

# Walnut Blight Control Investigations 2004

*(Xanthomonas campestris pv juglandis)*



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GOT BLIGHT?



WHO YOU GONNA CALL?!?!?



# BLIGHT BUSTERS















# 2003 Blight Damage Compared to Spray Application Timing

## Vina Variety, Butte County, California

One week after terminal bud break <sup>1</sup>	In-Season Sprays <sup>2</sup>						% Blight <sup>3</sup>
	4/8/03	4/15/03	4/21/03	5/1/03	5/15/03	5/26/03	
3/31/03							
x	x	x	x	x	x	x	0.95 c
x	x	x	x	x	x		1.24 c
x	x	x	x	x			0.97 c
x	x	x	x				1.14 c
x	x	x					4.7 c
x	x						4.39 c
x							25.46 b
x <sup>2</sup>							24.44 b
	x	x	x	x	x	x	1.1 c
Nontreated							57.4 a

<sup>1</sup>Kocide + Manex + Breakthru

<sup>2</sup>Kocide + Manex

<sup>3</sup>Duncan's Multiple Range Test for Treatment Mean at the 5% level.

# Natural and Simulated Rainfall for Tehama County, 2004

<u>Date</u>	<u>Estimated Amount</u>	<u>Condition</u>	<u>Date</u>	<u>Estimated Amount</u>	<u>Condition</u>
3/25	0.64"	Natural <sup>1</sup>	4/22	0.36" (6 hrs)	Simulated
3/26	0.01"	Natural	4/29-4/30	1.80" (30 hrs)	Simulated
3/30	0.03"	Natural	5/7	0.34	Natural
4/6	0.36" (6 hrs)	Simulated <sup>2</sup>	5/8	0.96" (16 hrs)	Simulated
4/10	0.60" (10 hrs)	Simulated	5/10	0.06"	Natural
4/13	0.36" (6 hrs)	Simulated	5/17	0.15"	Natural
4/16	0.02"	Natural	5/18	0.11"	Natural
4/17	0.36" (6 hrs)	Simulated	5/19	1.80" (30 hrs)	Simulated
4/19	0.04"	Natural	5/27	0.01"	Natural
4/20	0.03"	Natural	5/28	0.01"	Natural
4/21	0.02"	Natural			

<sup>1</sup>Natural rain — 13 events for 1.47 inches. Measured off site using the local CIMIS station.

<sup>2</sup>Simulated rain — 8 events for 6.60 inches. Total rainfall = 8.07 inches.



# 2004 Blight Damage Compared to Spray Application Timing Ashley Variety, Tehama County, California

	7 days after Pistillate Budbreak	In Season Sprays <sup>2</sup>							Simulated Rain	Percent Blight <sup>5</sup>
		3/19/04	3/24	4/5	4/12	4/21	4/28	5/6		
1		X	X	X	X	X	X	X	Yes	12.77 b <sup>6</sup>
2	X <sup>1</sup>	X	X	X					Yes	12.03 b
3	X <sup>1</sup>	X	X						Yes	11.22 b
4	X <sup>1</sup>	X							<b>Yes</b>	<b>14.28 b</b>
5	X <sup>1</sup>								Yes	13.45 b
6		X	X	X					Yes	10.92 b
7		X	X						Yes	18.96 b
8		X							Yes	14.87 b
9	X <sup>2</sup>	X							<b>Yes</b>	<b>11.68 b</b>
10	Untreated (sprinkler) <sup>3</sup>								Yes	30.39 a
11	Untreated (natural) <sup>4</sup>								No	12.03

<sup>1</sup>Kocide 2000 + Manex + Breakthru: 6 lbs. + 58 oz. + 64 oz./Ac.

<sup>2</sup>Kocide 2000 + Manex: 6 lbs. + 64 oz./Ac.

