

# Spray Timing and Materials for Walnut Blight

*(Xanthomonas arboricola pv juglandis)*

## Control in Northern California USA



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**X. aboricola** pv **juglandis**



## **A Good Commercial Walnut Blight Control Program in Northern California Requires:**

- Material – Copper plus Manex (formulations comparable)
- Rate – 6.73 kg Kocide 2000 plus 4.23 l Manex/Ha
- Coverage – Airblast orchard sprayers 940 l/Ha every row recommended – some alternate rows
- Timing – 7 to 10 days depending upon rain currently investigating early sprays











**Current research is evaluating early spray applications using over tree simulated rainfall**







**Riser height about 9 meters – Nelson R-30 sprinklers**









# Natural and Simulated Rainfall for Tehama County, California 2004

Date	Estimated Amount (mm)		Condition
3/25	16.2		Natural <sup>1</sup>
3/26	.2		Natural
3/30	.7		Natural
4/6	9.1	(6 hrs)	Simulated <sup>2</sup>
4/10	15.2	(10 hrs)	Simulated
4/13	9.1	(6 hrs)	Simulated
4/16	.5		Natural
4/17	9.1	(6 hrs)	Simulated
4/19	1.0		Natural
4/20	.7		Natural
4/21	.5		Natural
4/22	9.1	(6 hrs)	Simulated
4/29-4/30	45.7	(30 hrs)	Simulated
5/7	8.6		Natural
5/8	24.3	(16 hrs)	Simulated
5/10	1.52		Natural
5/17	3.8		Natural
5/18	2.7		Natural
5/19	45.7	(30 hrs)	Simulated
5/27	.2		Natural
5/28	.2		Natural

<sup>1</sup>Natural rain — 13 events for 37.3 mm

<sup>2</sup>Simulated rain — 8 events for 167.6 mm



# Blight Research in Northern California

- Apply treatments to individual trees by handgun
- Randomized Complete Block Experimental Design
- Simulated rainfall by over tree sprinklers
- Timing off of pistillate budbreak
- Visually inspect 300 to 500 walnuts/tree for blight symptoms (early June)















# 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.



# 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.



# 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	5/17		
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: 6.73 kg + 4.23 l + 4.67 l/Ha

<sup>2</sup>Kocide 2000 + Manex: 6.73 kg + 4.23 l/Ha

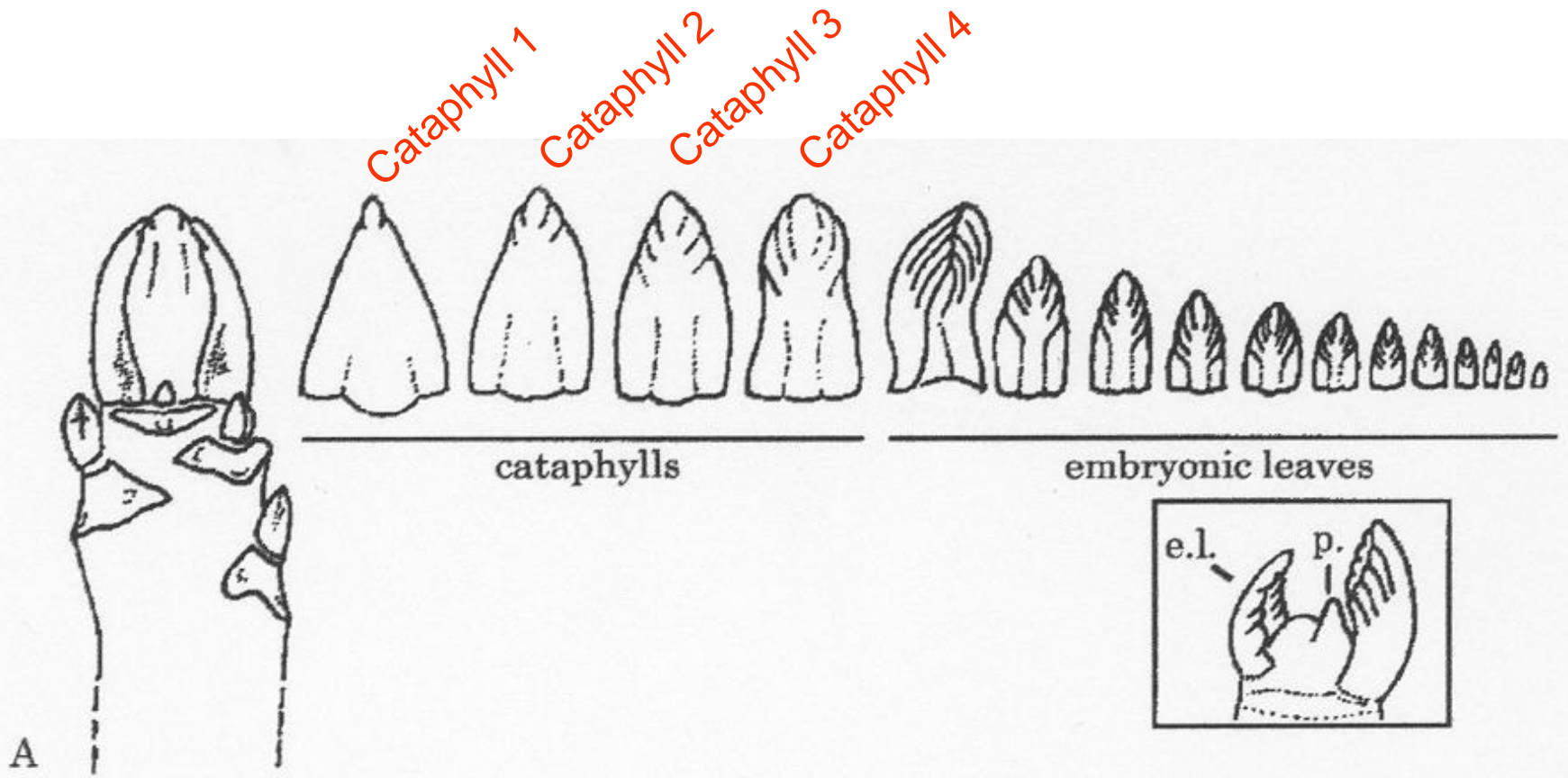
<sup>3</sup>Untreated under simulated rain using over tree sprinklers

<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







# Developing Buds Harvested in June

## Lindow 2003

