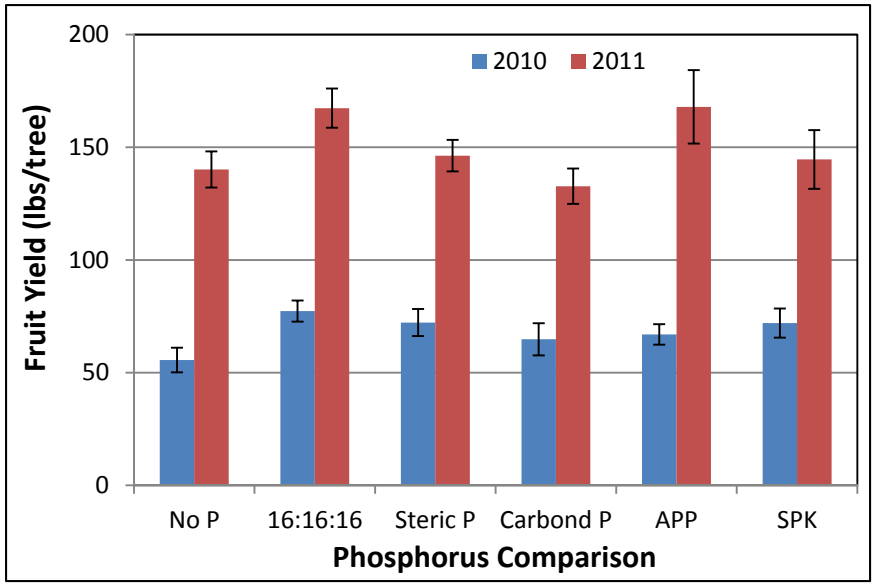


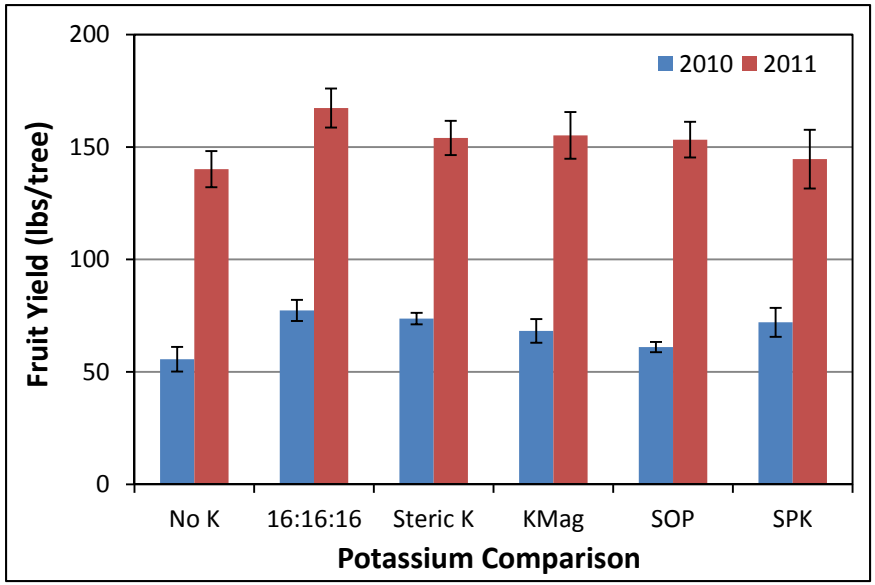


- Aggressive nutrient management history
  - There are no significant differences from treatment effect on yield in 2010 or 2011
  - Large increase in yield from year to year
  - For both moderate crop year and high crop year plant need is satisfied

