



# Walnut Blight Control Investigations Tehama County 2006

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# 2006 Objectives

- 1) Evaluate alternative materials for walnut blight control (GX569, Sonata and Manzate) plus variable rates of the bud penetrating material Breakthru.
- 2) Verify if applied copper can be reduced from the 6 lb. rate of Kocide 2000.
- 3) Maintain the over tree sprinkler rainfall simulator.
- 4) Evaluate timing of terminal budbreak (prayer stage) and tagged nuts for blight disease progression.
- 5) Determine efficacy of early season bactericides applied at different stages of bud break and shoot elongation. (Lindow et.al.)

# Tehama County 2006 Test Plot

- Simulated rainfall – overtree sprinklers
- RCB with 10 treatments x 5 replicates
- Individual trees
- Dilute (400 gpa) application by handgun
- Four applications 4/20, 4/28, 5/8 and 5/16
- First application at approx 40% Budbreak (prayer stage)
- Visually rated 400-500 nuts per tree





# Bud Break Evaluation

## Terminal Bud Break

<u>Date</u>	<u>% Bud Break</u>
4/8/06	5.0%
4/13/06	25.9%
4/18/06	33.5%
4/25/06	59.3%
4/28/06	72.8%
5/5/06	73.2% (full bloom)
5/12/06	77.5%

Figure 7. Bud break evaluations for Chandler walnuts in 2006. Cone Grove location.



## Rainfall: natural and simulated for the Tehama Blight Plot:

<u>Date</u>	<u>Amount (in)</u>	<u>Condition</u>
4/2 – 4/5	1.13	natural <sup>1</sup>
4/7 – 4/12	2.09	natural
4/15 – 4/16	.80	natural
4/22	.17	natural
4/29	.72 (10 hours)	simulated <sup>2</sup>
5/10	.72 (10 hours)	simulated
5/17	.72 (10 hours)	simulated
5/19	.25	natural
5/21 – 5/23	.38	natural
5/26	.01	natural

<sup>1</sup>Natural rainfall – 7 events for 4.83 inches

<sup>2</sup>Simulated rainfall – 3 events for 2.16 inches

Figure 4. Natural and simulated rainfall for the Tehama material evaluation experiment.



DATE	5/10	5/15	5/19	5/22	5/25	5/30	6/2	6/5	6/8	6/12	6/15	6/19
% BLIGHTED NUTS	0.0%	12.9%	31.7%	48.3%	53.1%	60.4%	65.2%	69.8%	72.5%	73.5%	73.9%	74.2%

