RETAIN APPLICATIONS ON TEHAMA COUNTY 'CHANDLER' WALNUTS

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ABSTRACT

ReTain (Valent BioSciences) applications were evaluated in two mature Tehama County Chandler walnut orchards. Sprays were grower applied (125ppm) using standard orchard airblast sprayers on 5/2/06 at 40-50% bloom. Replicated plots were evaluated by measuring yield at harvest. Experiment one was designed to compare full spray coverage, half spray coverage and untreated control. Experiment two was designed to evaluate any ReTain effects with distance from pollinizer. Test trees were 28, 112, 196 and 280 feet north or south of Franquette or Cisco. ReTain applications in the first experiment result in no yield increase from a full or half spray application and may suggest a yield decrease. In the second experiment, there was no yield difference when ReTain was applied 28, 112, 196 and 280 feet north or south of Cisco or Franquette.

INTRODUCTION

Research by Bob Beede, Joe Grant, Vito Polito, Holly Johnson and others showed dramatic yield increases from 125 ppm ReTain applied to Serr walnuts. ReTain is a commercially available ethylene inhibitor developed by Valent BioSciences. The product dramatically increased fruit set in field experiments (Beede and Grant) on the Serr variety. Given the successes with applications on Serr walnuts, it didn't take long for Tehama County walnut growers to ask about ReTain on varieties other than Serr. These experiments were designed to test ReTain on the Chandler variety and evaluate full versus half sprays popular for insect and disease management.

OBJECTIVES

1) Evaluate full versus half spray applications of ReTain on Chandler.
2) Discover if ReTain can increase Chandler yield.
4) Evaluate if ReTain applications can improve Chandler yield compared to distance to pollinizer.

PROCEDURES

The first experiment was a randomized complete block design with three treatments and three replicates. The three treatments were:

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.

The plot was part of a commercial Chandler orchard planted north/south 25 feet x 25 feet (69 trees per acre). The experiment utilized 25 rows with 48 trees/row. Pollinizers were located on the north and south ends. Whole tree rows were treated by the grower using their orchard airblast sprayer with two guard rows to protect treatments. ReTain was applied on 5/2/06 using 125 ppm at 40-50% bloom. Weather conditions did not allow the 30% bloom timing. Yield evaluations were made by harvesting five individual trees per treated row. Harvested trees had to be healthy, vigorous and a trunk diameter of 11.2 inches one foot above the graft union. By measuring trunk circumference on every tree in the experiment it was possible to identify same sized trees. The goal was to reduce or eliminate any yield difference based upon tree size. Each yield tree was pre-raked, shaken and picked up to insure individual tree yield. Dry inshell yield was calculated using the dry ratio from a 9-pound subsample. Trees were harvested 10/13/06 following ethephon.

The second experiment was also a randomized complete block design with four treatments and three replicates. The four treatments were:

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 of Cisco.

The variable was tree location from the pollinizer row. The plot was part of a commercial Chandler orchard planted 28 feet x 28 feet (55 trees/Ac.) with pollinizer rows planted diagonally through the orchard every eleventh row alternating either Cisco or Franquette (Figure 1).

