



A Reduced Early-Season Irrigation Schedule for Southeastern Pecan Production

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THE UNIVERSITY OF GEORGIA
COLLEGE OF **AGRICULTURAL &**
ENVIRONMENTAL SCIENCES

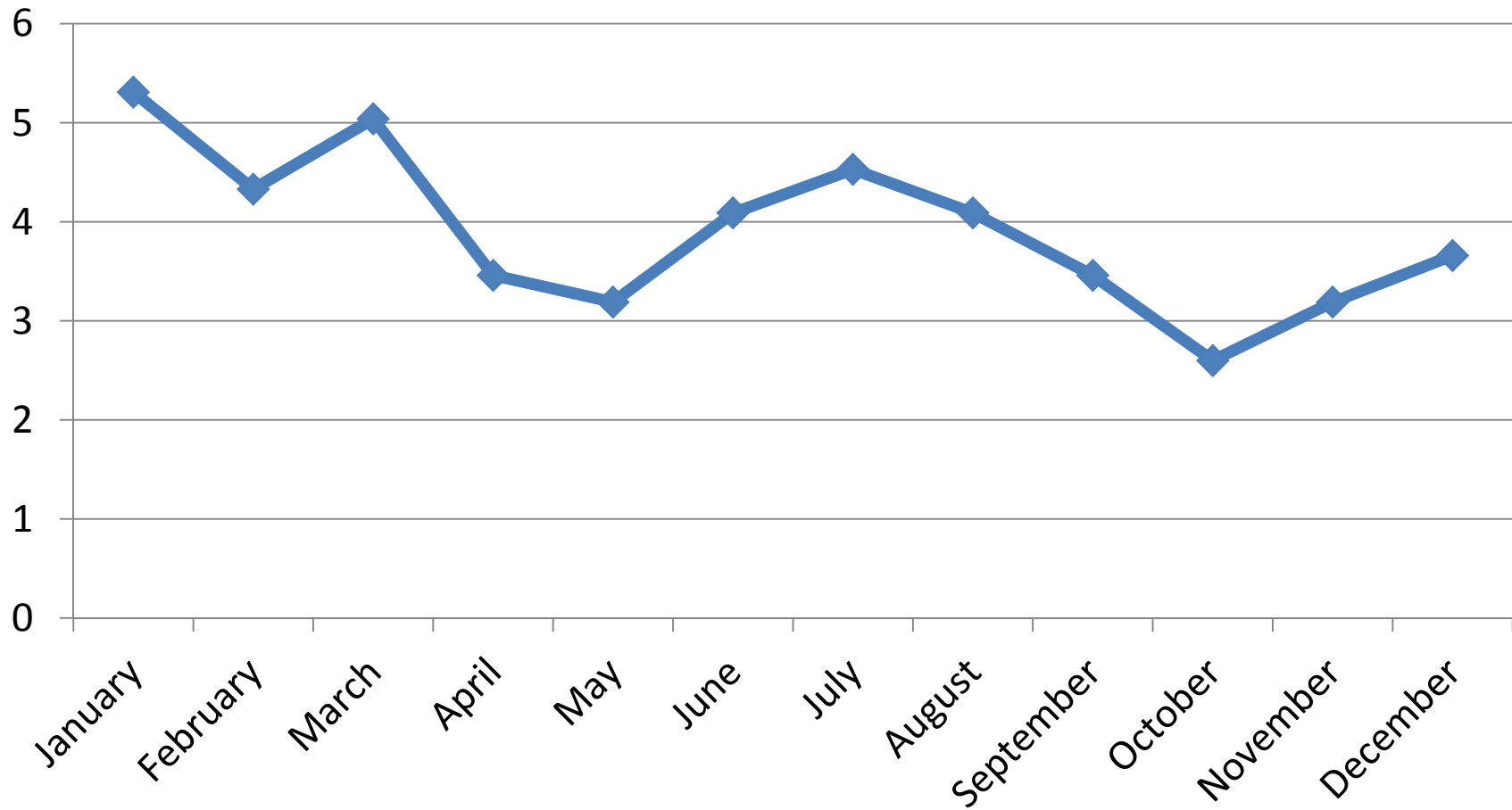
Pecans and Water

- Pecan trees require 350 gallons of water per day during PEAK DEMAND

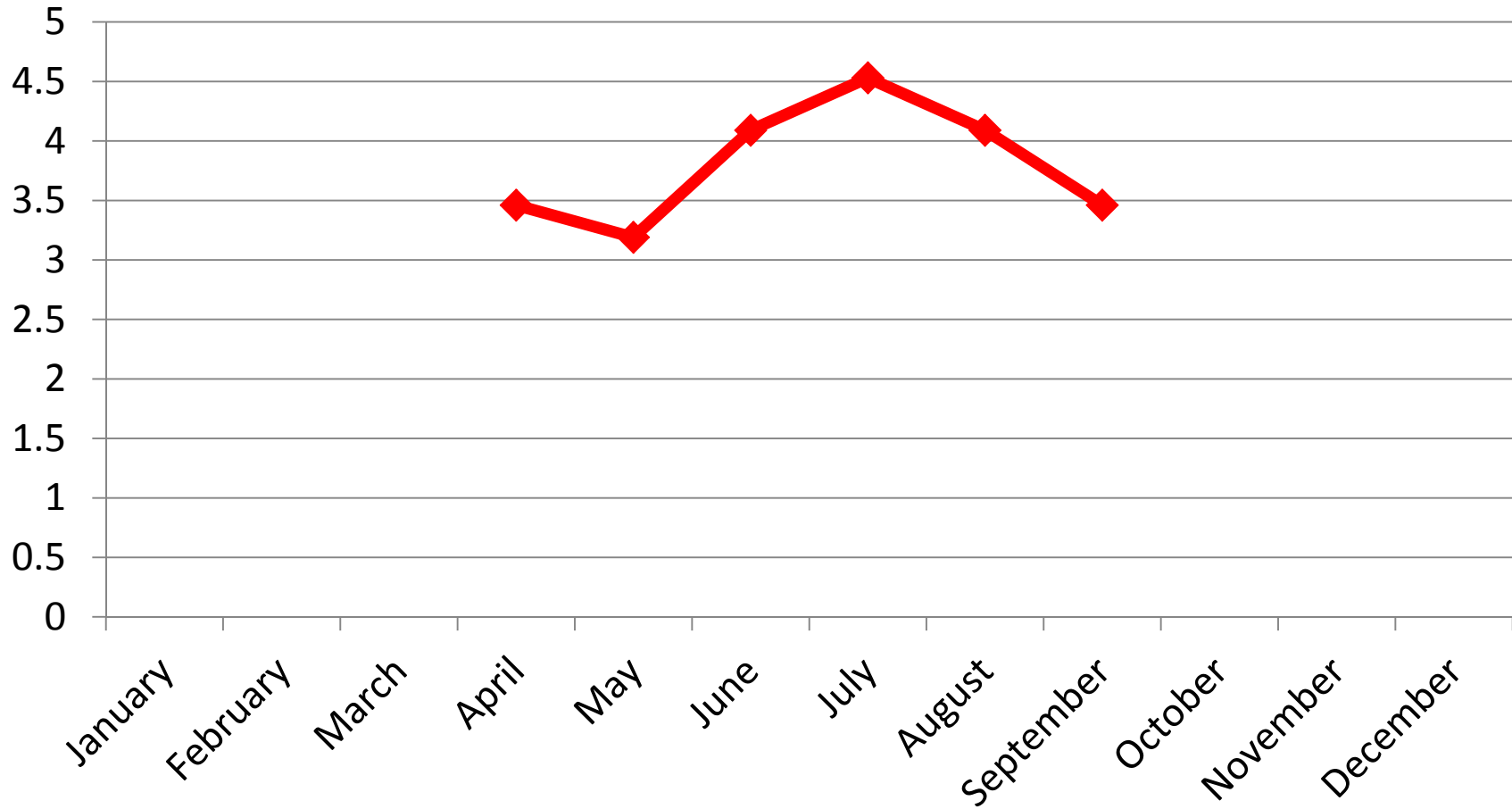
New Mexico Vs. Georgia

- New Mexico
 - April-October
 - Et= 40"-57"
 - Average Rainfall April-October=7.37"
 - Additional water required to flush salt out of root zone
- Georgia
 - April-October
 - Et=35-40"
 - Average Rainfall April-October=25.4"

Average Rainfall Distribution Tifton, GA



Average Rainfall Distribution Tifton, GA



Current Drip Irrigation Schedule for Pecans

	Recommended	*@ 30 gph/tree
	Daily	
April	7.5 hr	
May	8.5 hrs	
June	9.5 hrs	
July	11 hrs	
August	12 hrs	
September	12 hrs	

A Reduced Early-Season Irrigation Schedule for Pecans

	Reduced	Recommended
	Every other day	Daily
April	4 hrs	7.5 hr
May	6 hrs	8.5 hrs
June	8 hrs	9.5 hrs
July	10 hrs	11 hrs
August	12 hrs*	12 hrs
September	12 hrs*	12 hrs

Two 15 gph microjets per tree (Total of 30 gph per tree)
25 Year old Stuart trees on Tifton Loamy Sand in Berrien CO., GA