<sup>3</sup>Untreated under simulated rain using over tree sprinklers

<sup>4</sup>Untreated under natural conditions (random trees outside sprinkler plot)

<sup>5</sup>Canopy counts for blighted walnuts 6/8/04

<sup>6</sup>Duncans multiple range test for treatment Means at the 5% level

# Natural and Simulated Rainfall for Butte County, 2004

<u>Date</u>	<u>Estimated Amount</u>	<u>Condition</u>	<u>Date</u>	<u>Estimated Amount</u>	<u>Condition</u>
3/19	0.5"	Simulated <sup>1</sup>	4/30	0.5"	Simulated
3/23	0.5"	Simulated	5/7	0.5"	Simulated
3/25	0.4"	Natural <sup>2</sup>	5/8	0.09"	Natural
3/29	0.5"	Simulated	5/10	0.2"	Natural
4/9	0.5"	Simulated	5/18	0.02"	Natural
4/16	0.5"	Simulated	5/20	0.5"	Simulated
4/17	0.08"	Natural	5/22	0.14"	Natural
4/18	0.04"	Natural	5/25	0.1"	Natural
4/19	0.06"	Natural	5/28	0.02"	Natural
4/23	0.5"	Simulated	6/1	0.01"	Natural
4/24	0.46"	Natural			

<sup>1</sup>Simulated rain — 9 events for 4.5 inches.  
<sup>2</sup>Natural rain — 12 events for 1.66 inches. Total rainfall = 6.12 inches.



# 2004 Blight Damage Compared to Spray Application Timing Vina Variety, Butte County, California

One week after terminal bud break <sup>1</sup>	In-Season Sprays <sup>2</sup>						% Blight <sup>3</sup>
3/29/04	4/6/04	4/14/04	4/22/04	4/30/04	5/7/04	5/19/04	
x	x	x	x	x	x	x	11 c
x	x	x	x	x	x		11.8 c
x	x	x	x	x			10.6 c
x	x	x	x				17.4 bc
x	x	x					15 bc
x	x						21 abc
x							<b>21.2 abc</b>
x <sup>2</sup>							<b>23.8 ab</b>
Nontreated							<b>31.6 a</b>

<sup>1</sup> Kocide + Manex + Breakthru

<sup>2</sup> Kocide + Manex

<sup>3</sup> Duncan's Multiple Range Test for Treatment Mean at the 5% level.

# Nordox 30/30 Evaluation Tehama County, 2004

Treatment	Nut Drop <sup>1</sup>	% Blight <sup>2</sup>
1. Kocide 2000: 6 lbs./Ac.	54.0 a	21.55 ab <sup>5</sup>
2. Kocide 2000 + Manex: 6 lbs. + 58 oz./ Ac.	59.2 a	12.77 b
3. Nordox 30/30: 10 lbs./Ac. (3.3 lbs. ai.)	31.0 a	12.49 b
4. Nordox 30/30: 13 lbs./Ac. (4.3 lbs. ai.)	35.8 a	17.77 b
5. Untreated (sprinkler) <sup>3</sup>	92.4 a	30.39 a
6. Untreated (natural) <sup>4</sup>	14.2	12.03

<sup>1</sup>Number of blighted nuts on the orchard floor 6/8/04  
<sup>2</sup>Canopy counts for blighted walnuts 6/8/04  
<sup>3</sup>Untreated under simulated rain using over tree sprinklers  
<sup>4</sup>Untreated under natural conditions (random trees outside sprinkler plot)  
<sup>5</sup>Duncans multiple range test for treatment means at the 5% level



# Tanos Evaluation Tehama County, 2004

Treatment	Nut Drop <sup>1</sup>	% Blight <sup>2</sup>
1. Kocide 2000: 6 lbs./Ac.	54.0 a	21.55 ab <sup>6</sup>
2. Kocide 2000 + Manex: 6 lbs. + 58 oz./Ac.	59.2 a	12.77 b
3. Kocide 2000 + Tanos <sup>3</sup> : 6 lbs. + 8 oz./Ac.	68.2 a	15.26 b
4. Untreated (sprinkler) <sup>4</sup>	92.4 a	30.39 a
5. Untreated (natural) <sup>5</sup>	14.2	12.03

<sup>1</sup>Number of blighted nuts on the orchard floor 6/8/04  
<sup>2</sup>Canopy counts for blighted walnuts 6/8/04  
<sup>3</sup>Tanos is a registered trademark of DuPont containing 25% Cynoxanil and 25% Famoxadone  
<sup>4</sup>Untreated under simulated rain using over tree sprinklers  
<sup>5</sup>Untreated under natural conditions (random trees outside sprinkler plot)  
<sup>6</sup>Duncan's multiple range test for treatment means at the 5% level

