Experience with Retain® in the Sacramento Valley – Tehama County

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What got all this started

- PFA is the loss of flowers 2 to 3 weeks after bloom
- Particular problem in the Serr variety
- Excessive pollen is thought to be the cause
- Research by Polito et.al. showed excessive pollen tubes produce excessive amounts of ethylene
- Elevated ethylene is the most likely cause of walnut flower abortion

ReTain® — Valent BioSciences

- Plant Growth Regulator for use on Apple, Pear, Stone Fruit (except Cherry) and Walnut
- Inhibits the production of ethylene in plant tissues
- Ethylene affects plant processes such as flower development, fruit set, fruit maturation, fruit ripening and fruit abscission
- Material rate, application and timing are important for product performance
- Increased nut set in cultivars affected by PFA

“Applications performed at 125ppm (one soluble bag/100 gpa) at about 30% bloom have consistently provided dramatic reductions in PFA and corresponding increases in yield” – Robert Beede

ReTain® for Serr PFA

Bob Beede - UCCE Farm Advisor Kings and Tulare
Joe Grant – UCCE Farm Advisor San Joaquin

	Percentage Drop		Yield Per Tree (lbs)	
County	Untreated	ReTain®	Untreated	ReTain®
Kings	40.6	14.0	108	152
Tulare	69.2	16.2	76	163
San Joaquin	73.3	36.3	72	105

Table 1. Effect of ReTain® plant growth regulator applied at 125 ppm in 100 gpa on percent drop and yield per tree of Serr walnuts grown in Kings, Tulare and San Joaquin counties, 2005.

Source: California Walnut Commission – Walnut News January 2006

Tehama Experiment #1 – Distance from Pollenizer

- Mature Chandler 28x28 (55 trees/ac.)
- Statistical Design with four treatments x three replicates
- 125 ppm ReTain® - Grower applied 5/2/06 40-50% bloom. (whole row sprays)
- Treatments
  1) 28, 112, 196 and 280 ft. south of Franquette.
  2) 28, 112, 196 and 280 ft. north of Franquette.
  3) 28, 112, 196 and 280 ft. south of Cisco.
  4) 28, 112, 196 and 280 ft. north or Cisco