*All trees irrigated daily in August/September







Pump up pressure chamber
PMS Instruments
www.pmsinstrument.com

Measuring Soil Moisture

Spectrum Technologies: www.specmeters.com

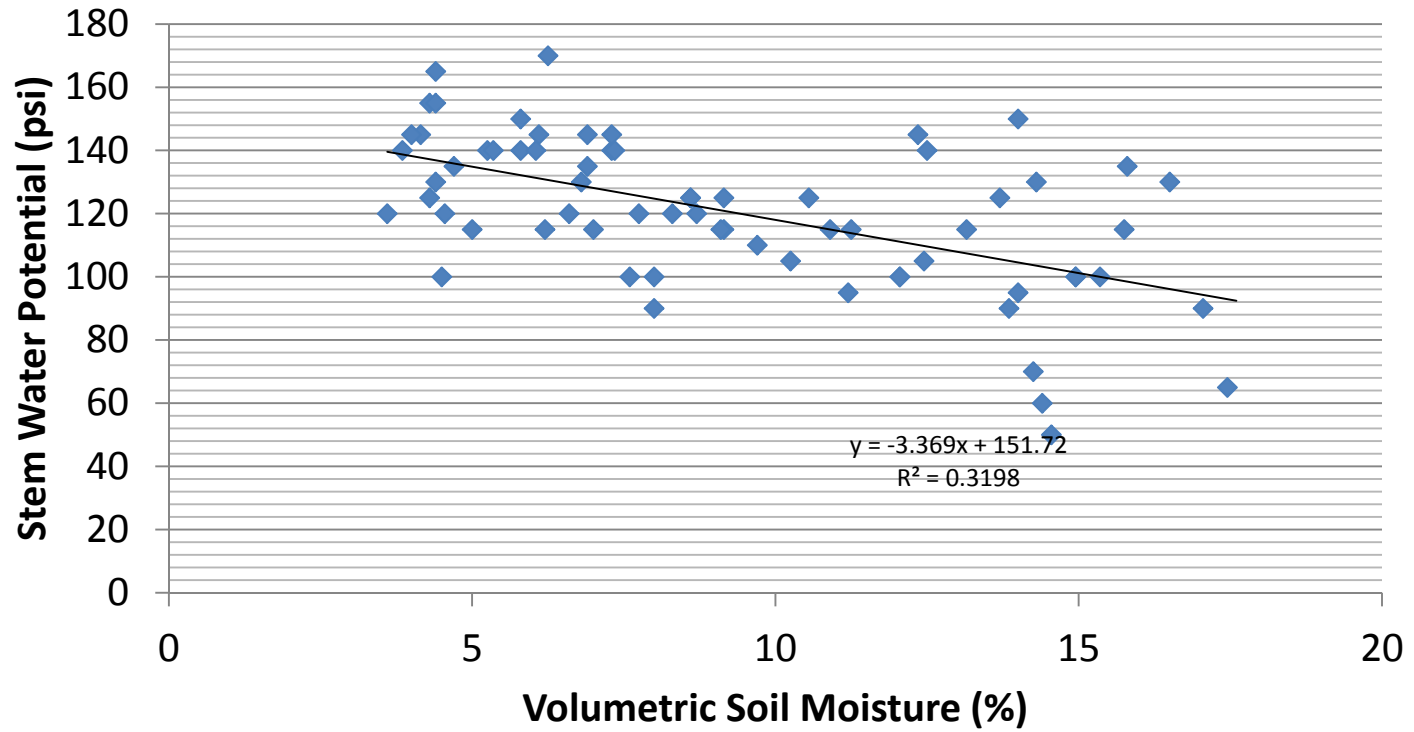
WaterScout SM100 Soil Moisture Sensor



