NUTRIENT CONSIDERATIONS IN TART CHERRY

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Graduate Students –
Sean Rowley (2010-12); Emily Tsai (2013-2015); Cole Harding (2019-Present)

EXTENSION
UtahStateUniversity

OBJECTIVES

- Review past research
- Point out some key findings relevant to nutrient management
- Establish reasons for current research projects
- Seek input on future work

RESEARCH REVIEW:

GET IN THE "WAY BACK" MACHINE!

SEAN ROWLEY'S WORK (2010-2012)

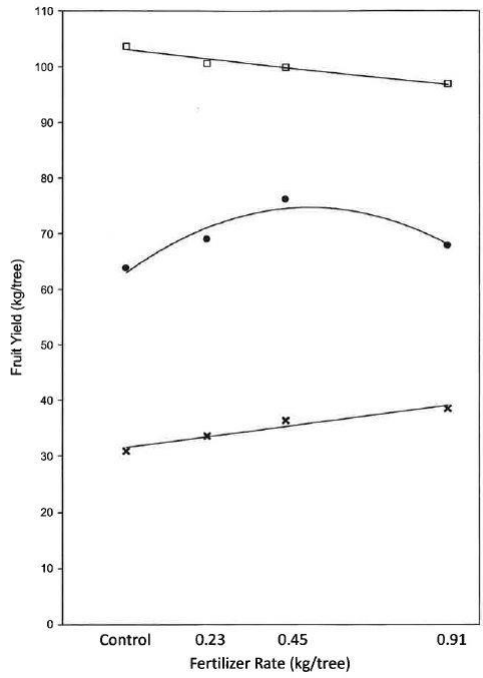
Table 2.1 Sites A and B descriptions

	Site A	Site B
Rowley (2013) Site	C	E
Location	Santaquin	West Payson
Date Planted	1997	1997
Cherry Variety	Montmorency	Montmorency
Rootstock	Mahaleb	Mahaleb
Adopted Management Practices?	Y	N
Experimental Design*	RBD**	RBD**
Replications	4	4
Trees per plot	16	10
Treatment:		
Year of Application	2011	2011
Control	X	X
0.45 kg 0-16-0	X	X
0.45 kg 0-0-16	X	X
0.23 kg 0-16-16	X	X
0.45 kg 0-16-16	X	X
0.91 kg 0-16-16	X	X
0.45 kg 0-16-16 (2X)	X	X
0.91 kg 0-16-16 (2X)	X	X
Timing of Sampling:		
Year of Sampling	2013	2014
May	X	X
June	X	X
July	X	X
New Growth	X	X
Yield	2011 & 2013	2011 & 2014

*RBD= randomized block design

**Blocked by tree uniformity

- Results Summary:



EMILY TSAI'S STUDY:(2013-2014)

FOLLOW ON SAMPLING OF SEAN'S PERIODICALLY FERTILIZED ORCHARD BLOCKS TO SEE MULTI-YEAR CARRY OVER (WAS THERE A RESIDUAL EFFECT OF VARIABLE P AND K APPLICATION)

