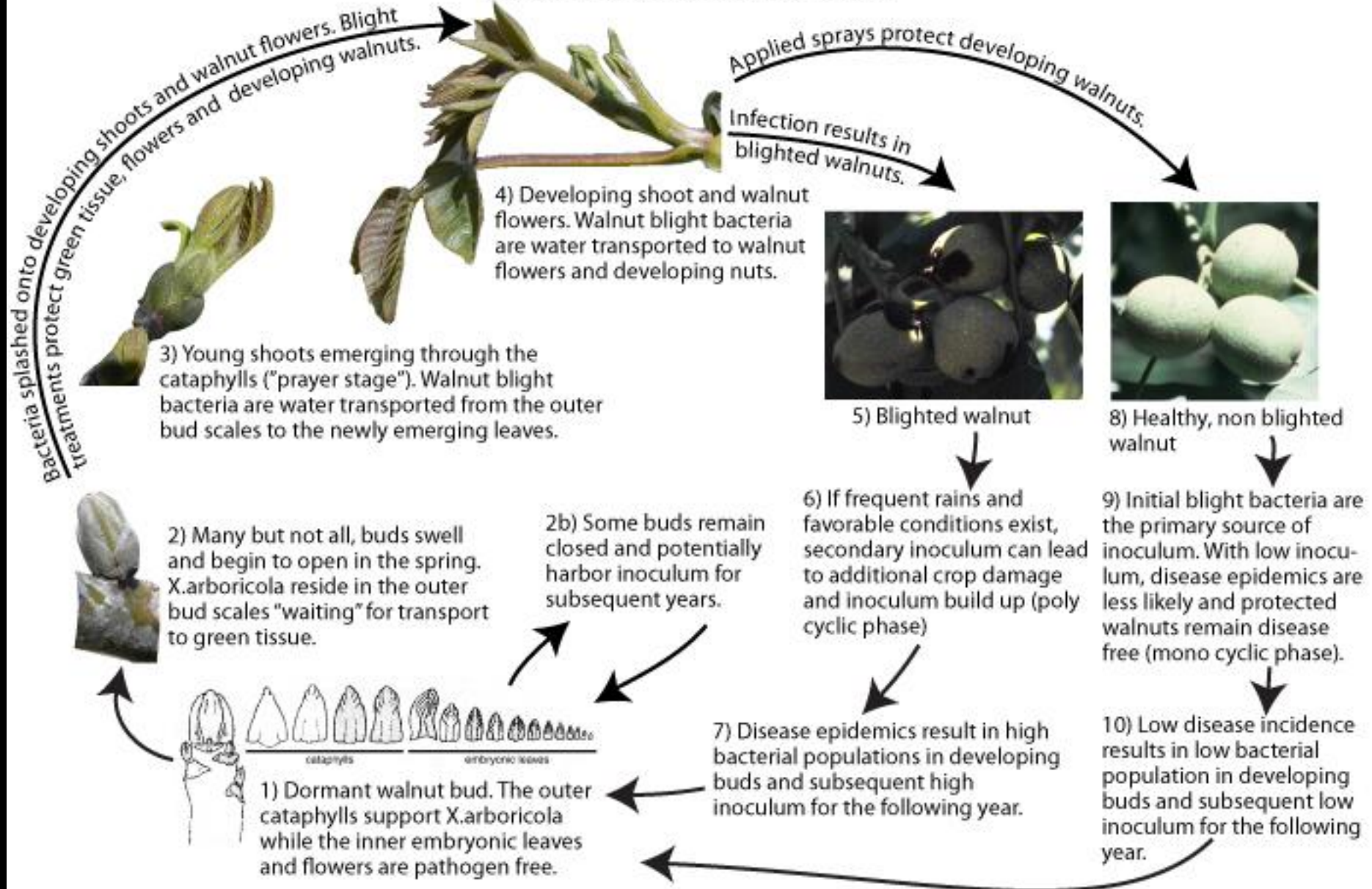


Walnut Blight
“What Happened in
2012”

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Disease Cycle for Walnut Blight caused by *Xanthomonas arboricola* pv *juglandis*

Richard P. Buchner and Steve E. Lindow



In 2012 we had a mix of very good and very poor walnut blight control.