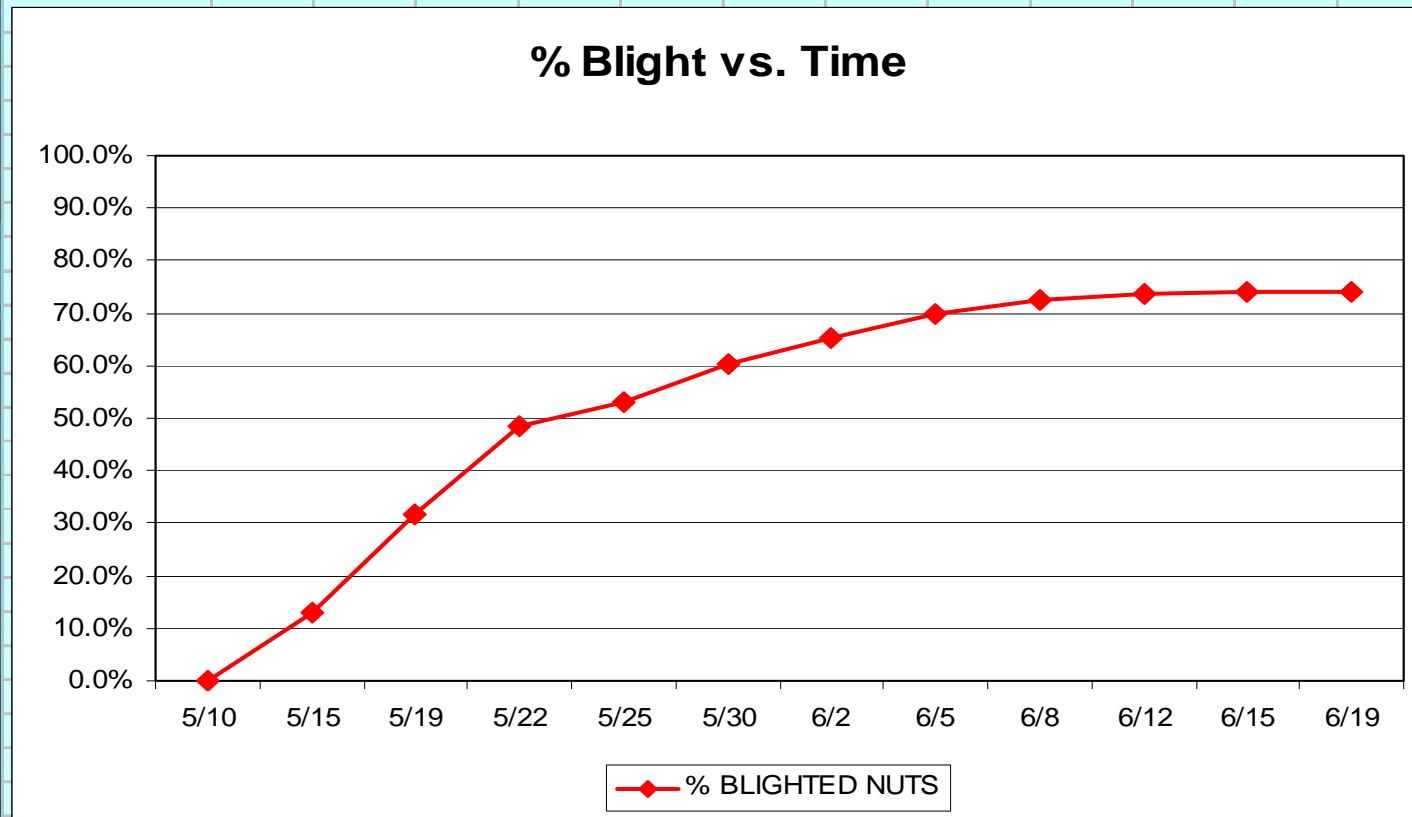


Figure 8. Blight symptoms on walnuts under simulated plus natural rainfall.

## Treatments for the material evaluation plot:

<u>Treatment</u>	<u>Rate</u>
1. Kocide 2000 <sup>1</sup>	6 lbs./Ac.
2. Kocide 2000 + Manex	6 lbs. + 58 oz./Ac.
3. Kocide 2000 + Manex	4 lbs. + 58 oz./Ac.
4. GX 569 <sup>2</sup> + Manex	4.6 lbs. + 58 oz./Ac.
5. GX 569 + Manex	3.5 lbs. + 58 oz./Ac.
6. Kocide 2000 + Manzate 75DF <sup>3</sup>	6 lbs. + 2.4 lbs./Ac.
7. Sonata <sup>4</sup>	4 qts./Ac.
8. Sonata	6 qts./Ac.
9. Sonata + Kocide 2000	6 qts. + 6 lbs./Ac.
10. Control (simulated & natural rainfall)	—
11. Control (natural rainfall)	—

<sup>1</sup>Kocide 2000: Dupont Crop Protection, 35% metallic copper

<sup>2</sup>GX 569: Dupont Crop Protection, 30% metallic copper

<sup>3</sup>Manzate 75DF: Dupont Crop Protection, zinc ion and manganese ethylene-bisdithiocarbamate

<sup>4</sup>Sonata: AgraQuest, bacillus pumulis strain QST 2808

Figure 1. Spray materials and rates for the Tehama walnut blight plot. Spray applications were made on 4/20, 4/28, 5/8 and 5/16. 33.5% terminal bud break occurred on 4/18 with full bloom on 5/15/06.