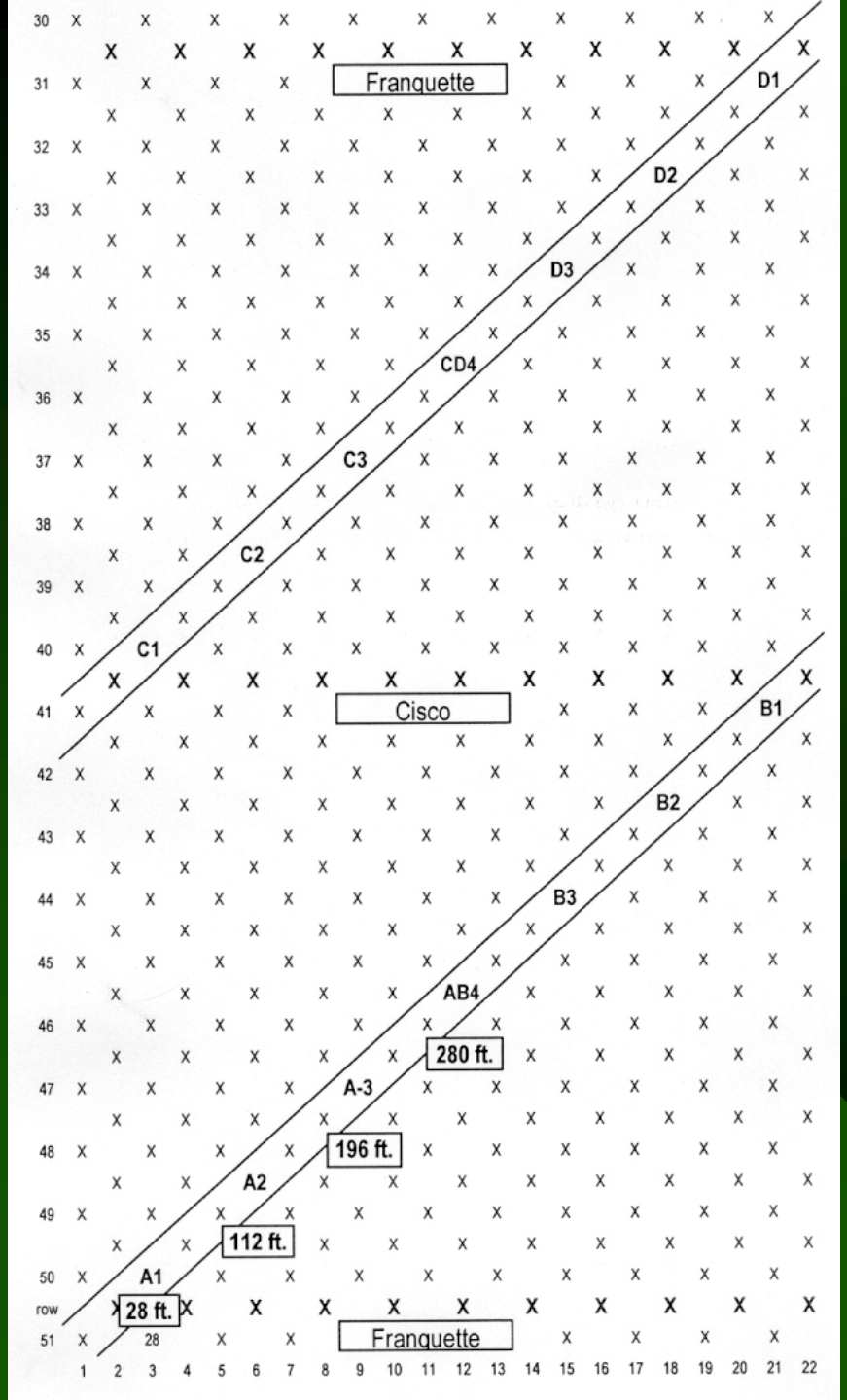

Figure 1. Plot design and layout for the distance from polinator ReTain experiment. For example, tree A1 is 28 feet south of the Franquette row. Tree A2 is 112 feet south of the Franquette row, etc.

YIELDS AND YIELD EFFICIENCY

Treatment				
Pollinizer	Direction	Distance (ft)	Yield (lbs./tree)	Yield Efficiency (lbs./tree)
Frank	South	28	81.43 a	.93 a
Frank	South	112	128.29 a	1.21 a
Frank	South	196	105.86 a	1.01 a
Frank	South	280	113.97 a	1.16 a
Frank	North	28	109.68 a	1.19 a
Frank	North	112	77.10 a	.98 a
Frank	North	196	105.63 a	1.10 a
Frank	North	280	106.54 a	1.14 a

[1]Duncan's multiple range test for treatment means at the 5% level.

Figure 3. Yields and yield efficiency for Chandler trees 28, 112, 196 or 280 feet north or south of Franquette pollinizer rows. Yield efficiency is pounds per tree divided by tree cross sectional area measured 12 inches above the graft union.

YIELDS AND YIELD EFFICIENCY

Treatment Pollinizer	Direction	Distance (ft)	Yield (lbs./tree)	Yield Efficiency (lbs./tree)
Cisco	South	28	56.08 a	.79 a
Cisco	South	112	87.59 a	1.18 a
Cisco	South	196	117.70 a	1.25 a
Cisco	South	280	106.54 a	1.14 a
Cisco	North	28	55.24 a	.90 a
Cisco	North	112	120.08 a	1.35 a
Cisco	North	196	123.49 a	1.29 a
Cisco	North	280	113.97 a	1.16 a

[1]Duncan's multiple range test for treatment means at the 5% level.

Figure 3. Yields and yield efficiency for Chandler trees 28, 112, 196 or 280 feet north or south of Cisco pollinizer rows. Yield efficiency is pounds per tree divided by tree cross sectional area measured 12 inches above the graft union.

- Without untreated control trees it’s difficult to make yield conclusions
- Likely that applications did not improve nut set

Tehama Experiment #2 – Full vs. Half Sprays

- Mature Chandler 25x25 (69 trees/ac.)
- Statistical design with three treatments x three replicates
- 125 ppm ReTain® - Grower applied 5/2/06 40-50% bloom. (whole row sprays)
- Treatments
  1) ReTain applied to both sides of the test row (full spray).
  2) ReTain applied to the east side of the test row (half spray).
  3) Unsprayed control rows.

FIVE TREE YIELDS (11 inch diameter) FOR THE HALF vs FULL SPRAY EXPERIMENT

Treatment	1	2	3
Full spray	474	475	386
Half spray (east side)	476	492	331
No spray	530	551	500
Rows	75 – 69	66 – 60	57 -51

RETAIN FULL VS HALF SPRAY COMPARISON

Treatment	5 tree yield (lbs.)	Avg tree yield (lbs.)
Full spray (both sides)	445 a[1]	89.10 a
Half spray (east side)	433 a	86.70 a
Untreated	527 a	105.50 b

[1]Duncan's multiple range test for treatment means at the 5% level.

Figure 2. Yields for the two ReTain spray applications. Five tree yields represent the sum of the five trees in the sprayed row.

Conclusion

- Not clear why we measured a yield decrease.
- Most likely ReTain® did not improve yield under the conditions of this experiment
- No Half vs Full spray comparison
- May not be effective on low PFA varieties
- Need more experience/research

In Summary

- Need more experience with ReTain®
- Timing, application, coverage, weather and the year are critical
- ReTain® may not be a good choice on Chandler
- Orchard variability needs to be accounted for