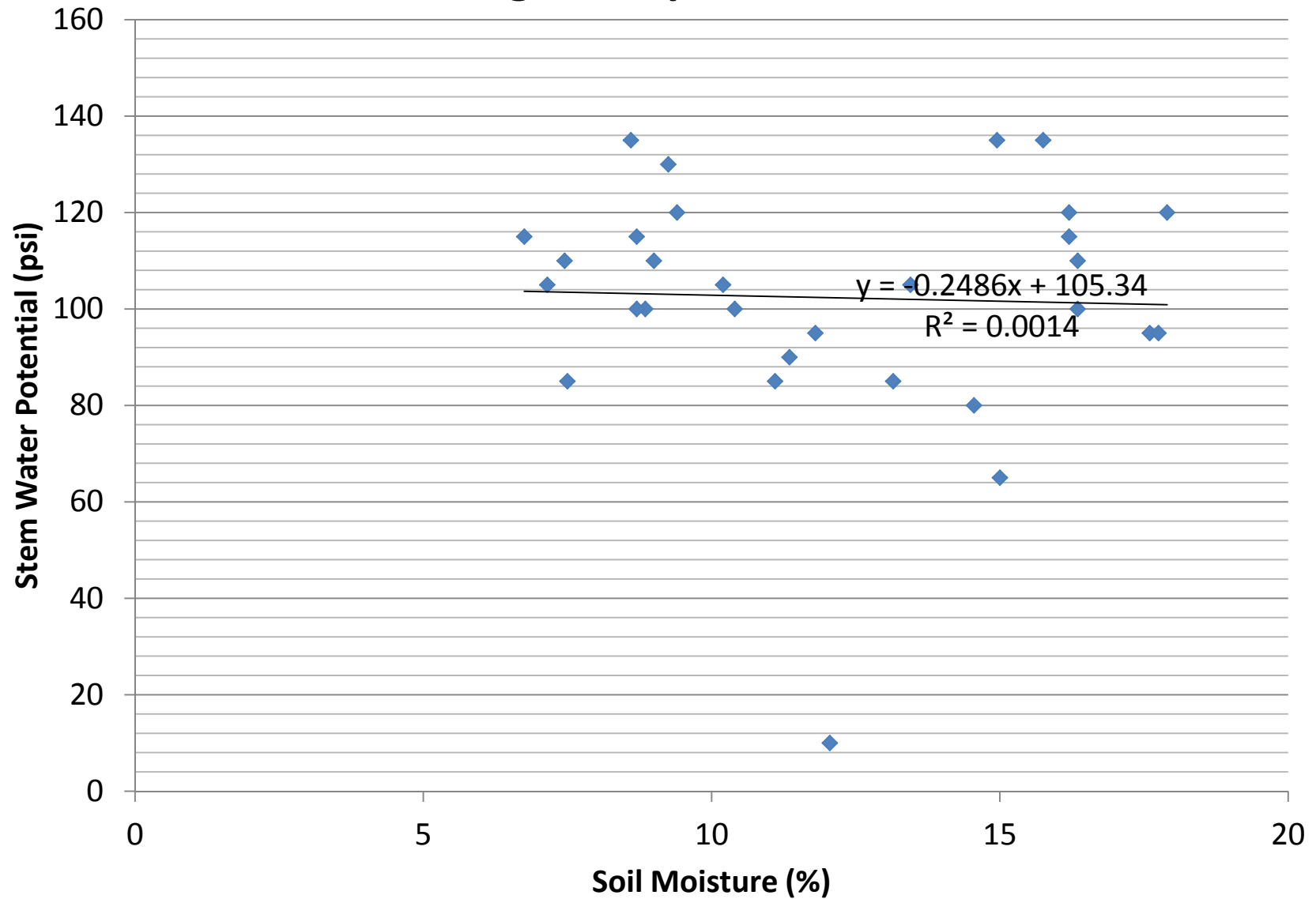
Field Scout TDR 300 Soil Moisture Meter

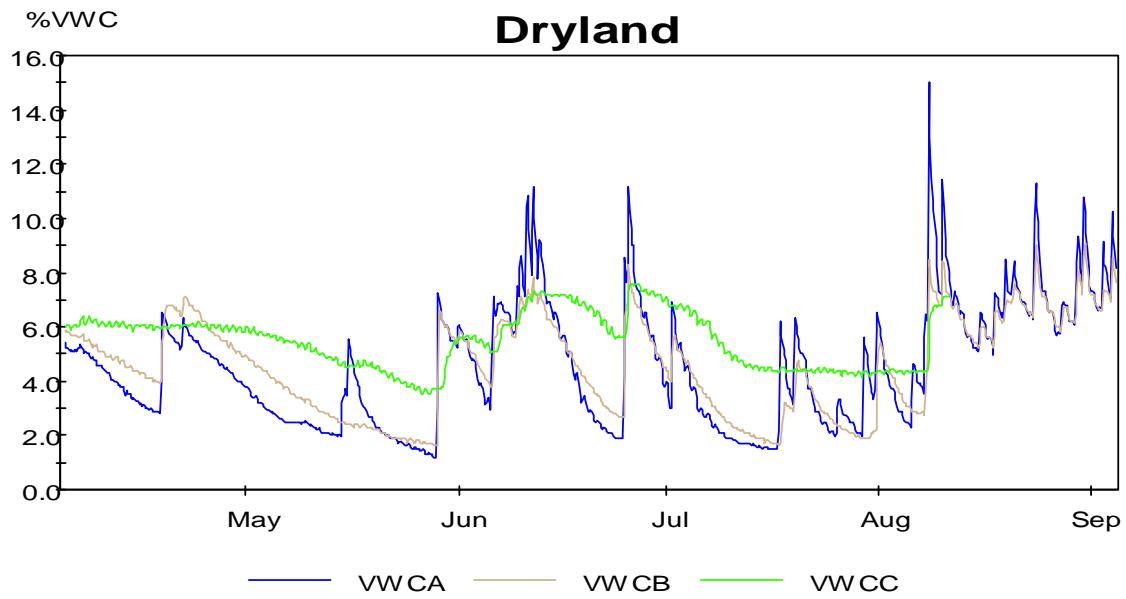


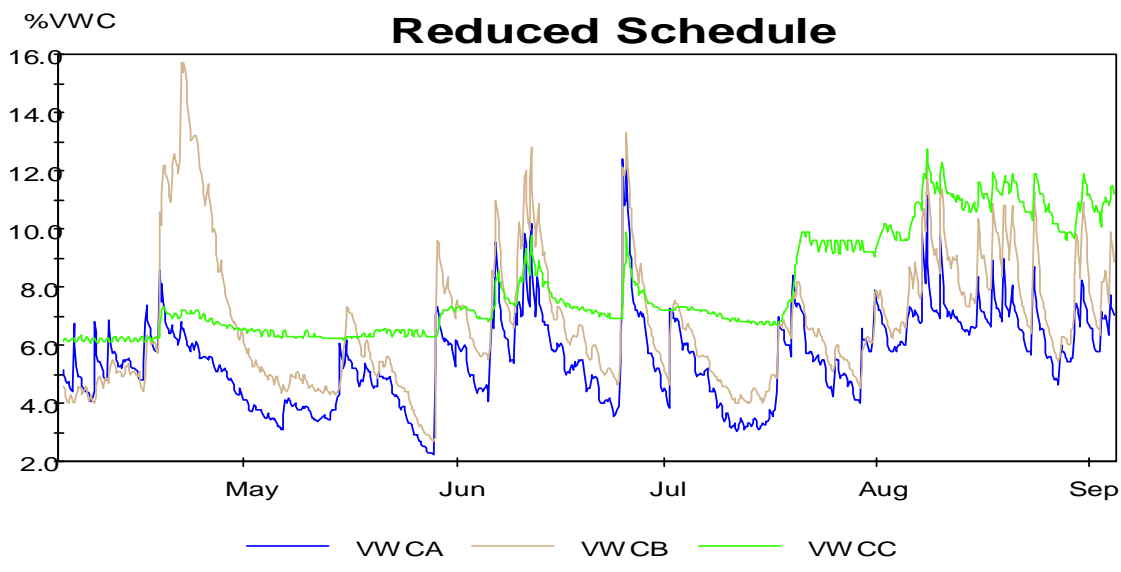
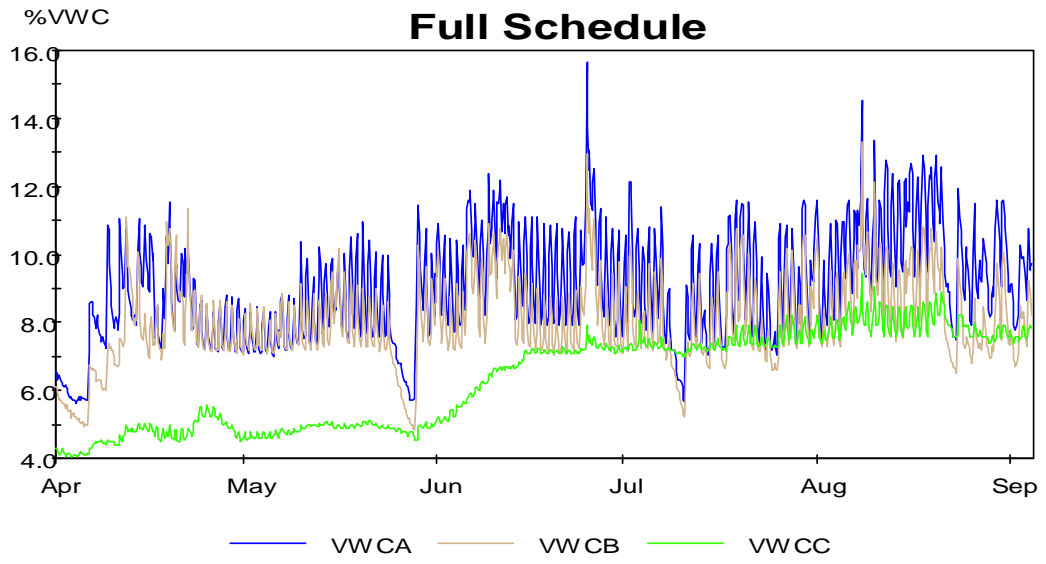
Water Stress and Soil Moisture---Dryland April-July