EVALUATE THE EFFICACY OF NUTRIENT SUFFICIENCY RANGES USED IN UTAH

DETERMINE THE TIMING OF NUTRIENT STATUS SAMPLING THAT BEST REFLECTS PRE-HARVEST NUTRIENT SUFFICIENCY

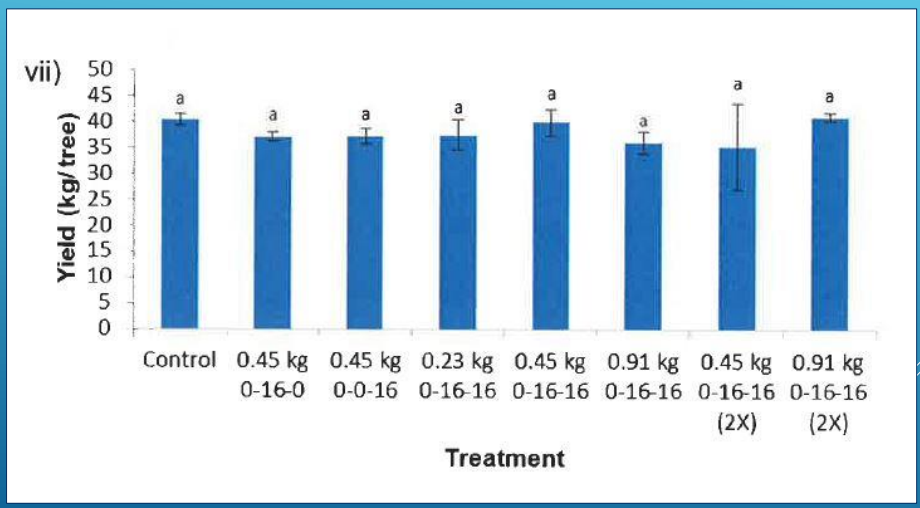
Table 1.1 Standard Sufficiency Ranges for Foliar Nutrient Content in Tart Cherry and Peach (Ranges modified from Rowley, 2013; Bryson et al, 2014; Walker et al., 1989)

Sufficient Foliar Nutrient Content					
Tree Fruit	Macronutrients %			Micronutrients ppm	
	P	K	Ca	Fe	Zn
Tart Cherry	0.13-0.24	1.5-3.0	1.0-2.7	50-800	15-125
Peach	0.14-0.4	1.0-3.0	0.8-2.6	50-200	18-80

Table 1.2 Sufficient Annual Vegetative Growth Ranges in Tart Cherry and Peach (Adapted from Rowley, 2013)

Sufficient Annual Vegetative Growth		
Tree Fruit	Young	Mature
	cm	
Tart Cherry	25-51	20-38
Peach	25-61	20-38

EMILY'S RESULTS:



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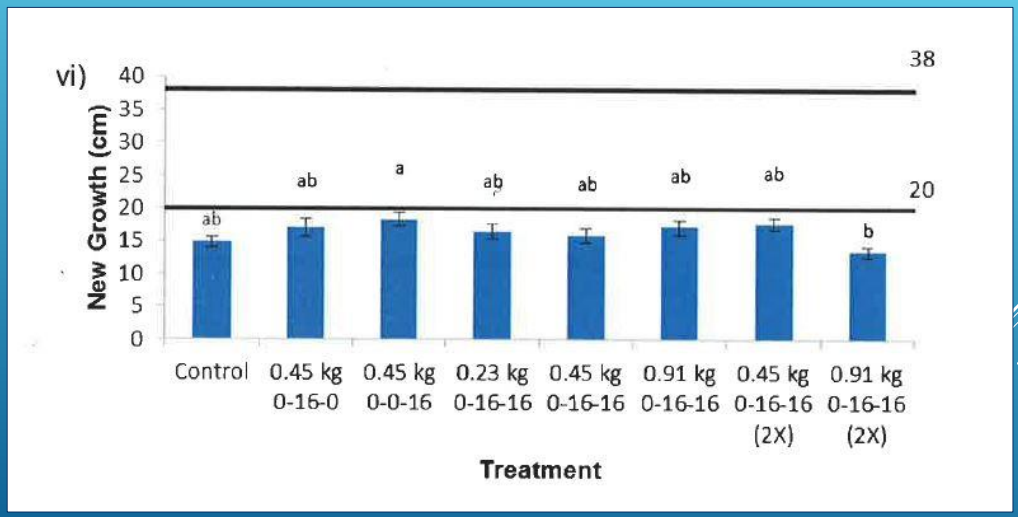