- Population increases / more initial inoculum
- Coverage problems / half rates and half sprays
- Late first spray dates / first application 40% prayer
- Copper resistance / Manzate tank mix OK

Survey for Copper and Mancozeb Sensitivity in Populations of *Xanthomonas arboricola* pv. *juglandis* from Walnut Orchards in Butte and Tehama Counties, California 2012

Jim Adaskaveg, Richard Buchner and Cyndi Gilles

Collection Notes	Orchard Location (county)	No. of Isolates tested	Incidence of Cu Resistance (%)	Mancozeb Sensitivity			
				LIC (mg/L)		MIC (mg/L)	
				Range	Avg.	Range	Avg.
Vina Variety	Butte	5	80	1.66-2.71	2.23	1.86-3.74	2.81
Vina Variety	Tehama	8	100	2.25-2.79	2.51	3.00-3.84	3.36
Vina Variety	Tehama	7	28.6	2.15-2.59	2.35	2.81-3.73	3.22
Vina Variety	Tehama	8	25	1.87-2.64	2.24	2.47-3.15	2.90
Vina Variety	Tehama	6	100	0.52-0.88	0.62	0.99-1.32	1.14
Vina Variety	Tehama	6	66.7	0.59-1.32	0.82	1.24-2.49	1.78
Chandler Variety	Butte	7	100	0.93-1.48	1.22	1.86-2.49	2.15
Chandler Variety	Butte	7	100	1.80-2.64	2.15	2.40-3.15	2.89
Vina Variety	Butte	5	80	1.90-2.49	2.11	2.50-3.28	2.80
Ashley Variety	Butte	8	100	1.48-2.31	1.80	1.86-3.32	2.42
	Total	62			1.81		2.55

Copper sensitivity was tested using CuSO_4 amended nutrient agar plates. Copper resistant growth at 50 mg/L Cu ion (200 mg/L CuSO_4). Mancozeb sensitivity tested using the spiral gradient dilution plate method. LIC = lowest concentration of Mancozeb where a reduction of bacterial growth was observed. MIC = concentration of Mancozeb where growth was inhibited by >95%.

2012 Spring Weather for CIMIS-Gerber

Date	Rainfall (in)	Temperature °F	
		Max	Min
3/01/12	.02	59	39
3/13/12	.55	53	49
3/14/12	.15	58	52
3/15/12	.11	61	55
3/16/12	.07	62	44
3/22/12	.02	65	41
3/24/12	.69	50	43
3/25/12	.38	54	41
3/27/12	.89	52	47
3/28/12	.01	63	53
3/31/12	.42	58	46
4/4/12	40% prayer stage Vina		
4/04/12	.02	61	35
4/10/12	.46	56	47
4/11/12	.07	63	49
4/12/12	.46	56	47
4/13/12	.29	51	45
4/17/12	40% prayer stage Chandler		
4/25/12	.04	66	57
5/03/12	.02	65	51
6/04/12	.16	71	55
	4.83		

Figure 14. 2012 Rainfall and maximum/minimum temperature for the Gerber (CIMIS #8) weather station in Tehama County. 40% prayer stage was estimated on 4/4/12 for Vina and 40% prayer occurred for Chandler on 4/17/12. Forty percent of the open buds at prayer stage signals the first spray application.

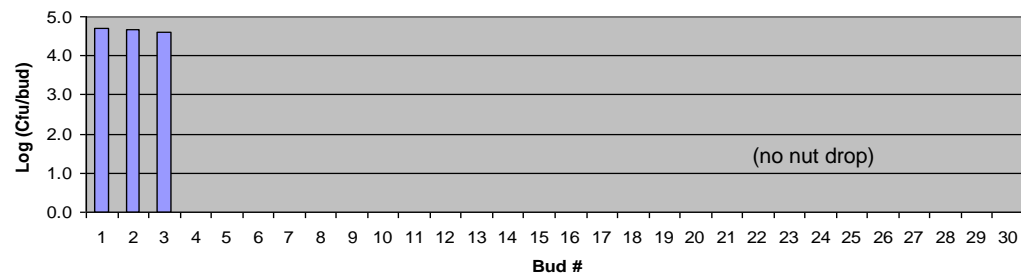
First Spray Timing

Orchard Location and Variety	2011 % Buds with pathogen	2011 % Blight	2012 % Buds with pathogen	2012 Spray Schedule 4 lbs/ac Badge plus 2.4lbs/ac Manzate	2012 % Blight
Location 1, Vina	16	1.49	30	4/16 & 5/2	3.50
Location 2, Vina	23	1.23	10	4/16 & 5/2	6.49
Location 3, Vina	6	2.00	16	4/16 & 5/2	2.42