# Serenade Evaluation – Butte County, 2004

Treatment	Material rates/ac.	# Sprays	% Blight	Phyto
1. First Pistillate bud appearance: Champ DP + Manex	4.5 lbs. + 58 oz.	1	13.6 d	None
Inseason: Champ DP + Manex	4.5 lbs. + 58 oz.	3		
2. First Pistillate bud appearance: Champ DP + Manex	5.33 lbs. + 58 oz.	1	17.2 cd	None
Inseason: Champ DP + Manex	5.33 lbs. + 58 oz.	3		
3. First Pistillate bud appearance: Kocide 2000 + Manex	6 lbs. + 58 oz.	1	17.4 cd	None
Inseason: Kocide 2000 + Manex	6 lbs. + 58 oz.	3		
4. First Pistillate bud appearance: Serenade AS	6 qts.	1	30.4 cd	None
Inseason: Serenade AS	6 qts.	3		
5. First Pistillate bud appearance: Serenade AS + Kocide 2000	6 qts. + 6 lbs.	1	30.4 abc	None
Inseason: Serenade AS + Kocide 2000	6 qts. + 6 lbs.	3		
6. First Pistillate bud appearance: Kocide 2000 + Manex	6 lbs. + 58 oz.	1	22.8 bcd	None
Inseason Alternate: Serenade AS	6 qts.	1		
