

The background of the slide is a close-up photograph of two green walnut husks (infructescences) on a branch. The husks are covered in small, raised bumps and have a slightly fuzzy texture. They are surrounded by large, dark green leaves with prominent veins. The lighting is natural, highlighting the texture of the husks and the vibrant green of the leaves.

# **Walnut Blight Population Sampling**

## **IPM for Walnut Blight**

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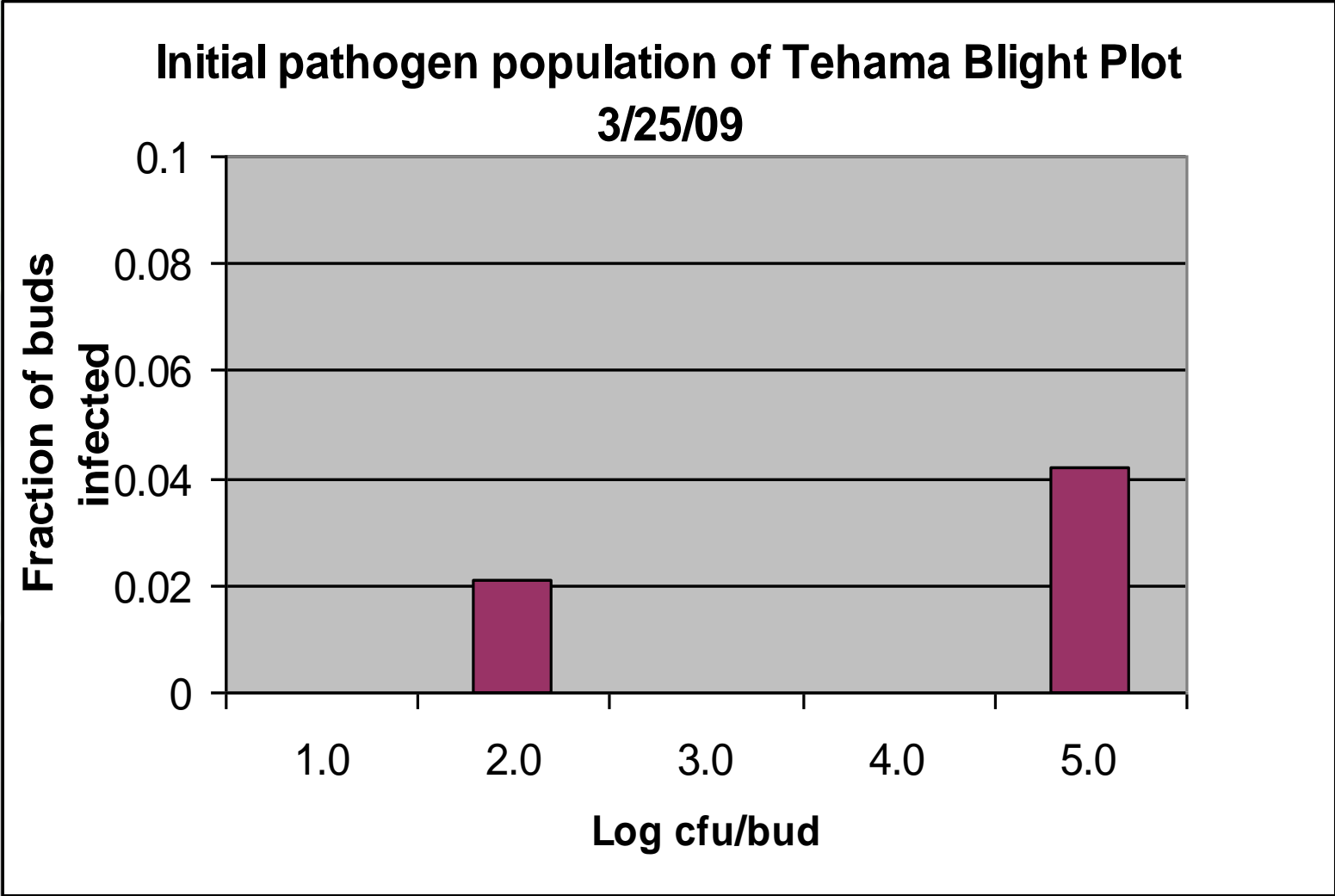
## 2009 Season - 8 simulated and 3 natural events