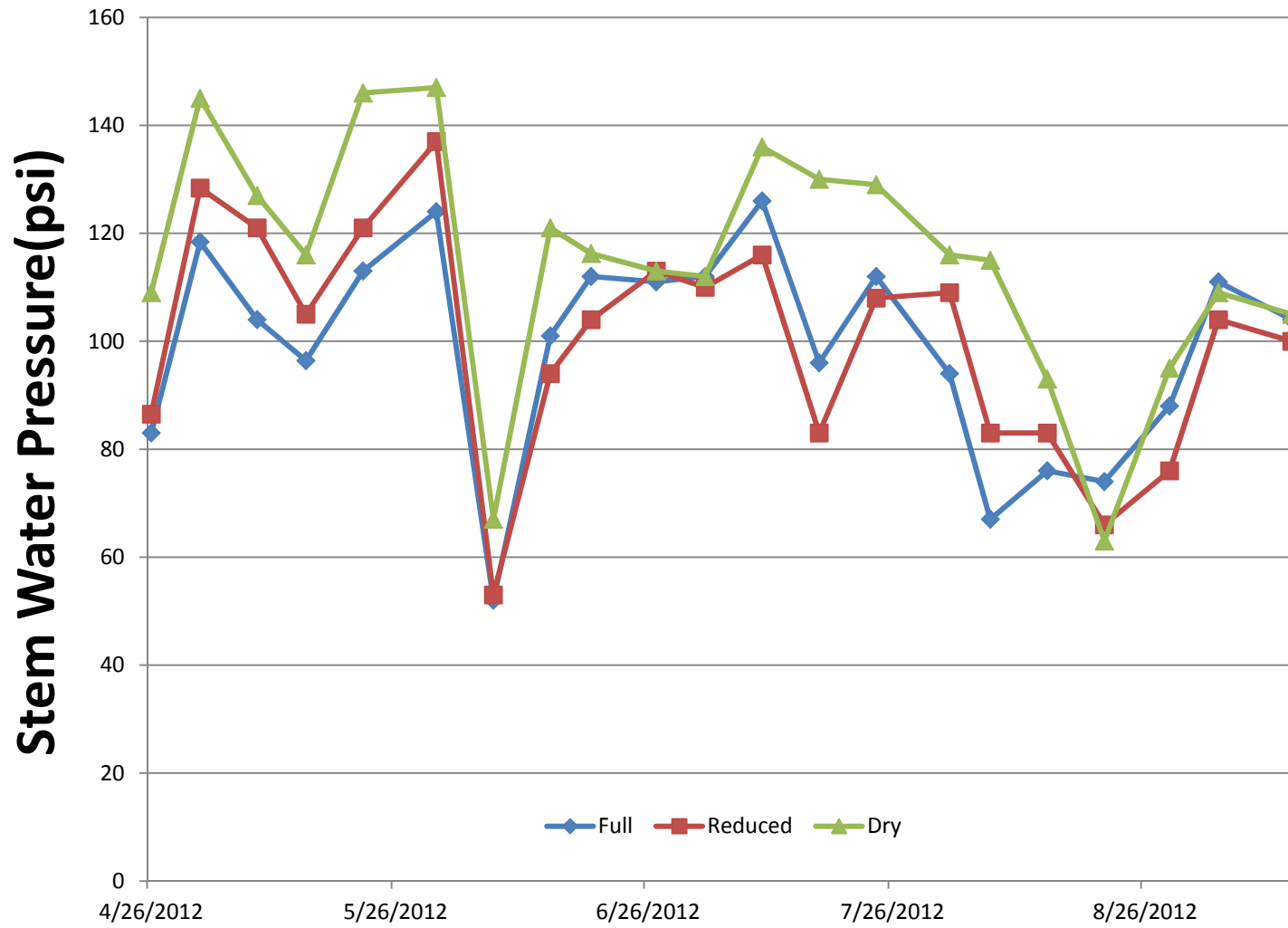
Water Stress and Soil Moisture---Dryland August/September







Tree Water Stress



Effects on Yield, Nut Quality, and Shoot Length

Treatment	Average Water Stress (psi)	Yield (lbs/tree)	Nuts/lb	% Kernel	Shoot Length
Recommended	96.9b	81a	50.2a	46.5a	4.2a
Reduced	98.3b	62a	47b	46.5a	3.5b
Non-Irrigated	113a	49b	50.4a	44.8a	3.1b

Irrigation Water Use (gallons per tree)

	<u>Reduced</u>		<u>Recommended</u>	
April	1800	(60 gal/day)	6750	(225 gal/day)
May	2880	(93 gal/day)	7905	(255 gal/day)
June	3600	(120 gal/day)	8550	(285 gal/day)
July	4500	(145 gal/day)	10,230	(330 gal/day)
August	11,160	(360 gal/day)	11,160	(360 gal/day)
September	10,800	(360 gal/day)	10,800	(360 gal/day)
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Total	34740		55,395	
Average Per Day	189		303	

The Reduced Irrigation Schedule provides a **38% Reduction** in irrigation water use with no significant effect on tree water stress, **yield, or quality**