## Material Evaluation

Treatment	% Blight	Phytotoxicity
7. Sonata @ 4 qts.	60.26 a <sup>1</sup>	0
10. Control (simulated and natural rainfall)	59.27 a	0
9. Sonata @ 6 qts. + Kocide @ 6 lbs.	51.39 ab	0
8. Sonata @ 6 qts.	51.22 ab	0
1. Kocide @ 6 lbs.	39.75 abc	0
3. Kocide @ 4 lbs. + Manex <sup>2</sup>	30.61 bcd	0
5. GX 569 @ 3.5 lbs. + Manex	28.85 bcd	0
6. Kocide @ 6 lbs. + Manzate @ 2.4 bls.	19.49 cd	0
4. GX 569 @ 4.6 lbs. + Manex	14.54 d	0
2. Kocide @ 6 lbs. + Manex	12.42 d	0
11. Control (natural rainfall) <sup>3</sup>	12.50	0

<sup>1</sup>Duncan's multiple range test for treatment means at the 5% level.

<sup>2</sup>Manex @ 58 oz./Ac.

<sup>3</sup>Non replicated control outside simulated rainfall.

Figure 5. Blight ratings and phytotoxicity for the test treatments and rates.

## Treatments for the Breakthru Rate plot:

<u>University Treatment (4/24 and 5/1/06)</u>	<u>Rate</u>
1. Kocide 2000 + Manex	6 lbs. + 58 oz./Ac.
2. Kocide 2000 + Manex + Breakthru	6 lbs. + 58 oz./Ac. + 8 oz./100 gal.
3. Kocide 2000 + Manex + Breakthru	6 lbs. + 58 oz./Ac. + 16 oz./100 gal.
4. Kocide 2000 + Manex + Breakthru	6 lbs. + 58 oz./Ac. + 32 oz./100 gal.
5. Kocide 2000 + Manex + Breakthru	6 lbs. + 58 oz./Ac. + 64 oz./100 gal.

Figure 2. Treatments and rates for the first two blight sprays. University application 4/24 and 5/1/06.

<u>Grower Treatment (5/4, 5/14 and 5/24/06)</u>	<u>Rate</u>
1. Kocide 2000 + Manex + Breakthru + KNO3	4.5 lbs. + 58 oz. + 6 oz. + 5 lbs./Ac.

Figure 3. Treatments and rates for the remaining blight sprays applied on 5/4, 5/14 and 5/24/06 (half sprays) by grower.

## Breakthru Rate Evaluation

<b>Treatment (first 2 sprays)</b>	<b>% Low</b>	<b>% High</b>	<b>% Average</b>
K <sup>1</sup> + M <sup>2</sup> + Breakthru – 0 oz.	6.68 a <sup>3</sup>	3.44 a	5.06 a
K + M + Breakthru – 8 oz.	3.42 a	1.62 a	2.52 a
K + M + Breakthru – 16 oz.	4.64 a	1.92 a	3.28 a
K + M + Breakthru – 32 oz.	6.24 a	2.37 a	4.31 a
K + M + Breakthru – 64 oz.	7.92 a	2.41 a	5.17 a
Untreated Control <sup>4</sup>	17.34	12.49	14.92

<sup>1</sup>K = Kocide 2000 @ 6 lbs./Ac.

<sup>2</sup>M = Manex @ 58 oz./Ac.

<sup>3</sup>Duncan's multiple range test for treatment means at the 5% level.

<sup>4</sup>Untreated control trees were not part of the randomized complete block design

Figure 6. Blight counts for the Breakthru treatments.

# In Summary

- Simulated rainfall increased disease pressure
- The addition of Manex improves disease control
- Under severe disease pressure need 6 lbs. KOC 2000
- GX569 @ 4.6 lbs. performed well
- Manzate 75DF worked well
- Bacillus pumulis is not a control option at this time

# In the Future

- Continue the search for new materials
- Hopefully complete full registration for Manex
- Evaluate Kocide 3000 (GX569)
- Maintain the over tree rainfall simulator
- Finish up the bud tagging work with Lindow
- Evaluate timing of “prayer stage” bud break