Date	Rainfall	Simulated Rainfall (inches, max temp.)	Event
3/30/09			30% prayer stage
4/3/09			40% prayer stage
4/4/09		2 hours (.12 in)	frost protection
4/7-4/10/09	.40 in.		first spray (4/7)
4/9/09		30 hours (1.80 in, 55°F)	catkins gone
4/13/09		1 hour (0.06 in)	first flowers/frost protection
4/17/09			second spray (4/17)
4/18/09			full bloom on first prayers
4/20/09		24 hours (1.44 in, 97°F)	
4/24/09			third spray (4/24)
4/25/09		48 hours (2.88 in, 70°F)	
5/1-5/4/09	.58 in		
5/6/09			fourth spray (5/6)
5/8-5/9/09		30 hours (1.80 in, 86°F)	
5/16-5/18/09		42 hours (2.52 in, 97°F)	
5/21/09			fifth spray (5/21)
5/22/09		12 hours (.72 in, 90°F)	
6/3-6/5/09	.51 in		
6/12/09		30 hours (1.80 in, 78°F)	
6/19/09			blight canopy counts

Figure 1. Rainfall, Stage of Growth and Spray Timing for the Tehama Walnut Blight Experiment



Figure 5. Incidence of populations of *Xanthomonas juglandis* on individual buds of walnut sampled on March 25, 2009.



## 2009 Season – Chandler – 5 applications

<u>Treatment</u>	<u>Percent Blight</u>	<u>Phytotoxicity</u>
Kocide 3000 @ 4 lbs./Ac + Manex @ 58 oz./Ac	0 a	0
Kocide 3000 @ 4 lbs./Ac + Dithane @ 2.4 lbs./Ac	0 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate @ 2.4 lbs./Ac	0.06 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate @ 1.5 lbs./Ac	0.05 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate @ 0.5 lbs./Ac	0 a	0
Kocide 3000 @ 4 lbs./Ac	0.06 a	0
Pristine @ 10 oz./Ac	0.06 a	0
Pristine @ 10 oz./Ac + Kocide 3000 @ 4 lbs./Ac	0 a	0
Mankocide @ 8 lbs./Ac	0 a	0
<b>Untreated Control</b>	<b>0.13 a</b>	<b>0</b>

Figure 4. Walnut blight symptoms for 300 walnuts tagged on April 28, 2009. Tagged walnuts were unsprayed and under simulated rainfall.

