Problems with Quality and Late Shuck Opening in Southeastern Pecans in 2010

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Early 2010 Pecan Crop Predictions for Georgia

Littlepage	Pape	Alabama	NPSA
78 million	85 million	75 million	90 million

2010 Crop Maturity and Development Issues

- Cool Spring Temperatures

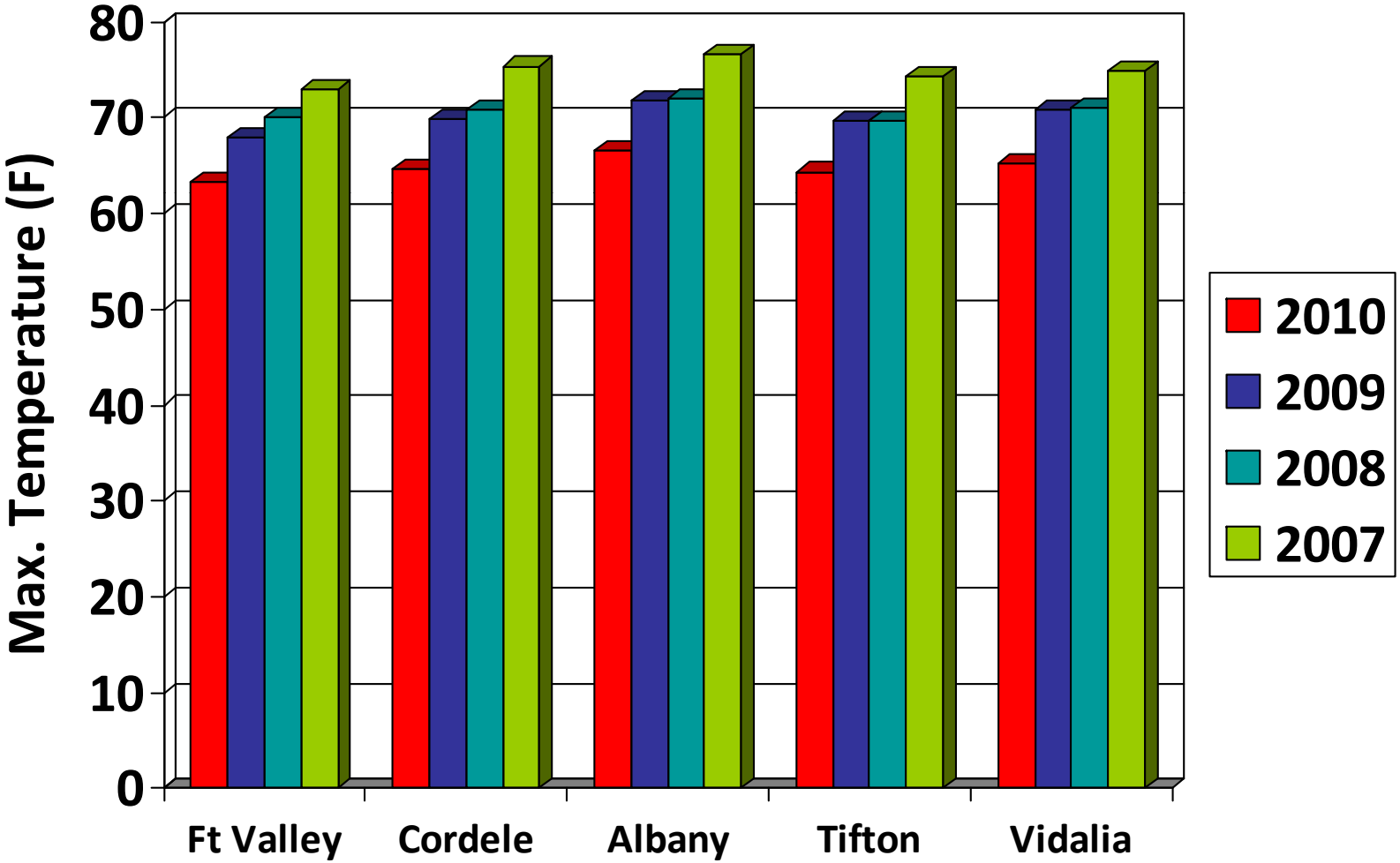
"The temperature effect on date of nut maturity is indirect in that springtime temperatures influence the starting date of fruit development."