Inseason Alternate: Kocide 2000 + Manex	6 lbs. + 58 oz.	1		
Inseason Alternate: Serenade AS	6 qts.	1		
7. First Pistillate bud appearance: Kocide 2000	6 lbs.	1	35.2 ab	None
Inseason: Kocide 2000	6 lbs.	3		
6. Untreated Control (natural conditions)		0	31.6 abc	None

<sup>1</sup>Treatment means followed by a common letter are significantly different from each other at the 5% level according to Duncan's Multiple Range Test for mean separation.

Note: each treatment was followed by 0.5" simulated rainfall.



# Kocide 2000 Rate Evaluation

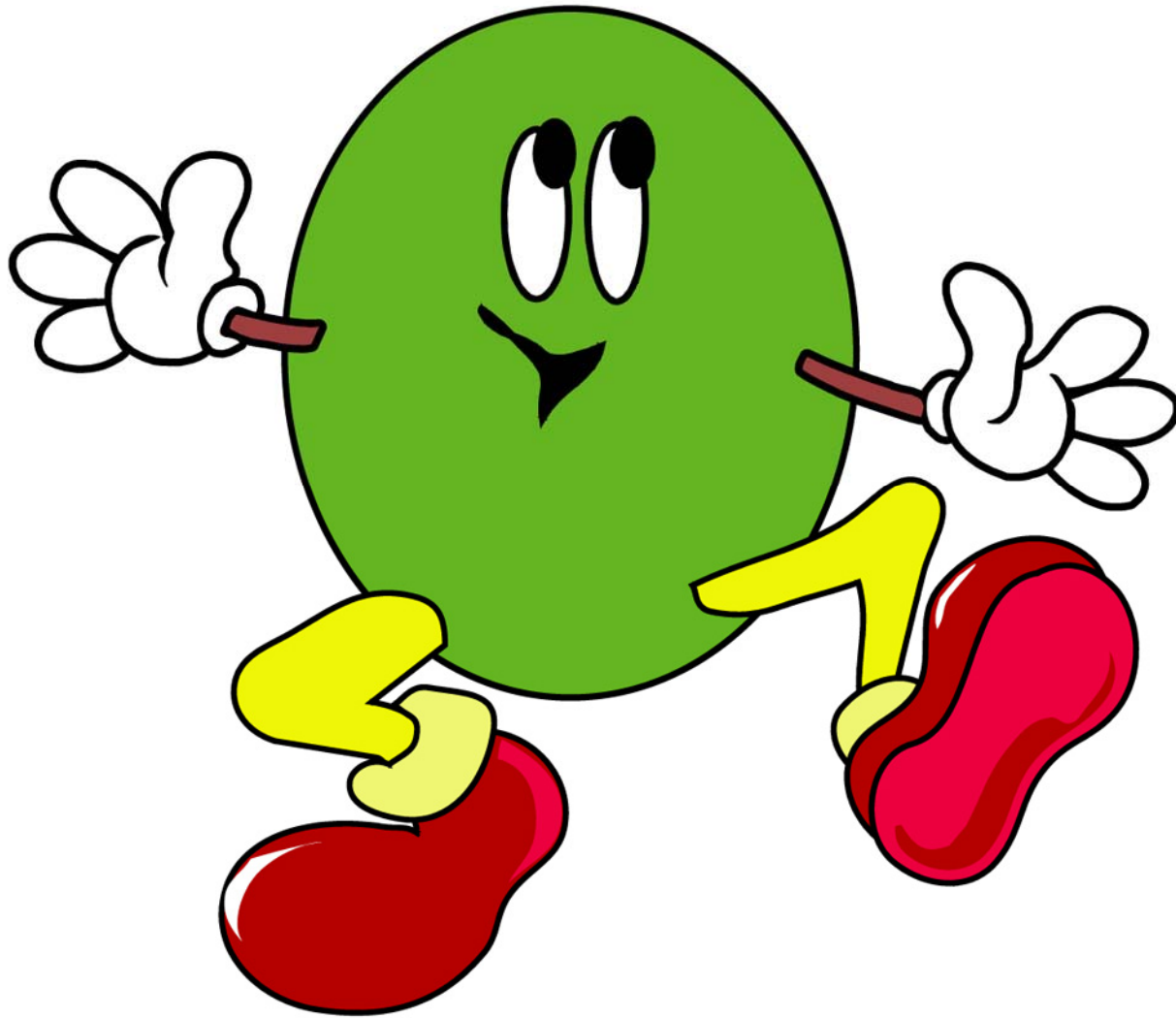
Treatment	Nut Drop <sup>1</sup>	% Blight <sup>2</sup>
1. Kocide 2000	54.0 a	21.55 ab <sup>5</sup>
2. Kocide 2000 + Manex: 6 lbs.	59.2 a	12.77 b
3. Kocide 2000 + Manex: 4 lbs.	23.2 a	15.76 b
4. Kocide 2000 + Manex: 2 lbs.	39.0 a	13.68 b
5. Untreated (sprinkler) <sup>3</sup>	92.4 a	30.39 a
6. Untreated (natural) <sup>4</sup>	14.2	12.03