Yield Results from Site B 2010

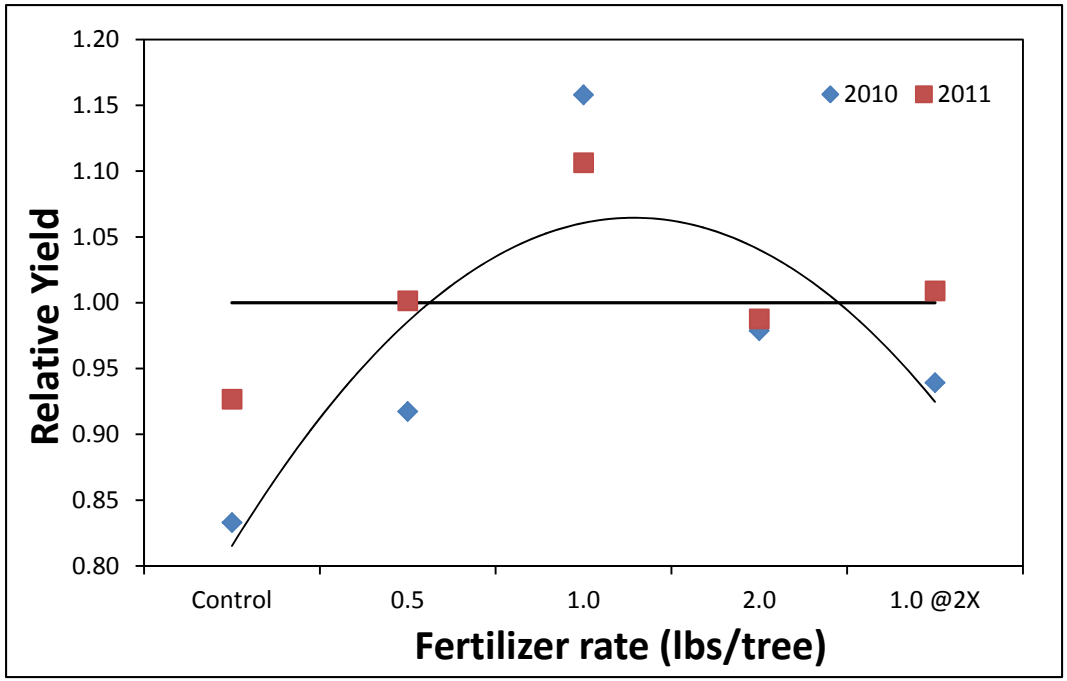






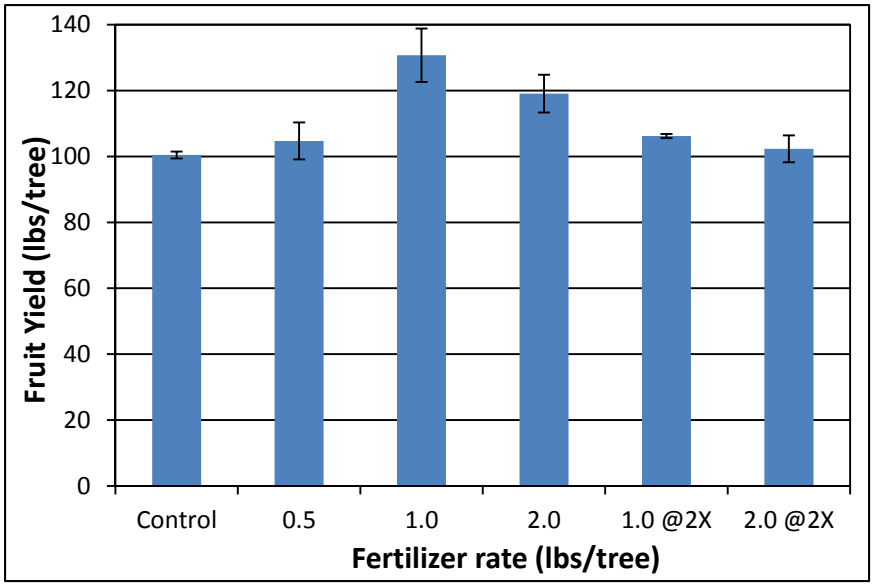
- Moderately aggressive nutrient management history