Darrell Sparks
UGA Horticulture

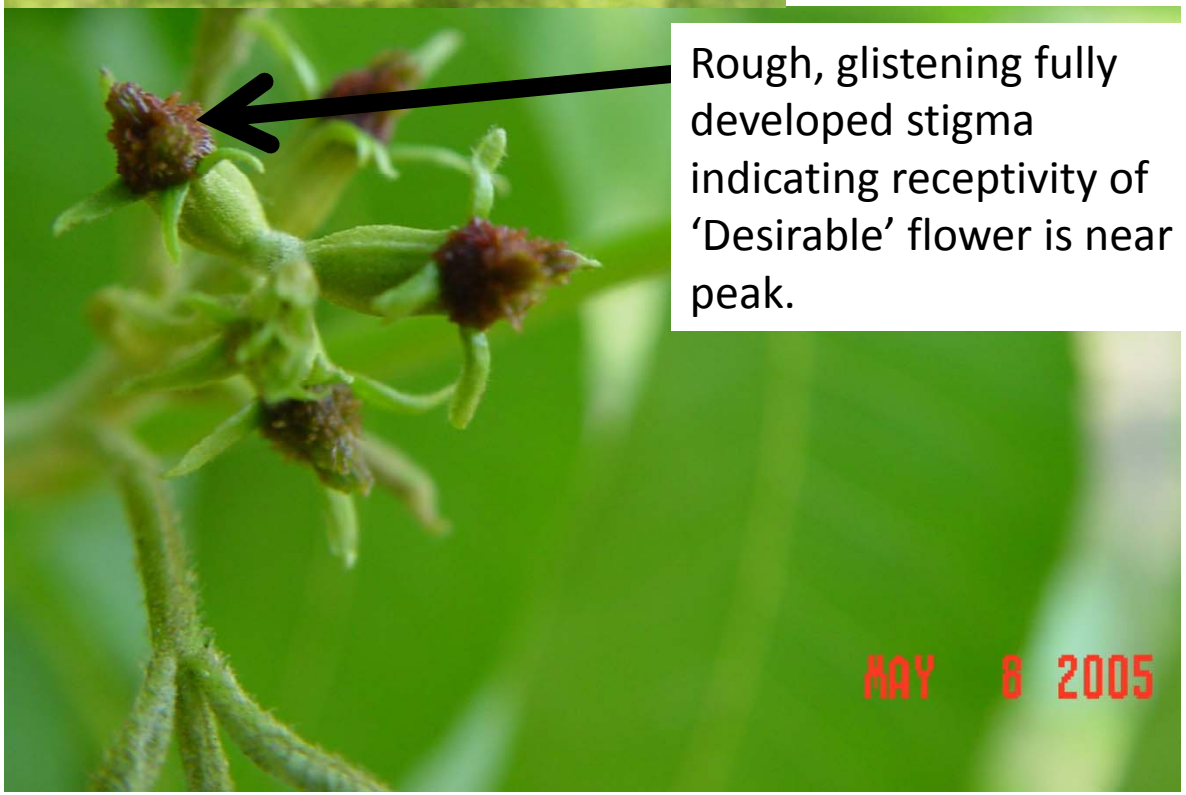
"Cool early season temperatures result in a pronounced delay in pollen shed, but a minor delay in receptivity, so chosen pollen shed –receptivity patterns may not match any more in a year with cool early season temperatures."

Tommy Thompson
USDA pecan breeder,

Average Maximum Temperature
March



Green immature catkins with no evidence of anther dehiscence suggest that Stuart is a few days from pollen shed.



Rough, glistening fully developed stigma indicating receptivity of 'Desirable' flower is near peak.

•Because many female flowers on adjacent Desirable trees are already receptive, they cannot be pollinated by Stuart, because they will no longer be receptive when Stuart pollen is shed.