<sup>1</sup>Number of blighted nuts on the orchard floor 6/8/04  
<sup>2</sup>Canopy counts for blighted walnuts 6/8/04  
<sup>3</sup>Untreated under simulated rain using over tree sprinklers  
<sup>4</sup>Untreated under natural conditions (random trees outside sprinkler plot)  
<sup>5</sup>Duncan's multiple range test for treatment means at the 5% level

# Summary

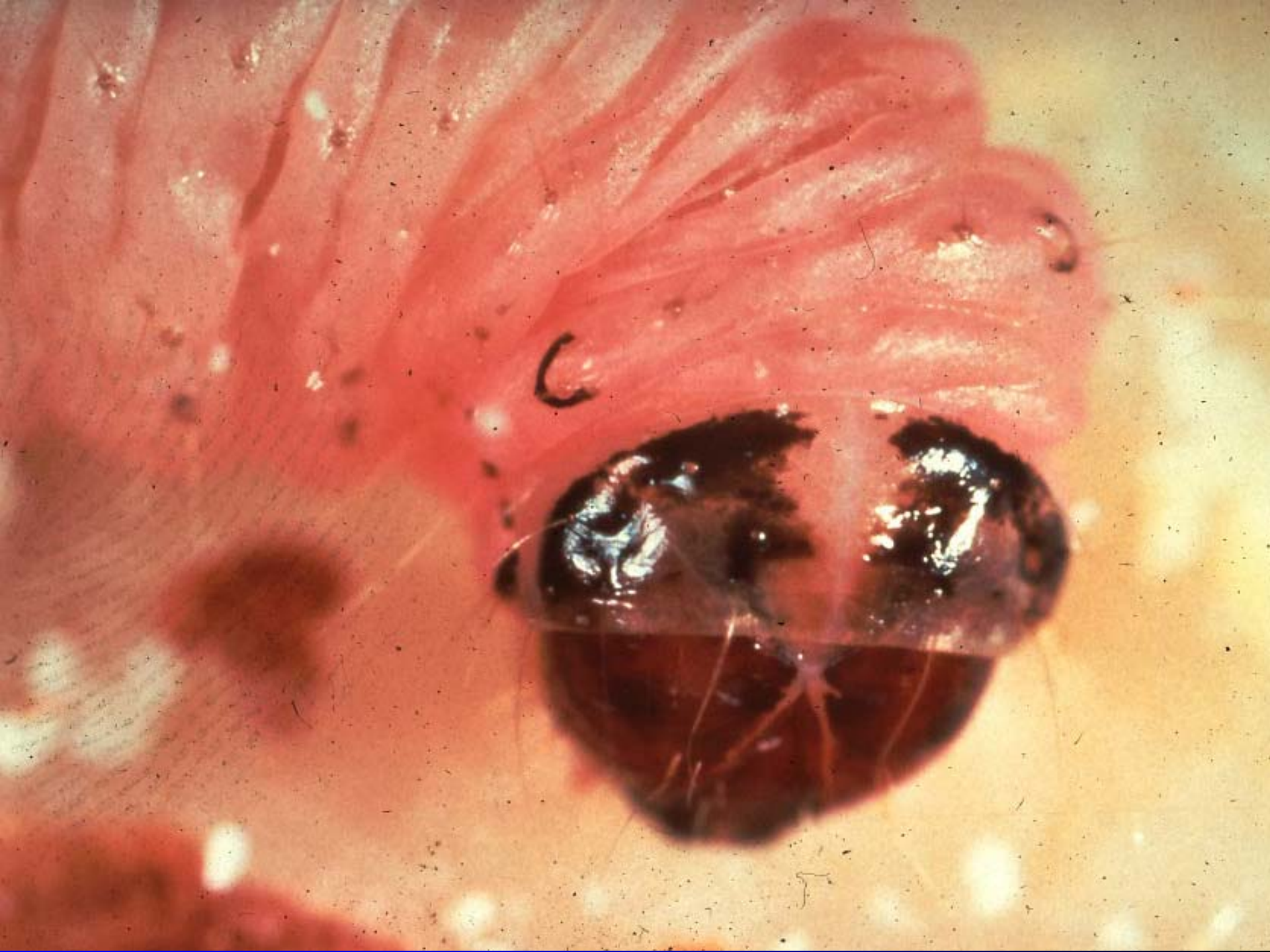
- Longer simulated rain events compensate for poor sprinkler distribution uniformity resulting in more uniform leaf wetness.
- Starting to measure a disease carry over effect. Poor disease control in the first year will carry over to poor disease control in the second year even with a good walnut blight control program.
- Early sprays play a key role in blight control.
- Tanos and Nordox 30/30 look promising; Serenade AS does not.
- Reducing the rate of Kocide 2000 from 6 lbs. to 2 lbs. with Manex looks promising.
- Copper plus Manex still the best we have.

JUST SAY NO



TO BLIGHT!