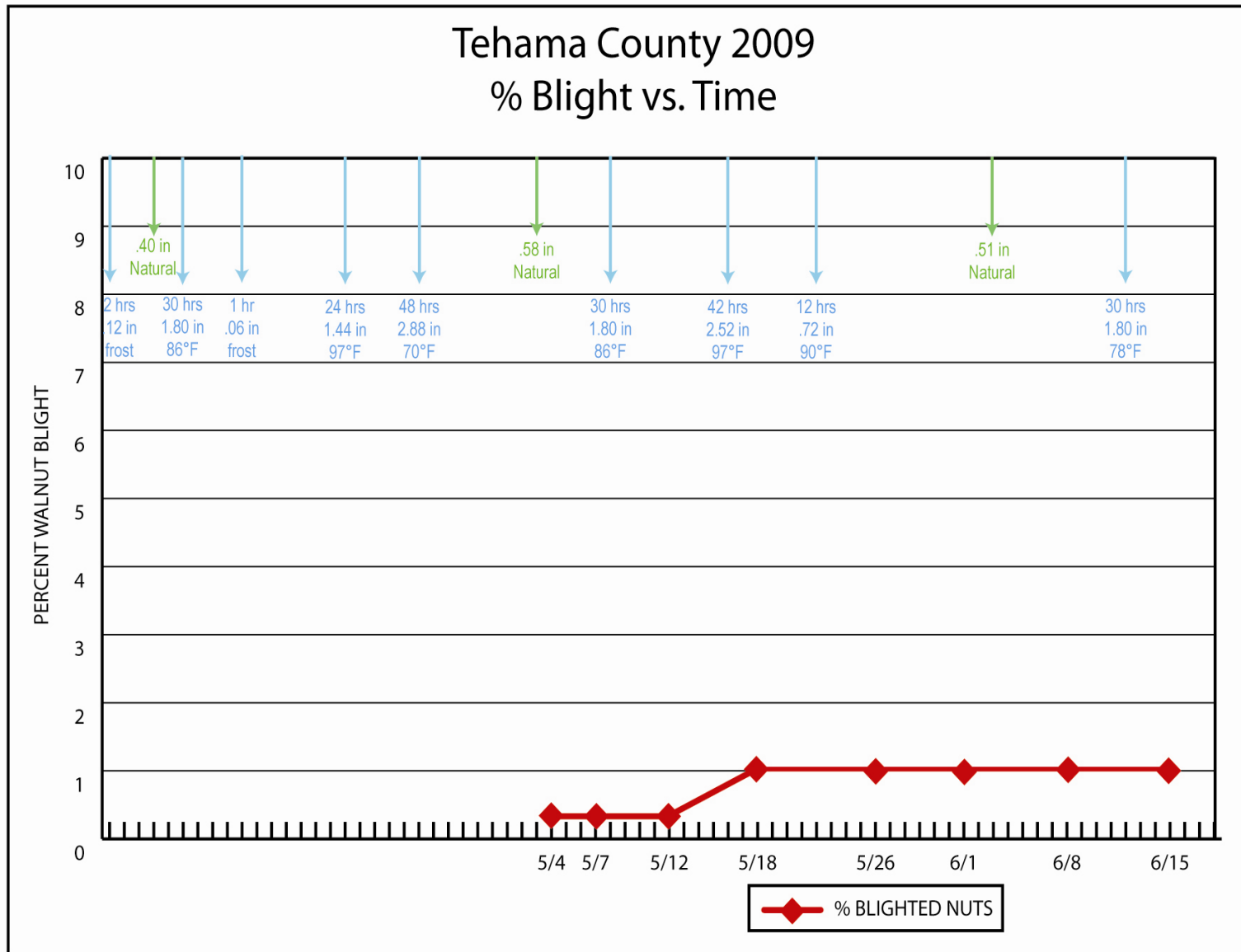