Bill Goff

Pollination

No Pollination

Self-Pollination

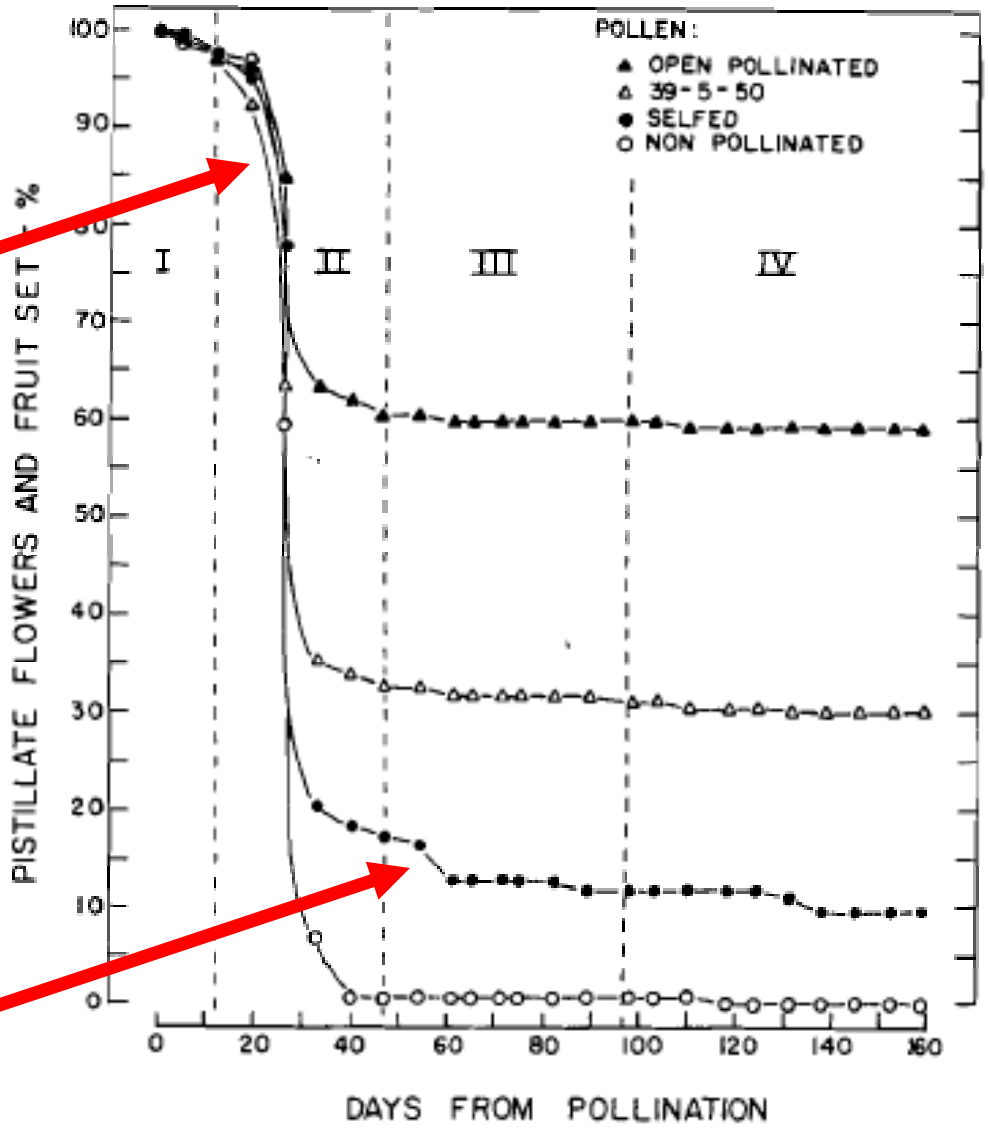


Fig. 2. Effect of self-, cross-, open-, and no pollination on pistillate flower and fruit abortion of 'Desirable' pecan. The numbers I, II, III, and IV designate the 1st, 2nd, 3rd, and 4th drops, respectively.

Sparks J. Amer. Soc. Hort. Sci. 110(2):219–223. 1985.