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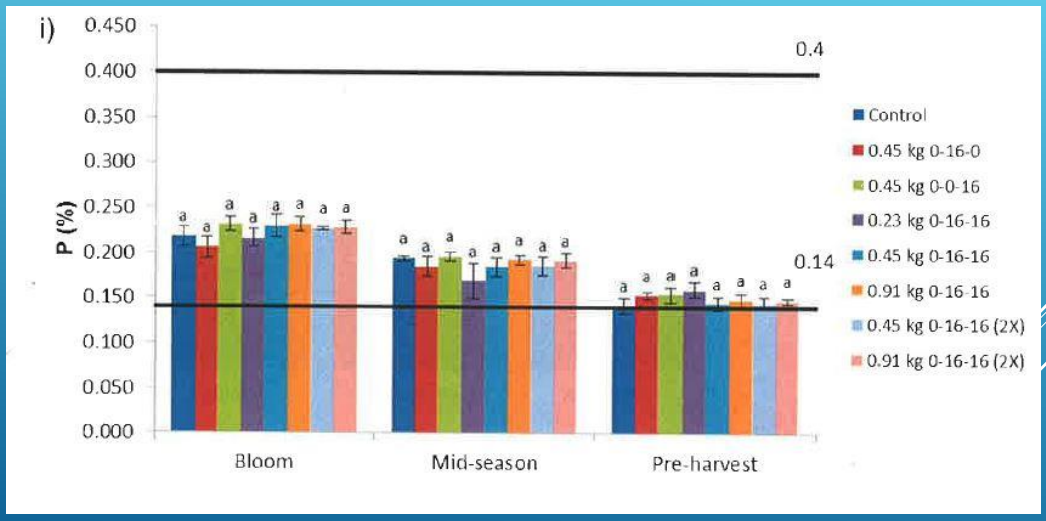

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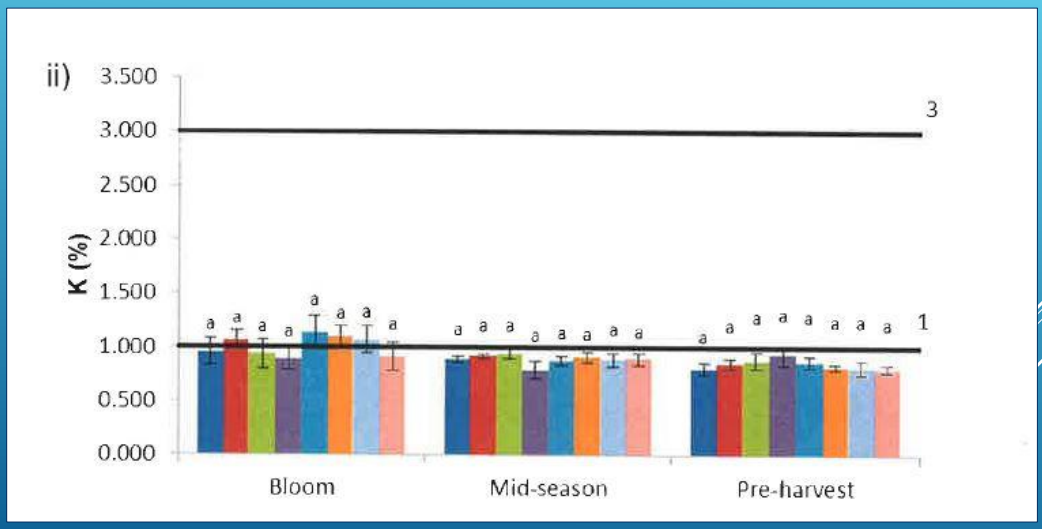