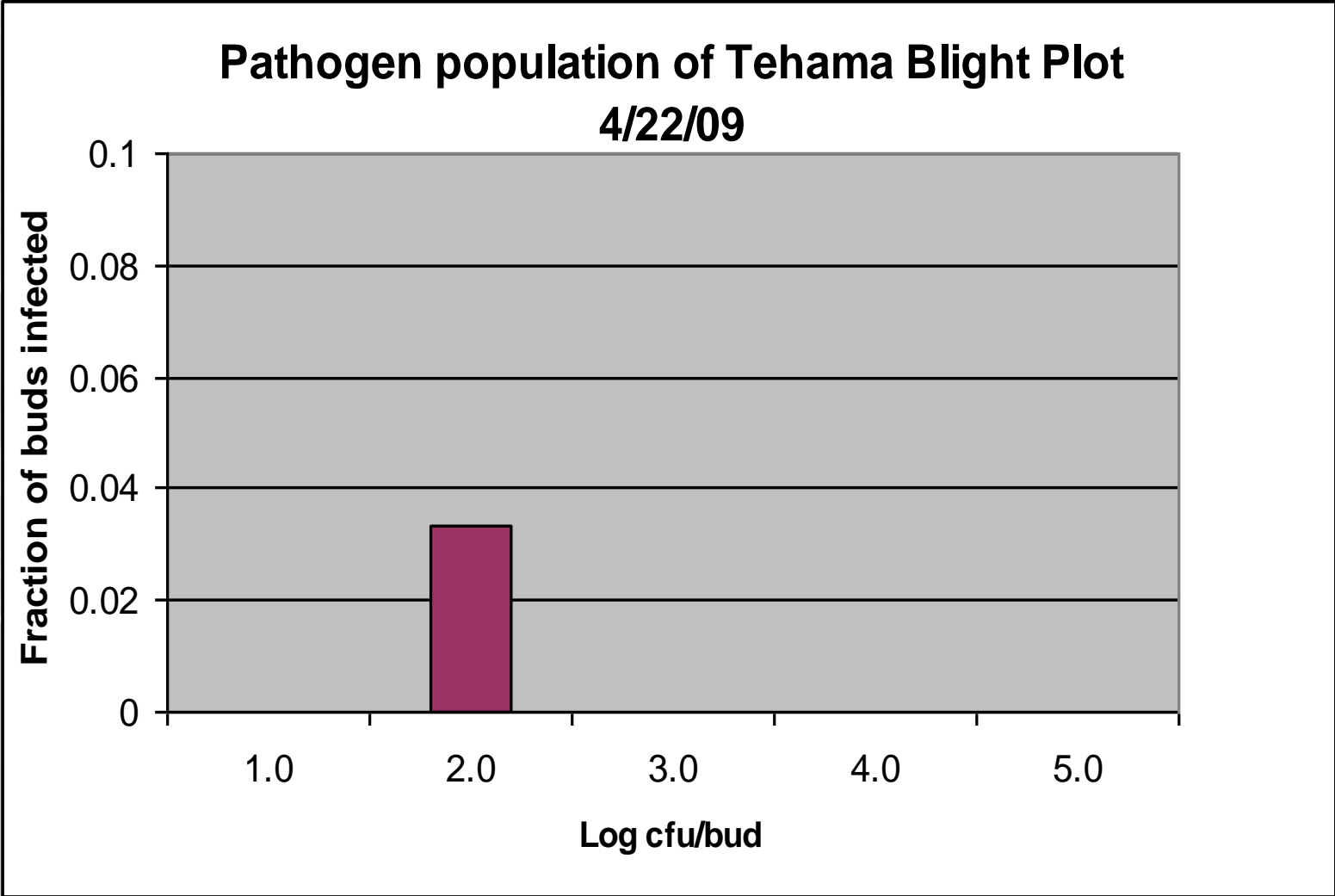
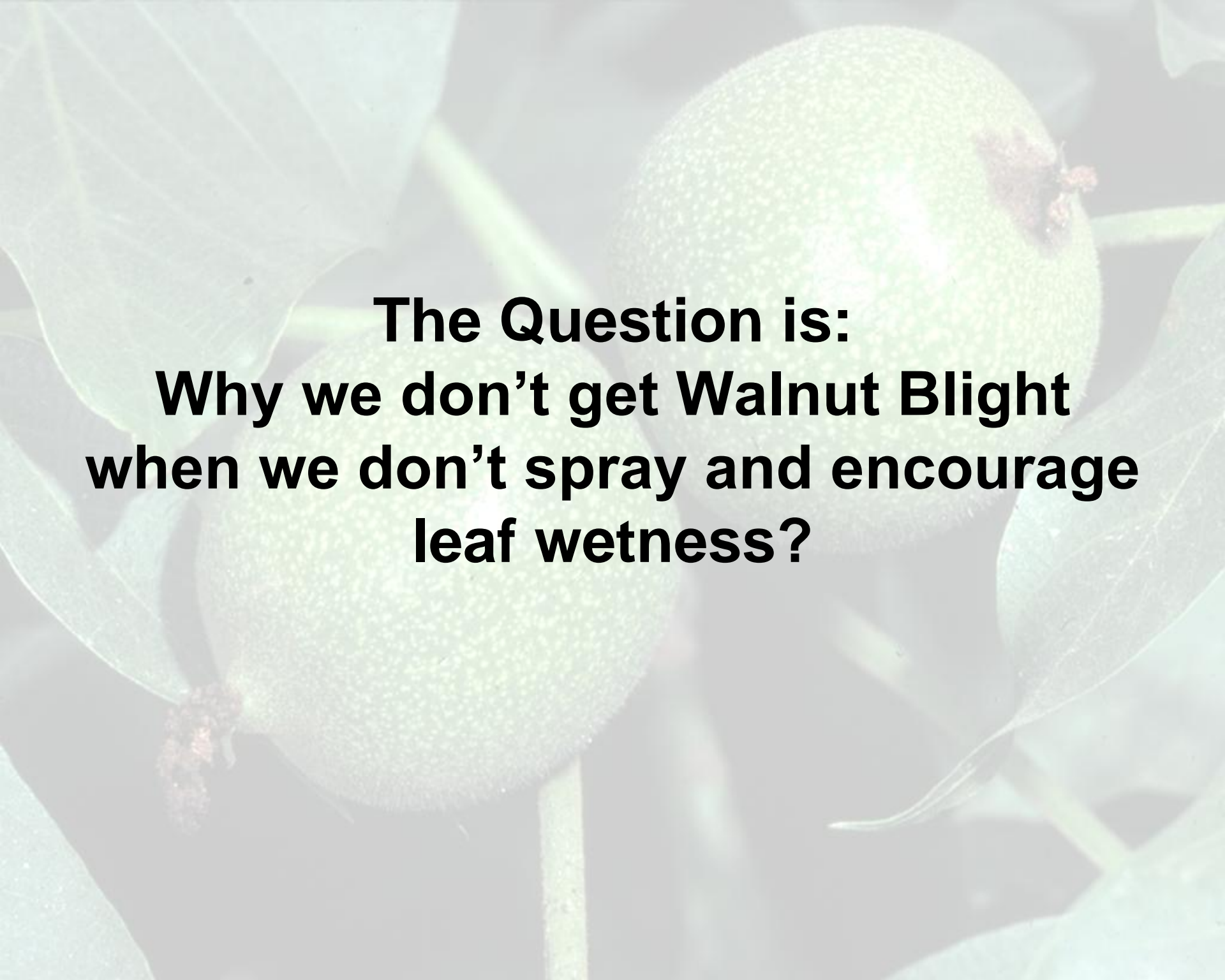