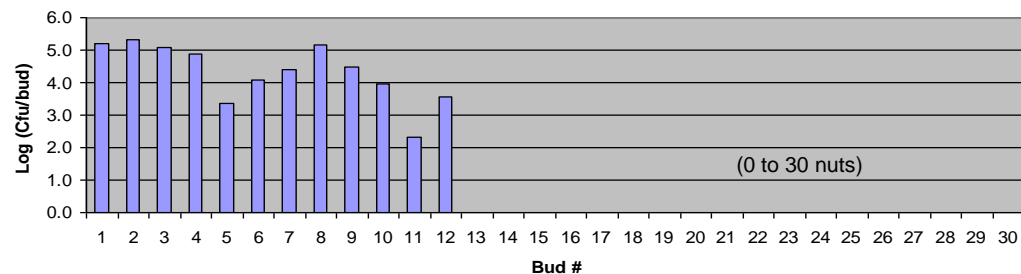
Figure 7. Two years of walnut blight survey information for a Vina variety walnut orchard. Sprays were full coverage (every row) using ground application equipment.

Tree #	Rating	Tree #	Rating
69	L	34	M
68	M	33	L
67	L	32	L
66	L	31	M
65	M	30	M
64	L	29	L
63	H	28	L
62	H	27	L
61	H	26	L
60	H	25	Replant
59	H	24	L
58	H	23	M
57	H	22	L
56	H	21	L
55	M	20	0
54	M	19	L
53	L	18	L
52	L	17	L
51	M	16	Replant
50	0	15	0
49	M	14	0
48	L	13	0
47	M	12	L
46	M	11	0
45	M	10	L
44	L	9	0
43	M	8	0
42	H	7	0
41	Replant	6	0
40	L	5	L
39	0	4	L
38	M	3	Replant
37	L	2	0
36	L	1	0
35	L		

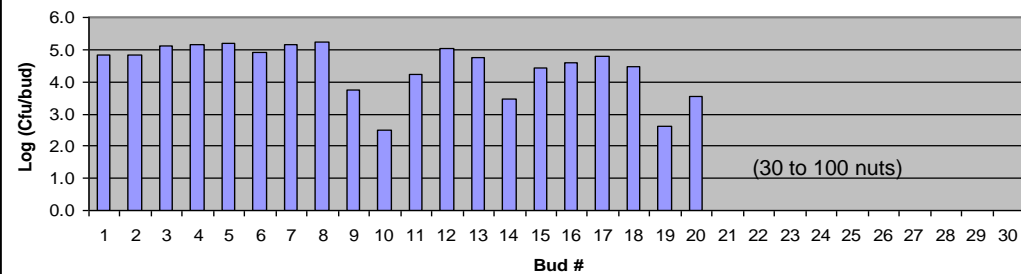
Xaj Histogram for Zero Blight Rating



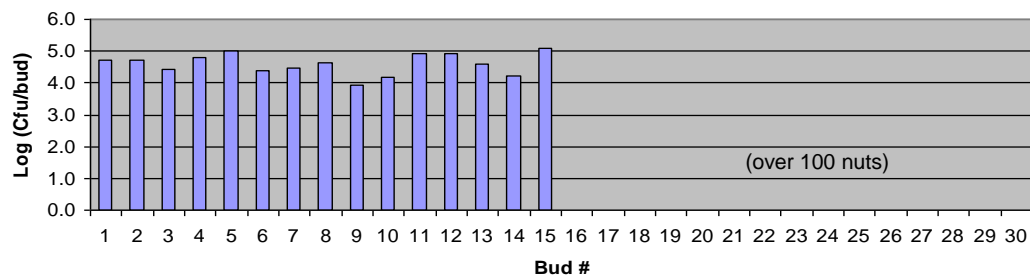
Xaj Histogram for Low Blight Rating



Xaj Histogram for Medium Blight Rating



Xaj Histogram for High Blight Rating



Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule						2012 % Blight
5) Ashley	0	5.24	70	3/23(G) B,M,S,	3/30(A) K2,M,S	4/7(G) B,M,S,Z	4/16(A) B,M,S	4/24(G) B,M,S,Z	5/25(G) B,M	17.84