PLOT DESIGN FOR THE POLLENIZER DISTANCE PLOT

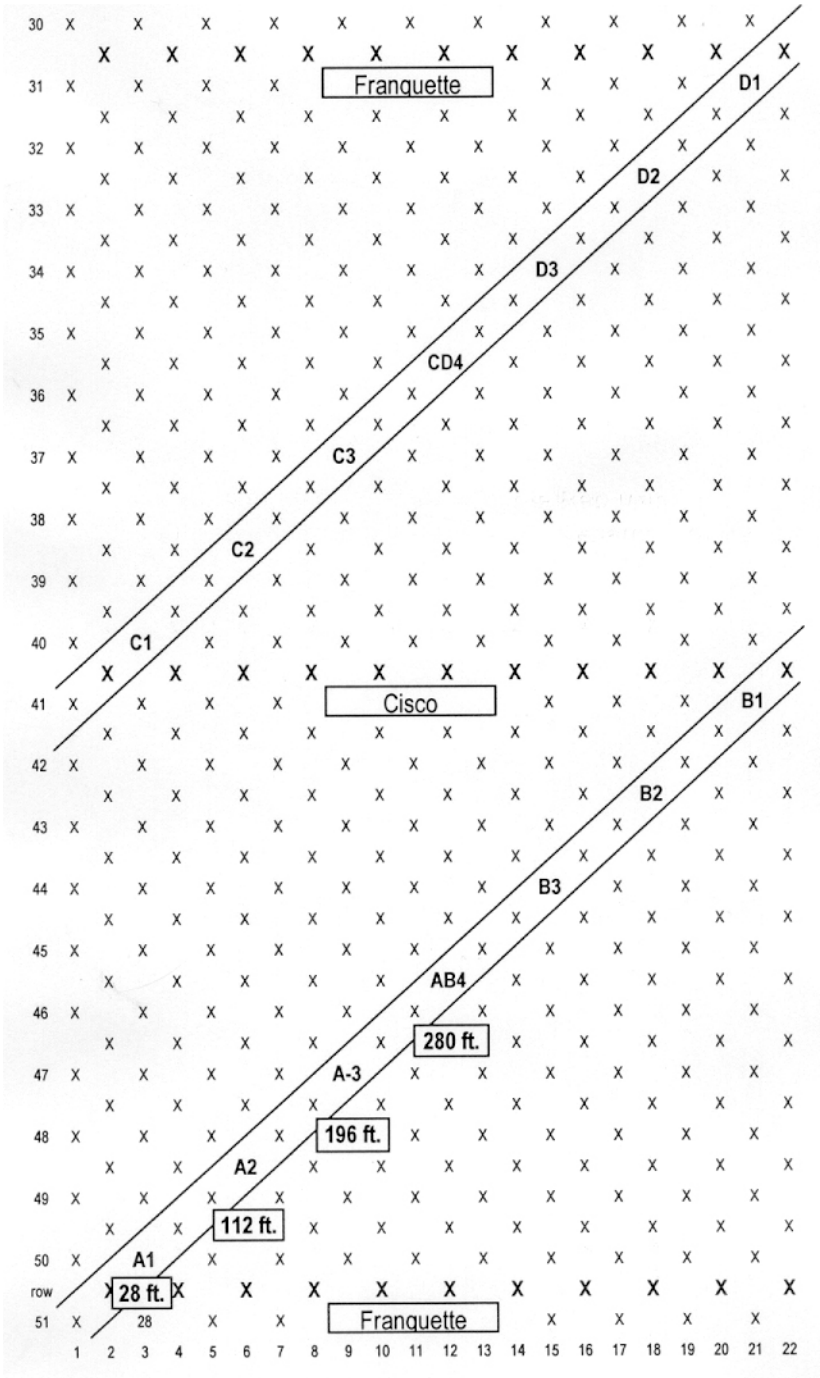

Figure 1. Plot design and layout for the distance from pollinator ReTain experiment. For example, tree A1 is 28 feet south of the Franquette row. Tree A2 is 112 feet south of the Franquette row, etc.

ReTain was applied to both sides of the test rows on 5/2/06 using 125 ppm at 40-50% bloom. Yield evaluations were done as previously described except that it was impossible to select same sized trees. Tree circumference was measured 12 inches above the graft union to calculated trunk cross sectional area and yield efficiency. Trees were harvested 10/16/06 following ethephon application.

RESULTS/DISCUSSION

Half sprays are popular for insect and disease control in Northern California. Spray efficacy and disease resistance are concerns if half sprays result in reduced coverage and/or material rates. Under the conditions of this experiment, yields for the half spray were not statistically different from the full sprays (figure 2). Average tree yield for the full spray was 89.10 lbs. compared to 86.70 lbs. for the half spray treatment. Interestingly, both spray strategies reduced yield compared to the untreated control. How and why that happened is unclear. Applications went on slightly late which might have had a detrimental effect. Additional research is required to learn how ReTain performs with varieties, rates and application timing.

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.

For the second experiment, the expectation would be that pistillate flower abortion (PFA) would decrease with distance from pollen source. Yields and yield efficiencies for ReTain treated trees were not statistically different with distance from pollinizer rows (figure 3). Without untreated controls or a history of PFA in this orchard it is difficult to know for sure if the lack of yield difference is attributable to the ReTain treatment. It is likely that ReTain had no effect on Chandler fruit set and PFA related to distance from pollinizer also had no effect on yield.

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
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
Frank	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 or Franquette pollinizer rows. Yield efficiency is pounds per tree divided by tree cross sectional area measured 12 inches above the graft union.