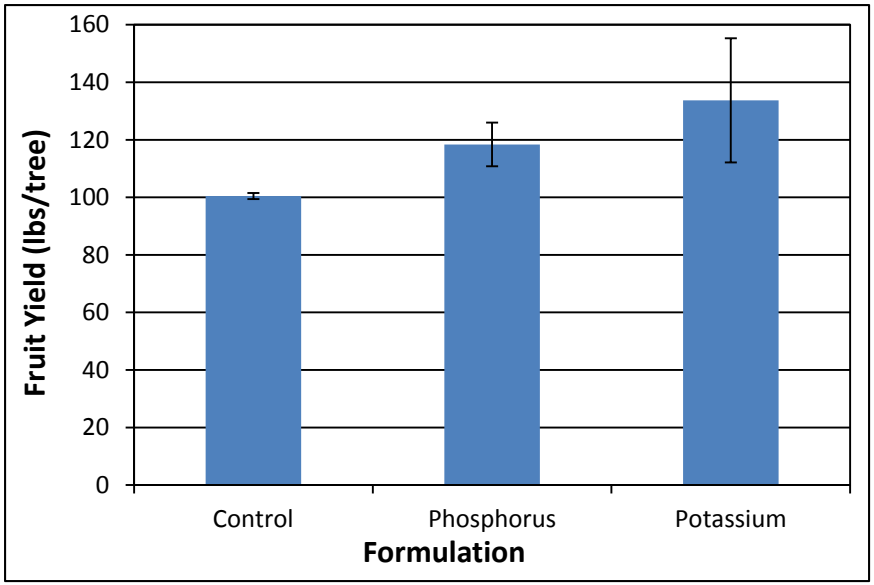
Yield Results from Site B



- Yield increased as rate increased up to 1 lb. per tree
- Consistent for both 2010 and 2011

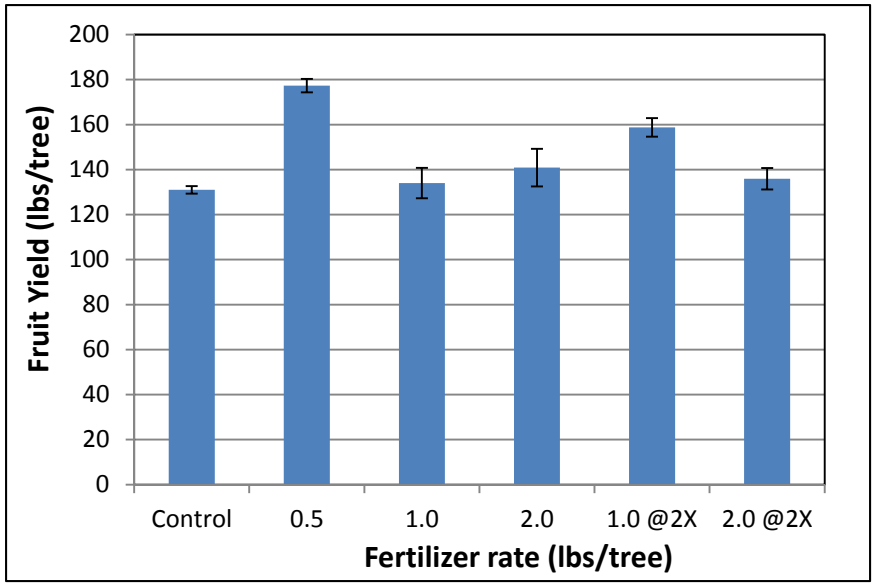
Yield Results from Site C 2011

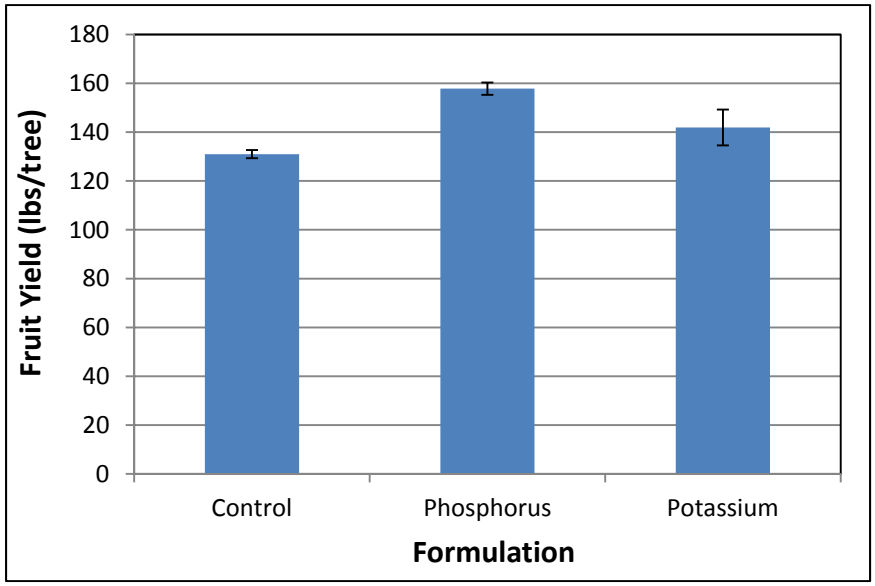




- Less aggressive nutrient management history
  - Yield increased as rate increased up to 1 lb. per tree
  - P and K addition affected yield
  - K addition affected yield the most