(G) or (A) indicates ground or air applications. All ground applications were half sprays (every other row alternating) except the 4/24 and 5/1 sprays in orchard #1. B=Badge at 4lbs/Ac. In orchards 5, 6 and 9 the Badge rate was reduced to 3.5lbs/Ac. K2=Kocide 2000 at 6lbs/Ac. M=Manzate at 2.4 lbs/Ac. S=Freeway at 4oz/Ac and Z=Zinc Sulfate 36% at 1lb/Ac. Buds were sampled 2/23/12 and blight was visually rated 6/19 and 6/20/12 by randomly counting 4000 nuts per orchard.

Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule				2012 % Blight
1) Hartley	16	.11	0	4/16(A) B,M,S,	4/24(G) B,M,S,Z	5/1(G) B,M,S,Z	5/23(G) B,M	0.18

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Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule				2012 % Blight
13) Tulare	0	.03	0	4/5(G) B,M,S,Z	4/15(G) B,M,S,Z	4/22(G) B,M,S,Z	5/21(G) B,M	.03

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Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule					2012 % Blight
10) Vina	60	2.60	43	4/2(A) B,M,S,Z	4/9 (G) B,M,S,Z	4/16(A) B,M,S	4/24(G) B,M,S,Z	5/25(G) B,M	16.17
14) Vina	3	.52	3	4/2(A) B,M,S	4/9 (G) B,M,S,Z	4/16(A) B,M,S	4/24(G) B,M,S,Z	5/25(G) B,M	.87

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Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule					2012 % Blight
6) Howard	20	.18	16	4/10 (G) B,M,S,Z	4/18 (G) B,M,S,Z	4/24 (G) B,M,S,Z	5/22 (G) B,M		1.31
8) Howard	40	.79	6	4/9 (G) B,M,S,Z	4/18 (G) B,M,S,Z	4/24 (G) B,M,S,Z	5/23 (G) B,M		1.40
9) Howard	16	.68	—	4/11 (G) B,M,S,Z	4/18 (G) B,M,S,Z	4/24 (G) B,M,S,Z	5/21 (G) B,M		1.42
11) Howard	53	.41	20	4/8 (G) B,M,S,Z	4/17 (G) B,M,S,Z	4/23 (G) B,M,S,Z	5/24 (G) B,M		1.41
12) Howard	40	4.82	23	4/8 (G) B,M,S,Z	4/17 (G) B,M,S,Z	4/23 (G) B,M,S,Z	5/24 (G) B,M	6/6 (G) B,M	5.45

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Orchard	2011 % Buds with Pathogen	2011% Blight	2012 % Buds with Pathogen	2012 Spray Schedule					2012 % Blight
2) Chandler	0	2.59	46	4/16 (G) B,M,S,Z	4/20 (G) B,M,S,Z	4/30 (G) B,M,S,Z	5/23 (G) B,M		2.50
3) Chandler	73	3.94	43	4/16 (G) B,M,S,Z	4/20 (G) B,M,S,Z	5/1 (G) B,M,S,Z	5/23 (G) B,M		10.25
4) Chandler	56	1.44	33	4/16 (G) B,M,S,7	4/23 (G) B,M,S,Z	5/3 (G) B,M,S,Z	5/24 (G) B,M	6/5 (G) B,M	2.68
7) Chandler	46	1.76	30	4/16 (G) B,M,S,Z	4/20 (G) B,M,S,Z	5/1 (G) B,M,S,Z	5/22 (G) B,M		13.73
15) Chandler	83	2.09	50	4/7 (G) B,M,S,Z	4/23 (G) B,M,S,Z	5/2 (G) B,M,S,Z	5/24 (G) B,M		6.00

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