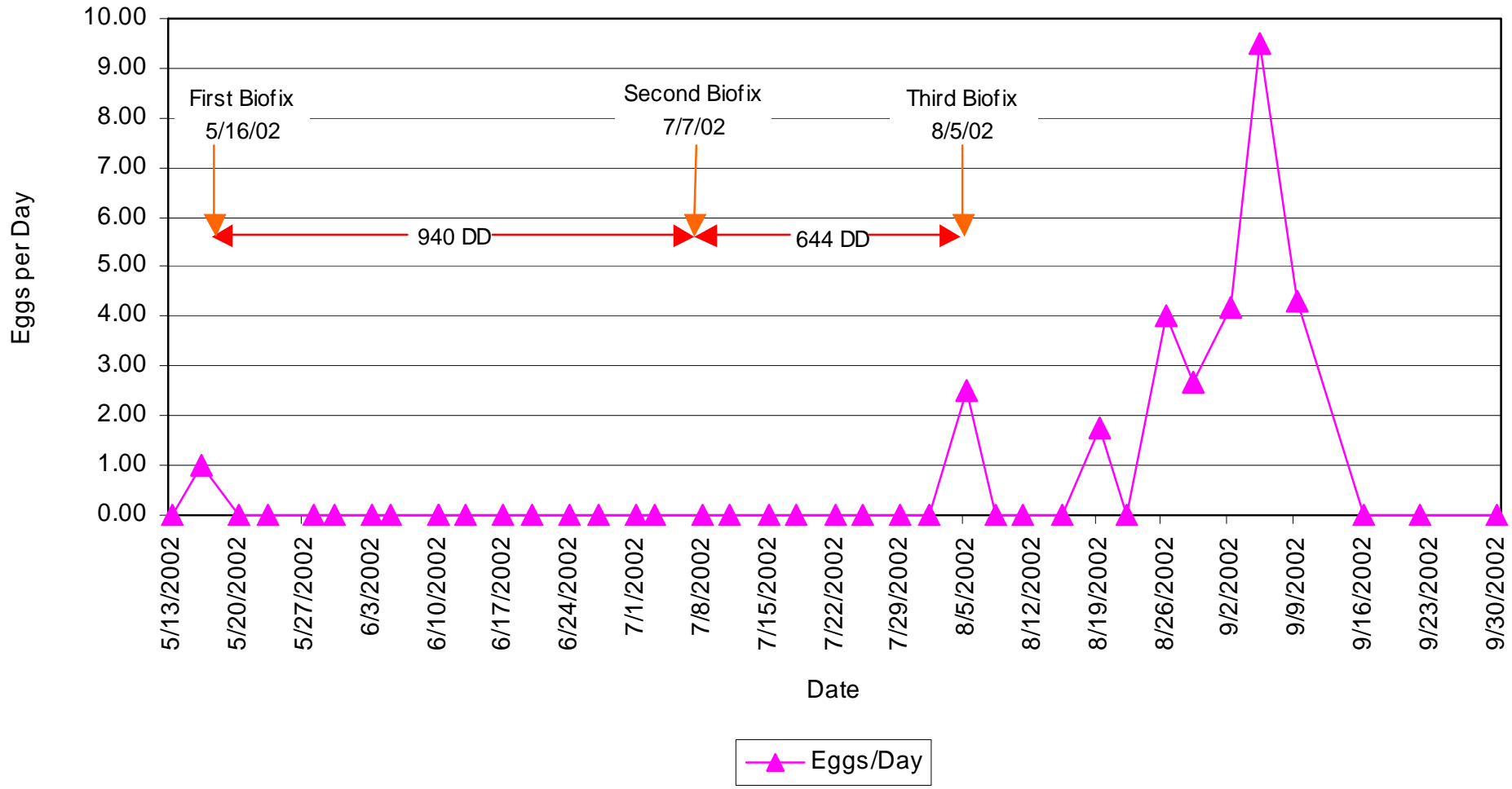






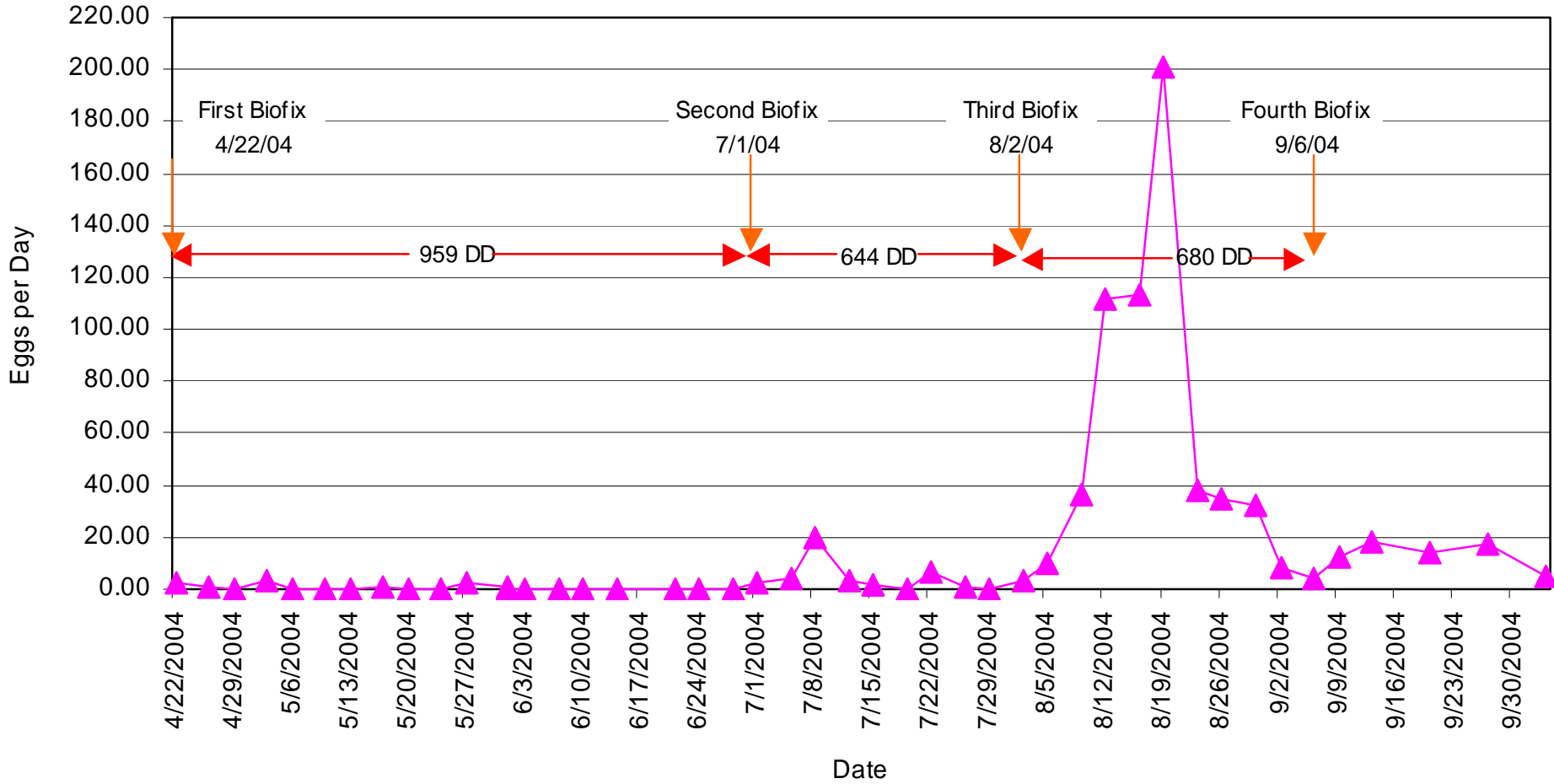
# NOW Tehama Almonds 2002

Buchner, Gilles & Humphreys



# NOW Wray Almonds 2004

Buchner, Gilles & Humphreys



**NOW** overwinters inside mummy nuts on the tree and in trash nuts left on the ground.

- Remove mummy nuts still on trees
- Remove nuts from the tree row
- Shred trash nuts before mid March
- Push the population down



NOW is a scavenger insect that feeds on damaged nuts.

- Good codling moth, walnut blight and sunburn control
- Push the population down

**NOW will feed on sound walnuts after hull split.**

- Monitor with egg traps ???
- Early hull split spray
- Rapid harvest after hull split
- Push the population down

## Navel Orange Worm Control – Tehama 2004

	<u>Treatment Application</u>	<u>Material Rates/Ac.</u>
1.Intrepid 2F + CS7	16 oz. + 16 oz	Early Hull Split 8/30/04
2.Imidan 70-W <sup>1</sup>	5.5 lbs.	Early Hull Split 8/30/04
3.DiPel DF (Single spray)	1.0 lb.	Early Hull Split 8/30/04
4.DiPel DF (Double spray)	1.0 lb.	Early Hull Split 8/30/04 & 9/8/04
5.Control	—	—

<sup>1</sup>Water ph at 5.5 using trifol

## 2004 Worm Damage for the Speed Sprayer Plots

<u>Treatment</u> <sup>1</sup>	<u># nuts</u>	<u>% NOW Larvae</u>	<u>% NOW Damage</u>	<u>% NOW Total</u>	<u>% Codling Moth</u>
1. Intrepid	997	2.11	1.00	3.11	3.01
2. Imidan	996	3.61	1.71	5.32	3.21
3. Bt 1 application	994	4.23	.70	4.93	4.93
4. Bt 2 applications	994	4.02	2.11	6.14	4.12
5. Control	998	3.11	3.01	6.11	4.61

<sup>1</sup>Applications on 8/30/04 and 9/8/04 for the second Bt spray. Harvest 9/22/04.