Effect of Self-Pollination ---Marquard, 1988

	Self Pollination	Cross Pollination
Weight	5.4g	6.5g**
Volume	7.4 ml	8.3ml**
% Pops	11.7%	3.6%^{NS}

Self Pollination results in:
17% less nut wt
11% smaller volume

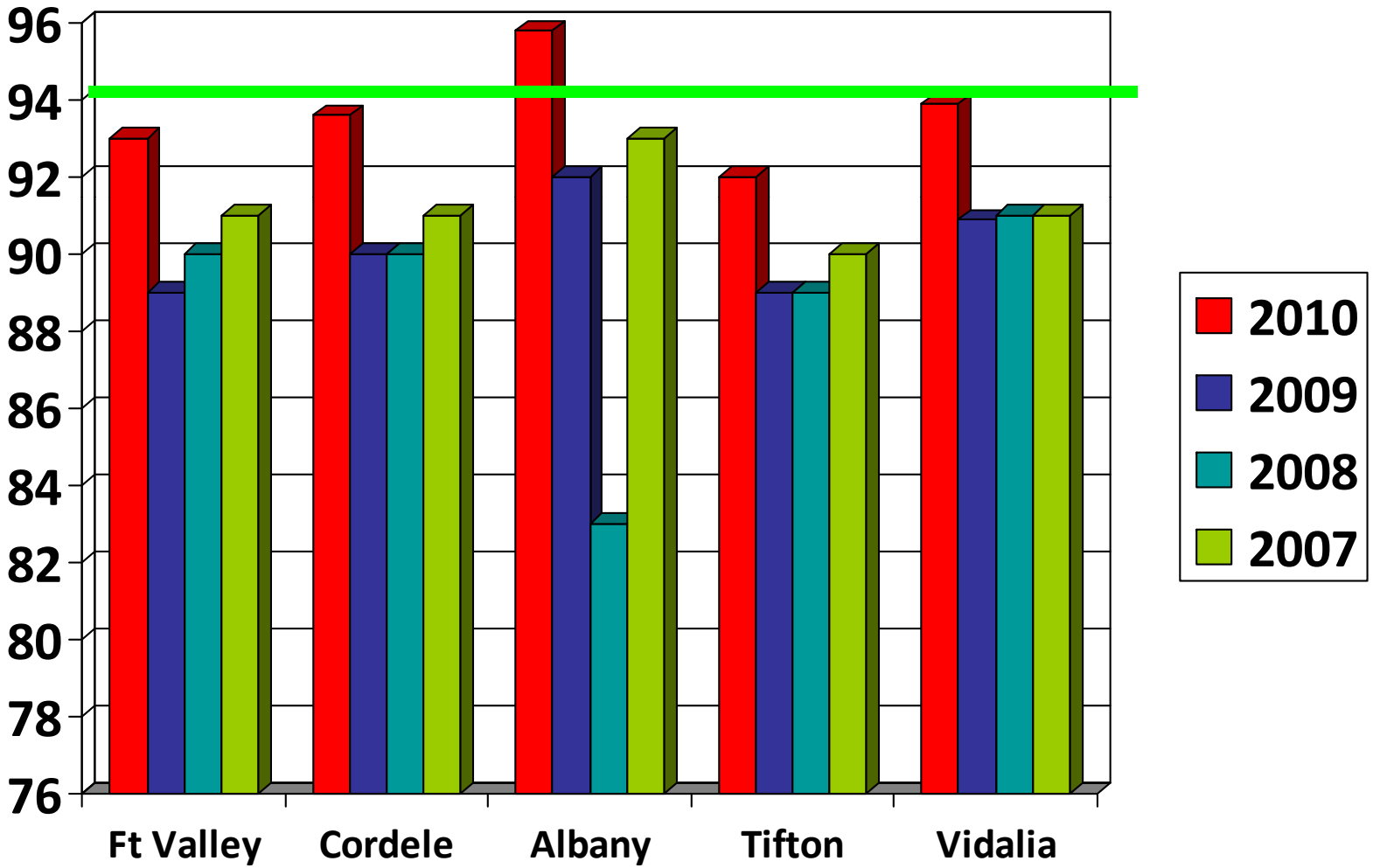
Cool Spring

- Cool spring temperatures indirectly delayed crop maturity as a result of the delay in budbreak
- Cool spring temperatures reduced pollination of ‘Desirable’ by ‘Stuart’ in some locations (and potentially other cultivars), leading to more fruit abortion and lower quality
- Use more than one pollinator!