Irrigation Water Use (gallons per acre)*

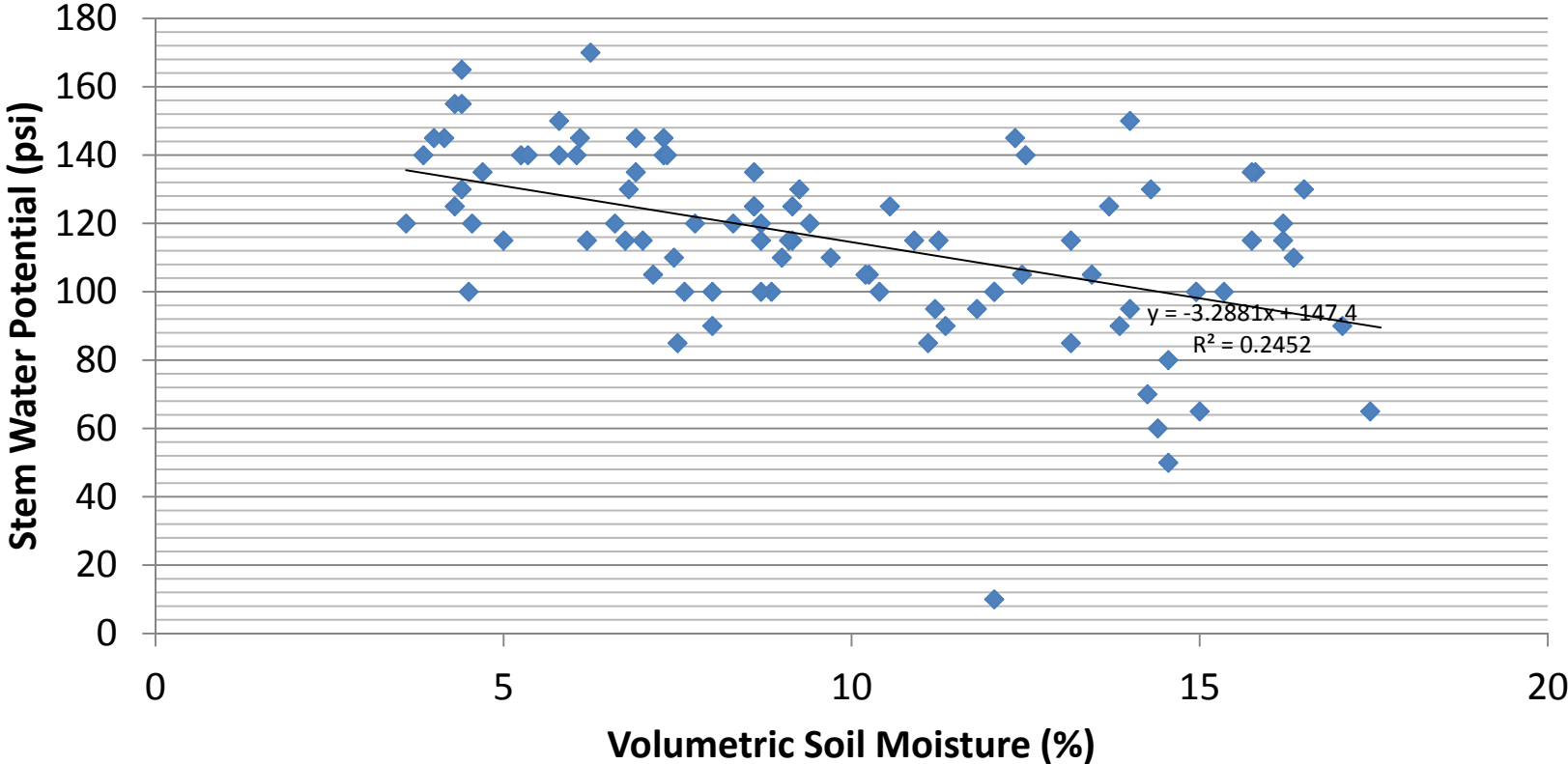
	<u>Reduced</u>	<u>Recommended</u>	<u>Rainfall</u>
April	21,600 gal (0.8")	81,000 gal (2.98")	1.47"
May	34,560 gal (1.27")	94,860 gal (3.49")	3.32"
June	43,200 gal (1.59")	102,600 gal (3.78")	4"
July	54,000 gal (1.99")	122,760 gal (4.52")	4.94"
August	133,920 gal (4.93")	133,920 gal (4.93")	6.93"
September	129,600 gal (4.77")	129,600 gal (4.77")	2.89"
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Total	416,880 gal (15.3")	664,740 gal (24.5")	23.55"

*12 Trees per acre

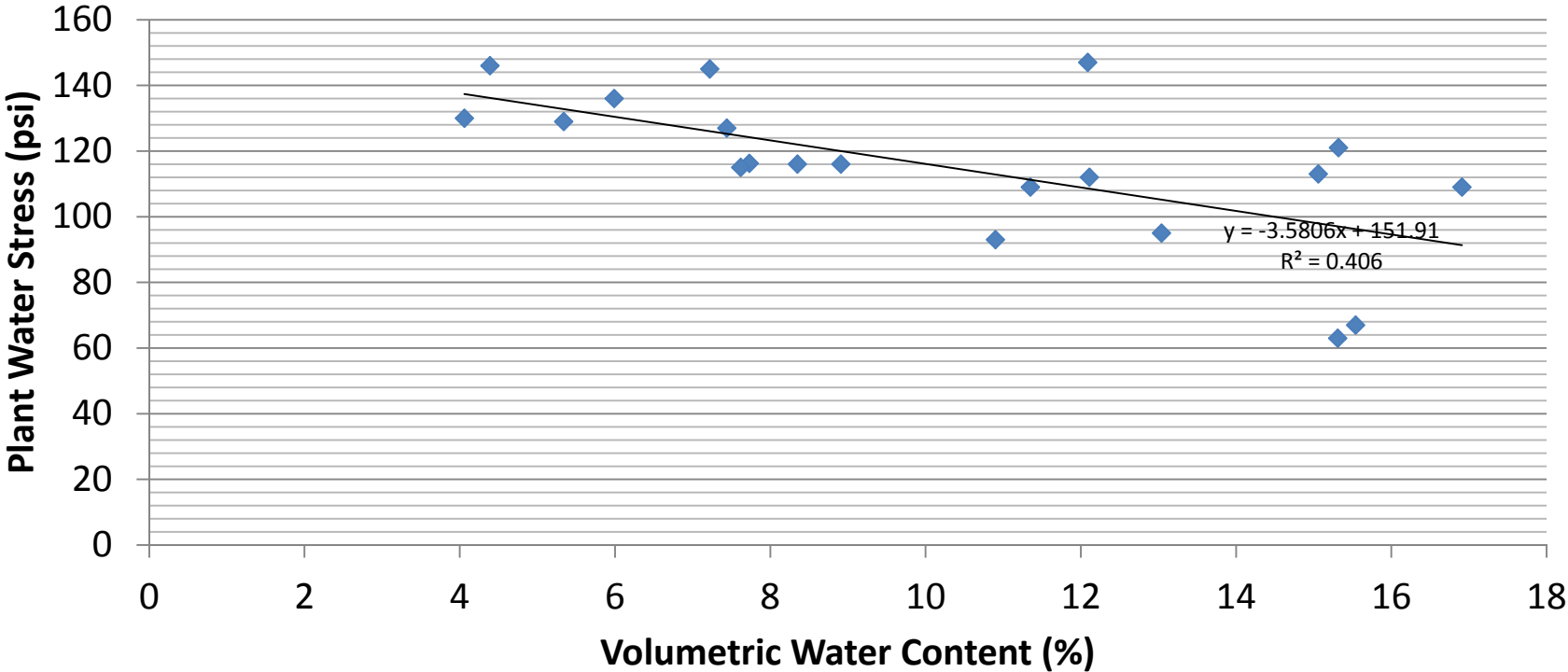
2012 Rainfall

	<u>Tifton</u>	<u>Ft. Valley</u>	<u>Albany</u>	<u>Baxley</u>
April	0.21"	0.67"	1.42"	2.07"
May	3.48"	1.18"	2.28"	6.43"
June	5.23"	5.13"	3.82"	5.15"
July	6.66"	1.52"	4.24"	3.35"
Aug.	13.4"	5.13"	6.2"	7.19"
Sept.	3.84"	2.72"	3.02"	2.34"
Totals	32.82"	16.35"	20.98"	26.53"