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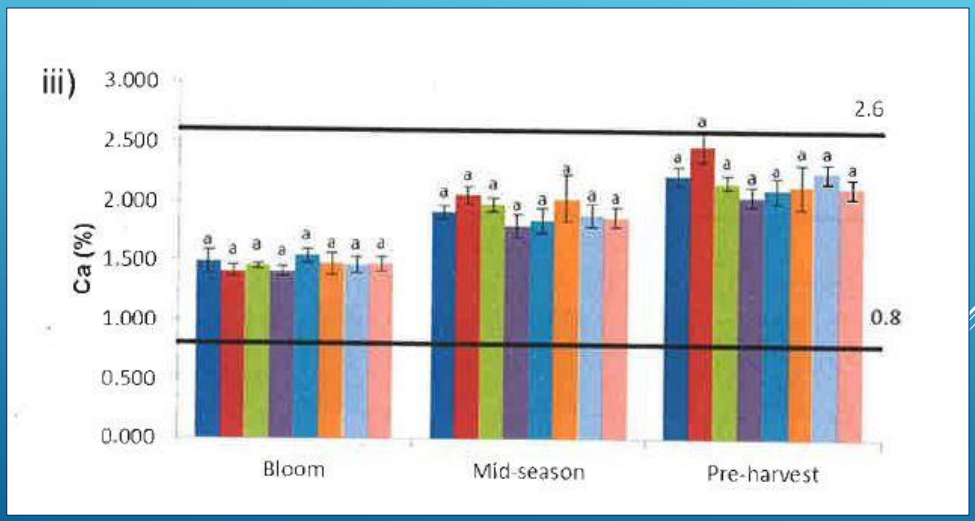

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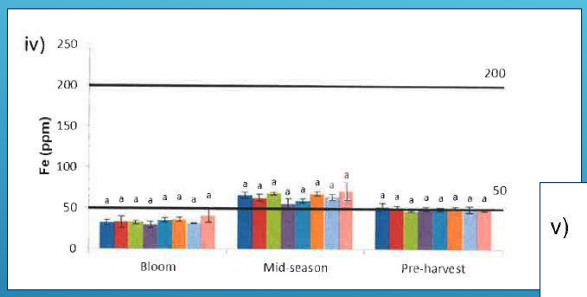

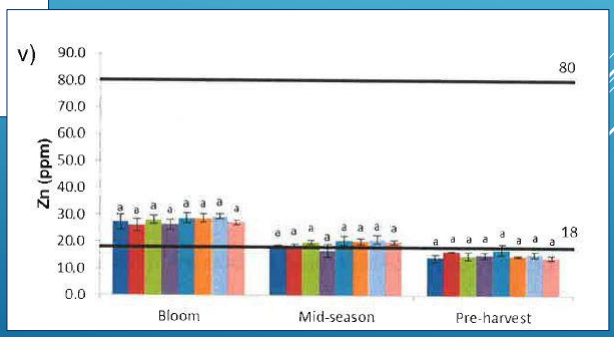

EMILY'S RESULTS:

Table 2.3 Qualitative Prediction of Pre-harvest Sufficiency Status in Tart Cherry

Tree Fruit	Site	Year	Nutrient	Bloom vs. Pre-harvest	Mid-season vs. Pre-harvest
Tart Cherry	A	2013	P	+	+
			K	-	+
			Ca	+	+
			Fe	-	+
			Zn	-	-
	B	2014	P	-	-
			K	-	+
			Ca	+	+
			Fe	-	+
			Zn	-	+

COLE HARDING'S STUDY:

- Given the impact of nutrient deficit on long-term orchard productivity (Sean's work)
- Given that averaging yield and evaluating annual dosing effect on growth and yield does not seem to reveal differential response (Sean and Emily's work)
- Given that we see large spatial variability on some orchard blocks (Cole's preliminary results)
- Then we are concerned that overall productivity may be impacted negatively if significant areas of orchards experience regular nutrient deficits (reduced yield and longevity of trees)

TAKE HOME MESSAGES:

- Incentive for annual fertilizer application
- Sufficiency ranges for nutrients used by USU are valid (reliably reflect Utah growing conditions)
- Mid-season tissue sampling great predictor of nutrient sufficiency near harvest
- Potassium and Iron regularly show deficits in tissue samples (are we leaving yield on the table?)
- Excited to look more deeply into variable rate application and management of fertility

SPECIAL THANKS

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