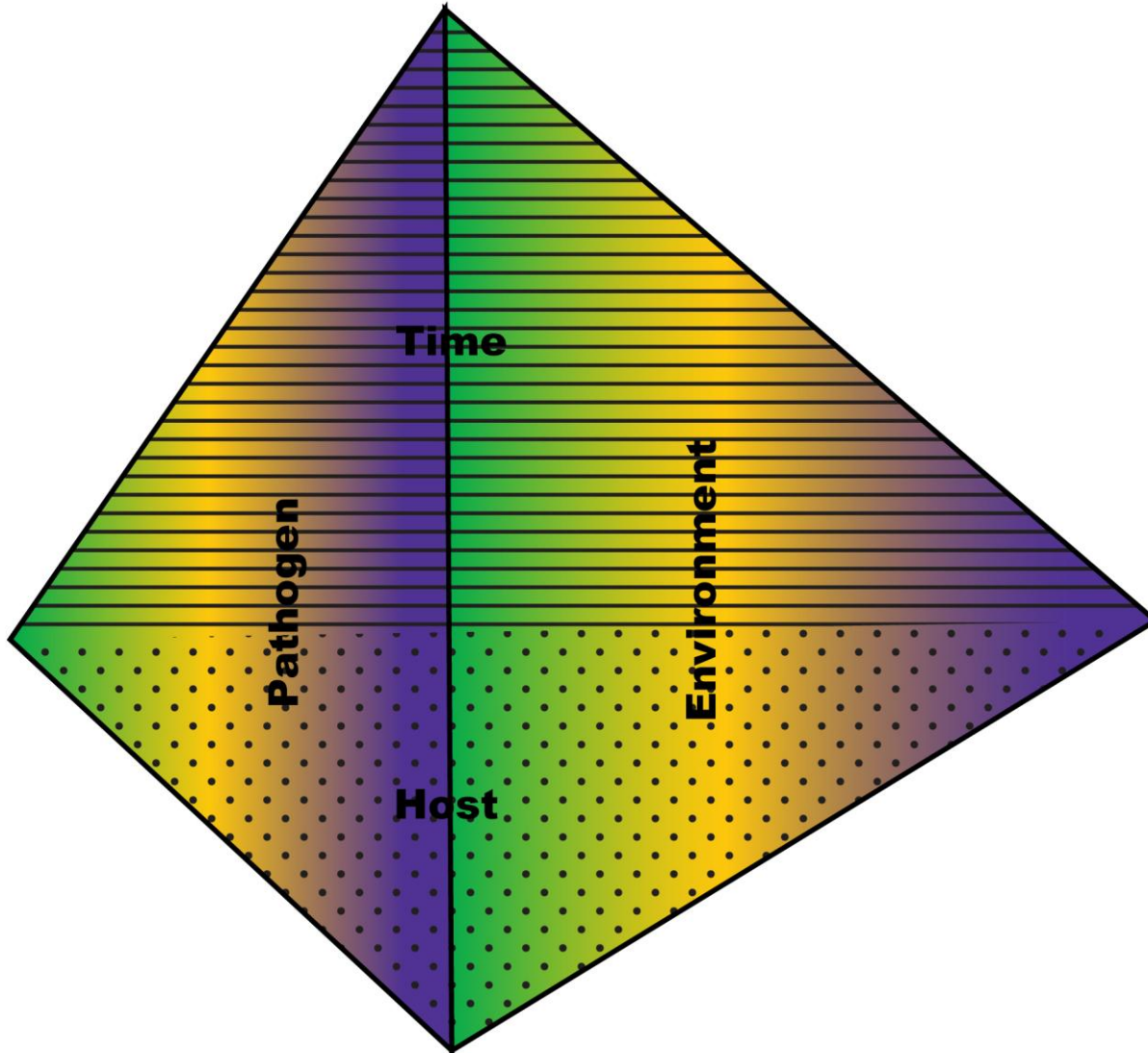