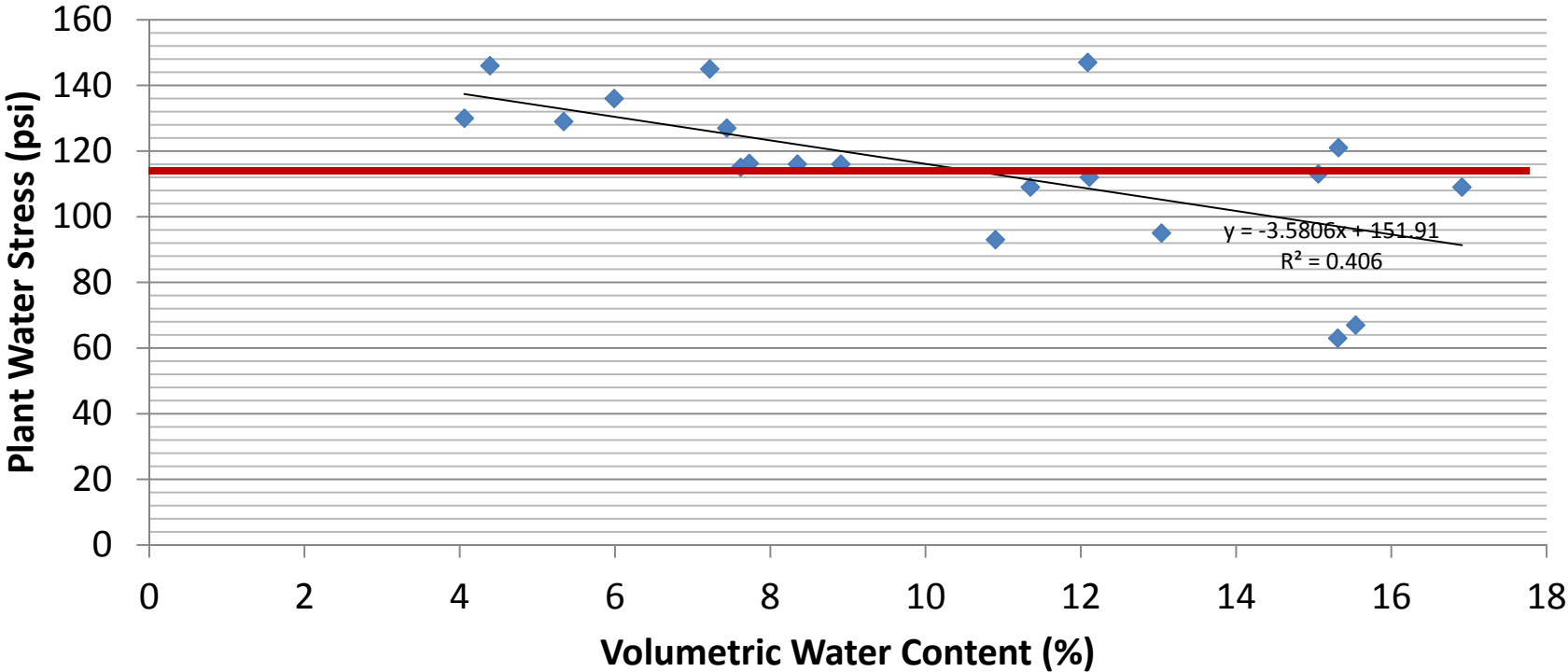
Baseline Soil Moisture and Plant Water Stress Non-Irrigated Stuart Trees



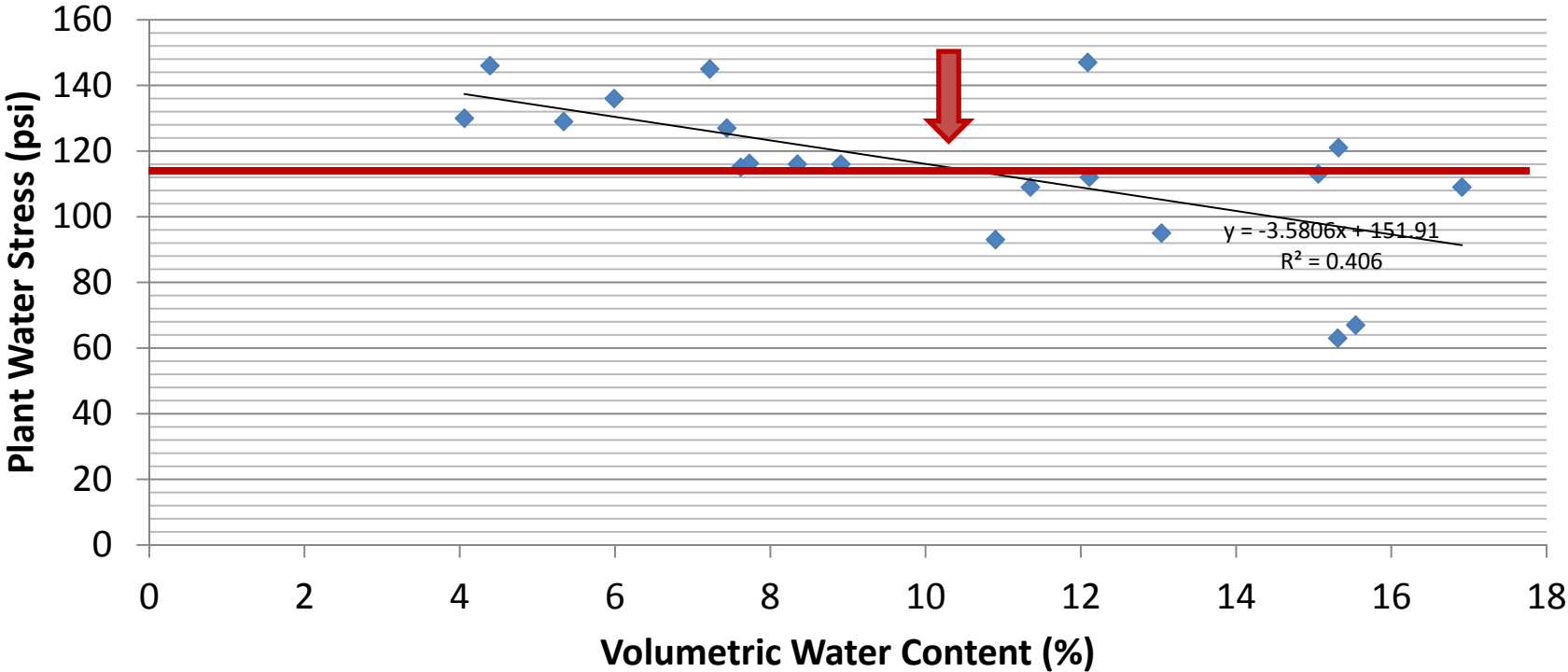
Baseline Soil Moisture and Plant Water Stress Non-Irrigated Stuart Trees