2010 Crop Maturity Issues

- Cool Spring Temperatures
- Extreme Prolonged Heat

Average Maximum Temperature
June 1-September 15



Pecans, Heat, and Water

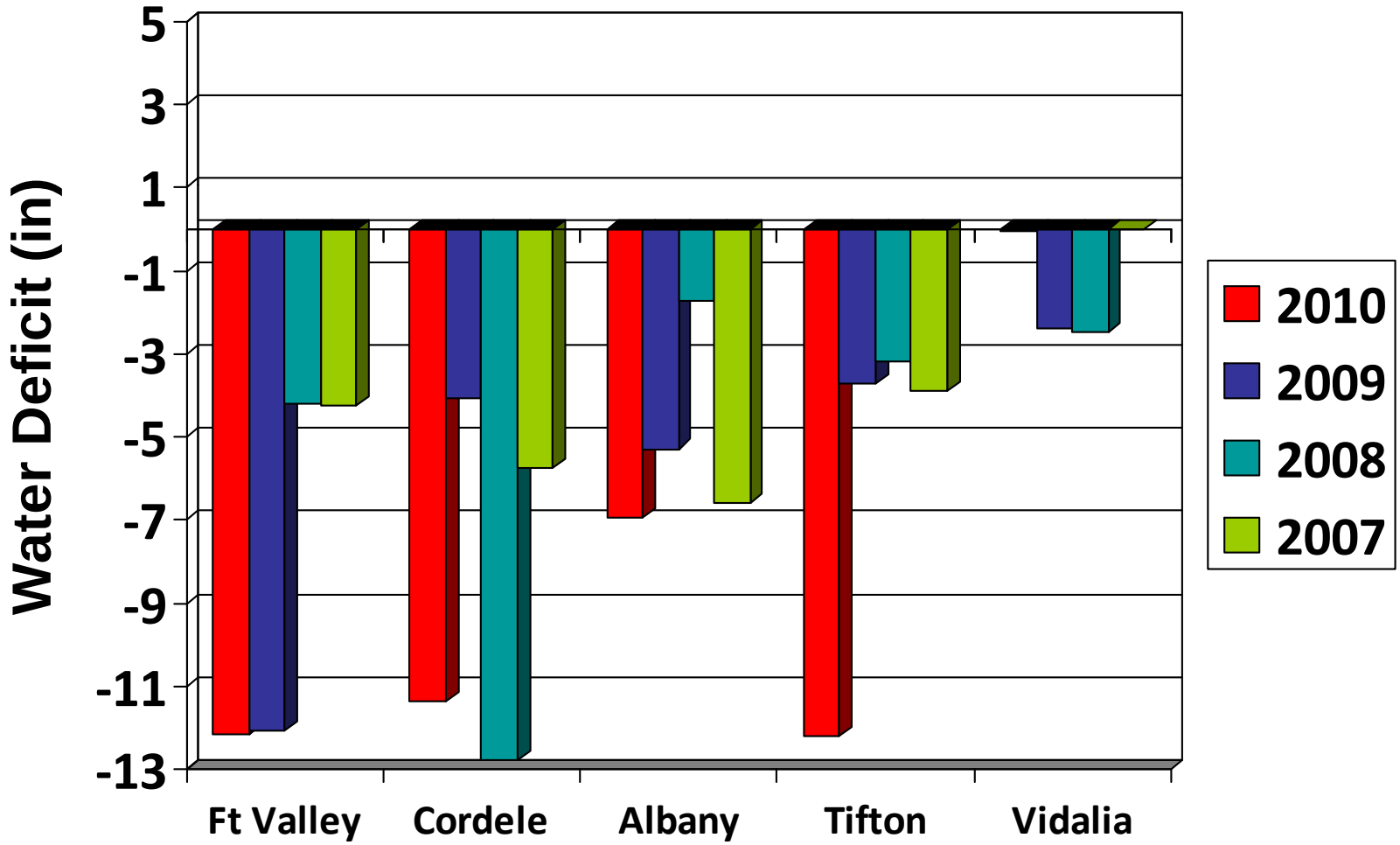
- Pecans have a very efficient water transport system
- Developed ability to avoid stomatal closure under high temps with adequate water
- Can tolerate temperatures of 106.5 with good soil moisture
- Pecans are very inefficient users of water
- Require large amounts of water to support optimal growth and fruit production

- High daytime temperatures are not a serious limiting factor to pecan production UNLESS soil moisture is inadequate
- SE irrigation systems are designed to be supplemental to rainfall
- Under prolonged heat and inadequate soil moisture, pecans will suffer