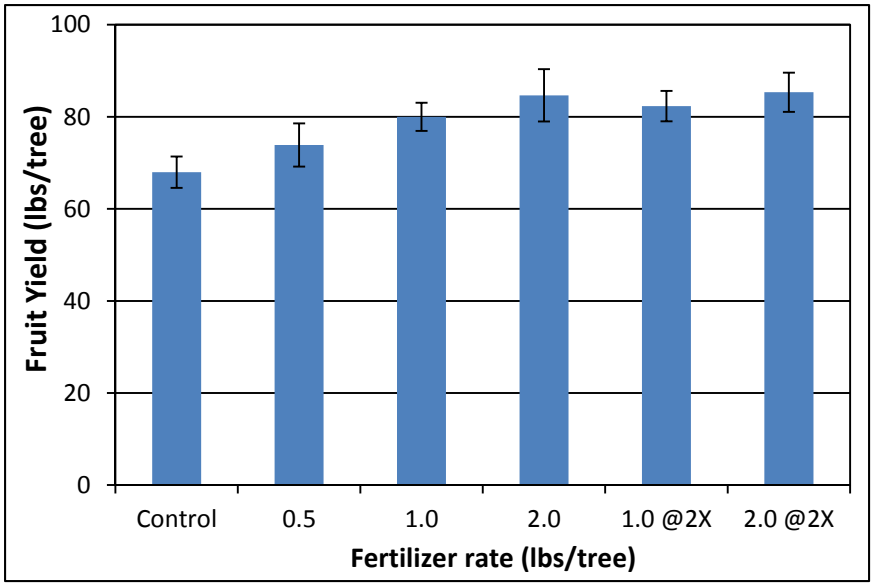
Yield Results from Site D 2011

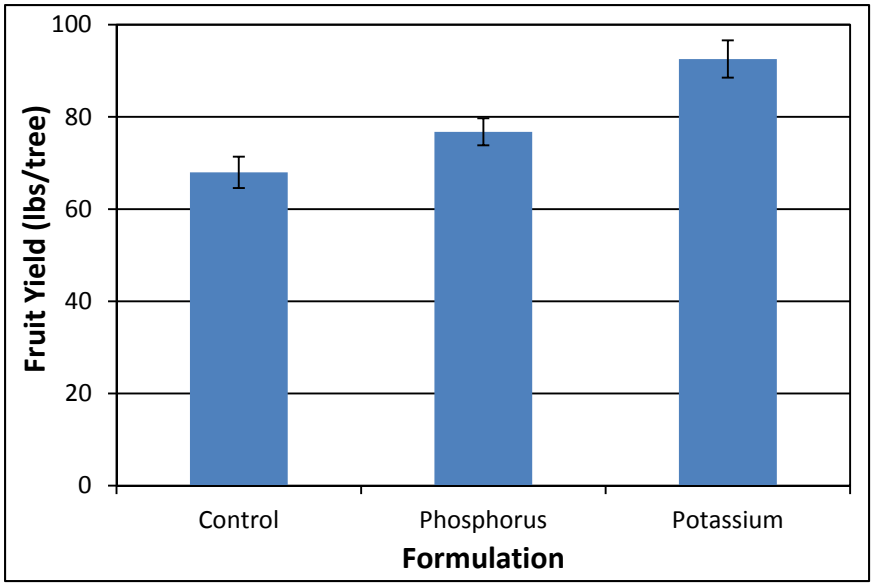




- Moderately aggressive nutrient management history
  - There are no clear trends in yield as rate increased
  - Yield was affected more by the addition of P then K