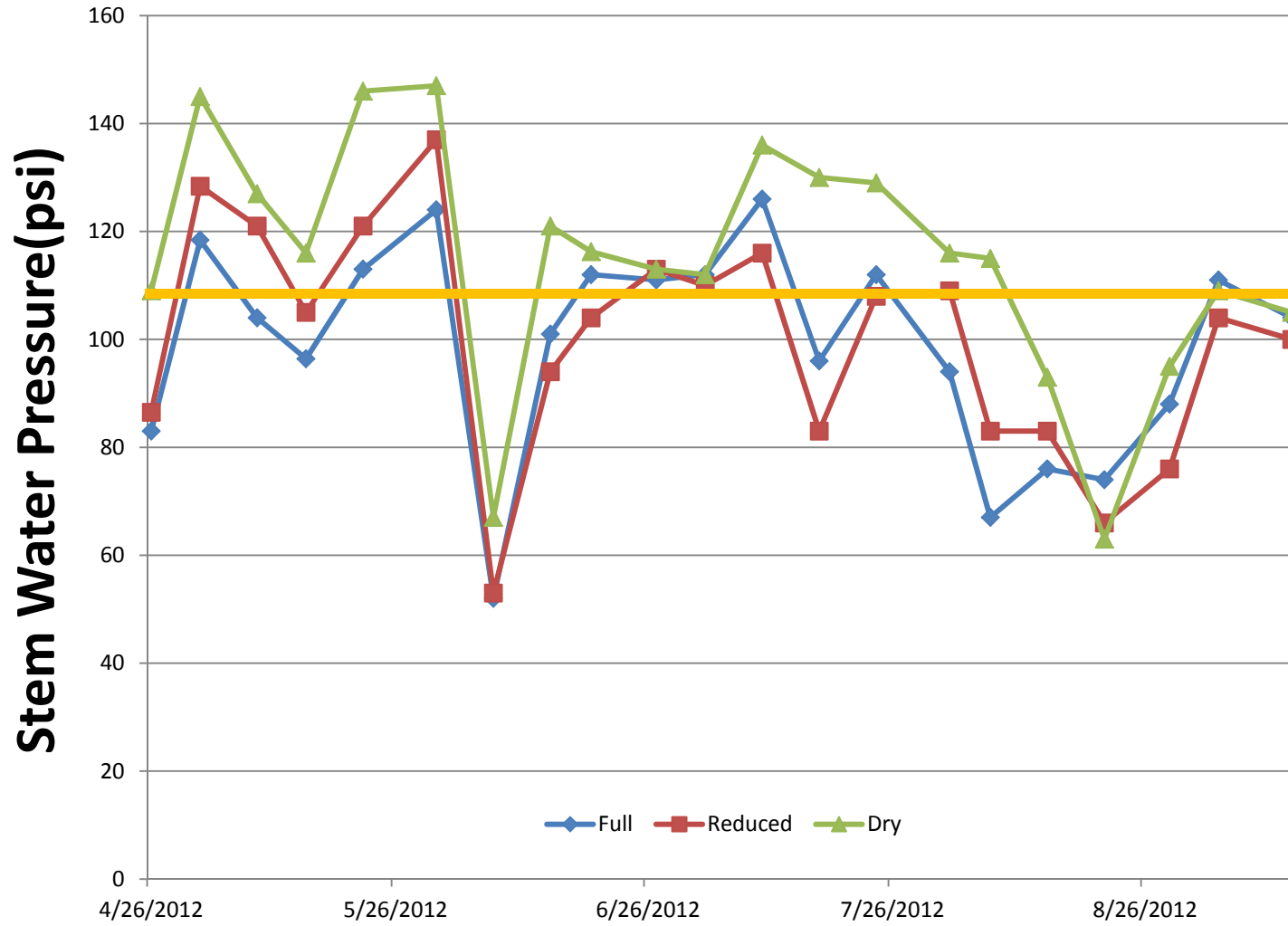
Baseline Soil Moisture and Plant Water Stress Non-Irrigated Stuart Trees



Baseline Soil Moisture and Plant Water Stress Non-Irrigated Stuart Trees



Tree Water Stress



Summary

- Water Stress on pecan occurred at about 113 psi using the pressure chamber to measure stem water potential
- Regression analysis suggests that irrigation scheduling for mature pecan trees may be needed when volumetric water content reaches 10-11% on Tifton loamy sand
- The Reduced Irrigation Schedule provides a 38% Reduction in irrigation water use with no significant effect on tree water stress, yield, or quality