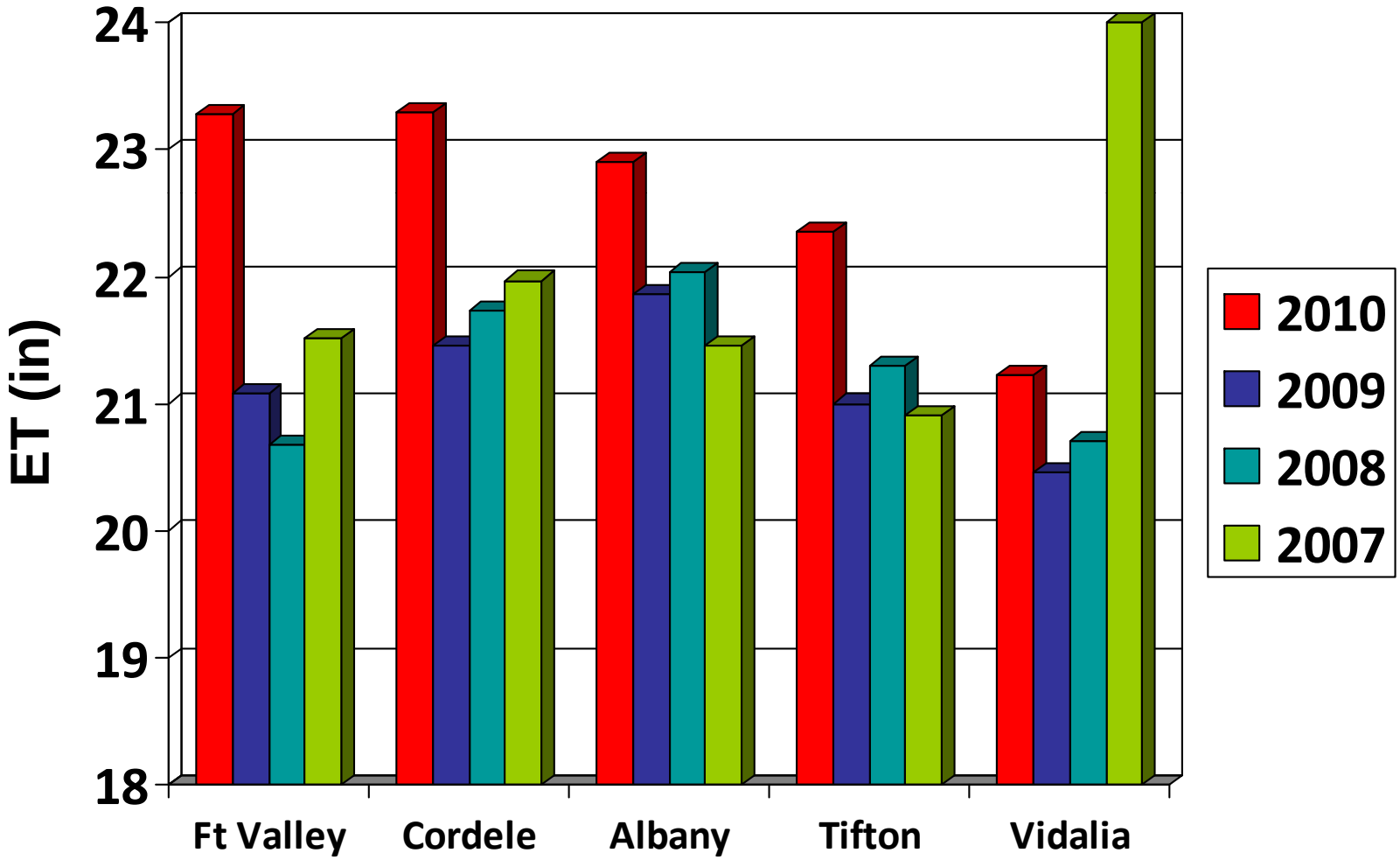
2010 Crop Maturity Issues

- Cool Spring Temperatures
- Extreme Prolonged Heat
- Late Season Drought

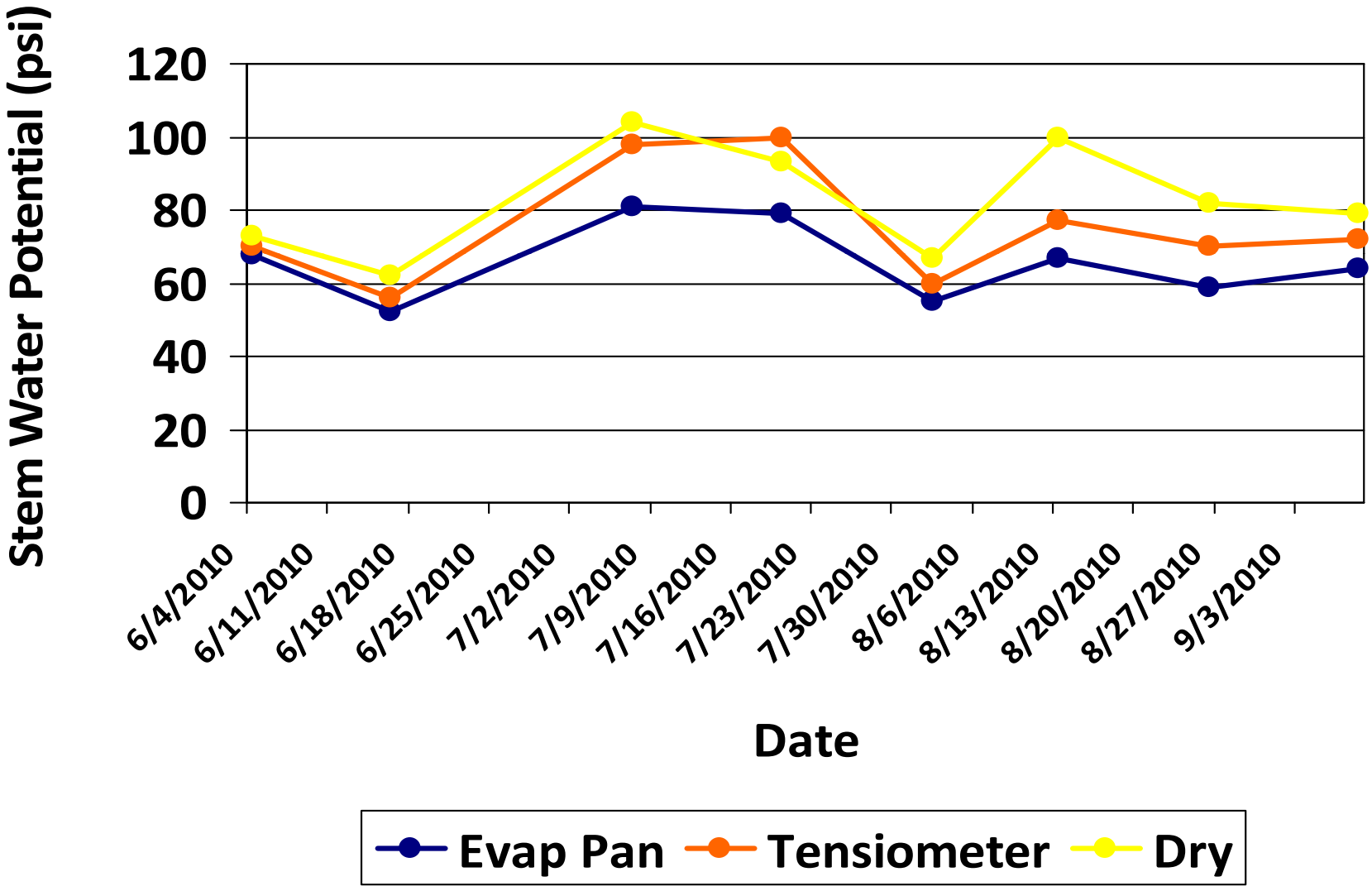
Water Deficit
June 1-September 15



Evapotranspiration
June 1-September 15



Tree Water Status 2010



	Nut Retention (%) (July 20)	Drought Induced Nut Drop (# nuts beneath canopy) (Aug. 13)	Yield (lbs/tree)
Evap Pan	61a	22.6a	59a
Tensiometer	65a	27.8a	48ab
Dry	60a	122.8b	30b

Summary

- Cool spring temperatures indirectly delayed nut maturity and directly affected pollination of certain cultivar combinations, which led to fruit abortion
- Prolonged heat combined with inadequate soil moisture and high ET reduced photosynthesis, leading to poor quality, small nut size, low volume, and nut abortion