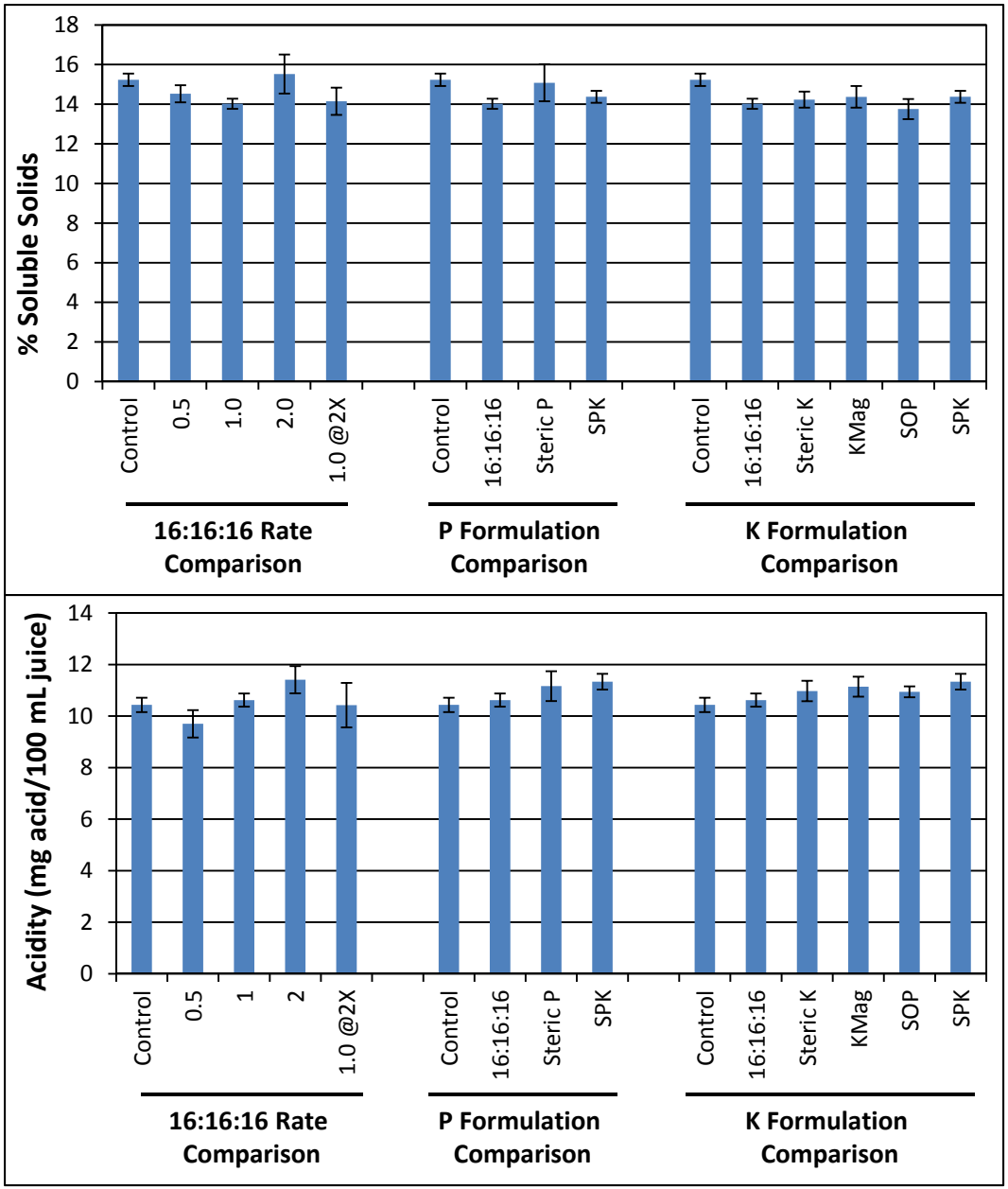
Yield Results from Site E 2011





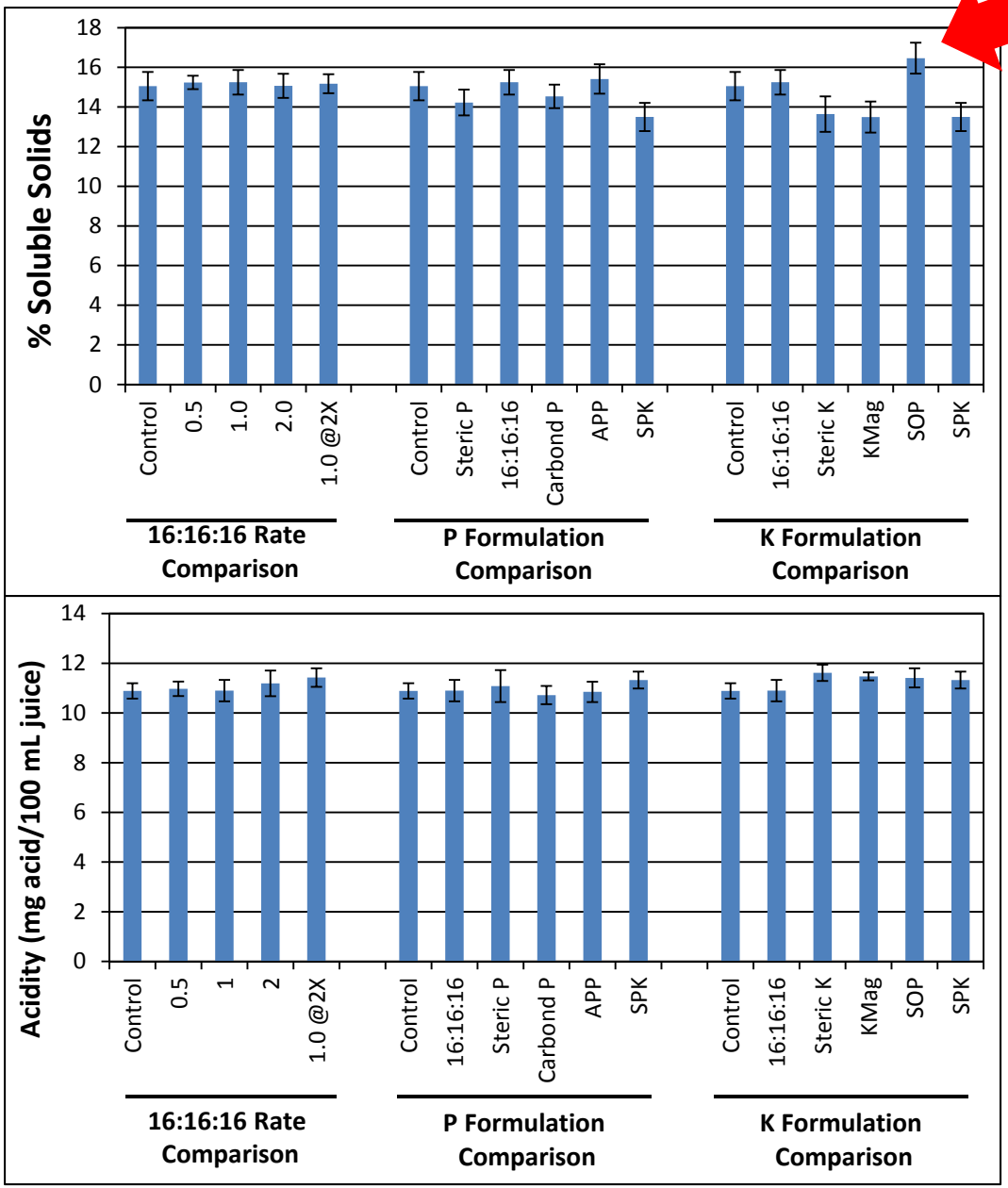
- Less aggressive nutrient management history
  - Yield increased as rate increased up to 2 lbs. per tree
  - Split applications did not increase yield any more than single applications
  - P and K addition affected yield
  - K addition affected yield the most

Fruit Quality Results from Site A



- Aggressive nutrient management history
  - There are no significant differences from treatment effect on soluble solids in 2010
  - There are no significant differences from treatment effect on acidity in 2010
  - 2011 data???

Fruit Quality Results from Site B



- Moderately aggressive nutrient management history
  - There are no significant differences from treatment effect on soluble solids in 2010
  - There are no significant differences from treatment effect on acidity in 2010
  - 2011 data???
- SOP treatment increased soluble solids
  - Can this be attributed to the Sulfur in the K source

Conclusion

- 16:16:16 formulation is just as effective as more expensive formulations
- Aggressive nutrient management programs (1 site)
  - No treatment differences in yield or fruit quality
- Moderate nutrient management programs (2 sites)
  - Show slight to moderate differences among treatments on yield
  - No difference among treatment on fruit quality in 2010
  - Where nutrients were compared alone P seems to be more effective
- Less aggressive nutrient management programs (2 sites)
  - Show the large differences among treatments on yield
  - Bigger benefit from K than from P

Future Directions

- 2011 Fruit Quality needs to be analyzed
- Leaf and fruit tissue samples need to be analyzed
  - To determine nutrient threshold
  - To determine if application number affects nutrient content
- Can fruit quality be boosted with Sulfur or other nutrient additions
- How might iron deficiency affect fruit quality in high crop load situations

Acknowledgements

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