Figure 6. Incidence of populations of *Xanthomonas juglandis* on individual shoots of walnut sampled on April 22, 2009.



A close-up photograph of two green walnuts on a branch. The walnuts are covered in a fine, white, fuzzy texture. There are several dark brown, necrotic lesions on the walnuts, which are characteristic of walnut blight. The background is a soft-focus green, showing more leaves and branches.

**The Question is:  
Why we don't get Walnut Blight  
when we don't spray and encourage  
leaf wetness?**



**Disease Tetrahedron**

## 2010 Season – 7 simulated, 18 natural

Date	Rainfall (in)	Max/Min °F	Sprinkler Rain time (in)	Event
4/2/10	.26	37-51	24 hrs (1.44)	
4/4/10	.62	39-51		
4/6/10				First pollen
4/7/10				33% prayer
4/11/10	.96	46-52		
4/12/10	.38	46-56	24 hrs (1.44)	
4/13/10	.04	43-63		
4/14/10	.19	38-62		
4/15/10				Catkins falling
4/16/10				Spray #1
4/18/10				First flowers
4/20/10	1.08	45-58		
4/21/10	.05	45-63		
4/23/10				Spray #2
4/24/10		41-77	24 hrs (1.44)	
4/26/10	.05	39-73		Bacteria applied
4/27/10	.02	40-67		
4/28/10	.25	37-59		
5/7/10				Spray #3
5/8/10		45-73	24 hrs (1.44)	
5/10/10	.32	36-59		
5/15/10		49-82	24 hrs (1.44)	
5/17/10	.09	52-64		Spray #4
5/19/10	.02	50-66		
5/21/10	.04	44-68		
5/22/10		34-63	24 hrs (1.44)	
5/25/10	.18	44-64		
5/27/10	.45	46-59		
5/28/10	.06	48-70		
6/1/10		59-79	24 hrs (1.44)	
6/16/10				Blight counts

## 2010 Season – Chandler – 4 sprays

<u>Treatment</u>	<u>Percent Blight</u>	<u>Phytotoxicity</u>
Kocide 3000 @ 4 lbs./Ac + Prostick @ 2.4 lbs./Ac	.87 a	0
Kocide 3000 @ 4 lbs./Ac + Prostick @ 1.5 lbs./Ac	.52 a	0
Kocide 3000 @ 4 lbs./Ac + Prostick @ 0.5 lbs./Ac	.55 a	0
Kocide 3000 @ 4 lbs./Ac	1.40 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate Flowable @ 58 oz./Ac	1.53 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate Flowable @ 36 oz./Ac	1.77 a	0
Kocide 3000 @ 4 lbs./Ac + Manzate Flowable @ 12 oz./Ac	.20 a	0
Untreated Control	2.67 a	0
<i>X.juglandis</i> @ one million cfu/gallon applied 4/26/10	61.41	

Figure 5. Incidence of populations of *X. juglandis* on sprayed Chandler walnut buds sampled following harvest on 12/1/10.

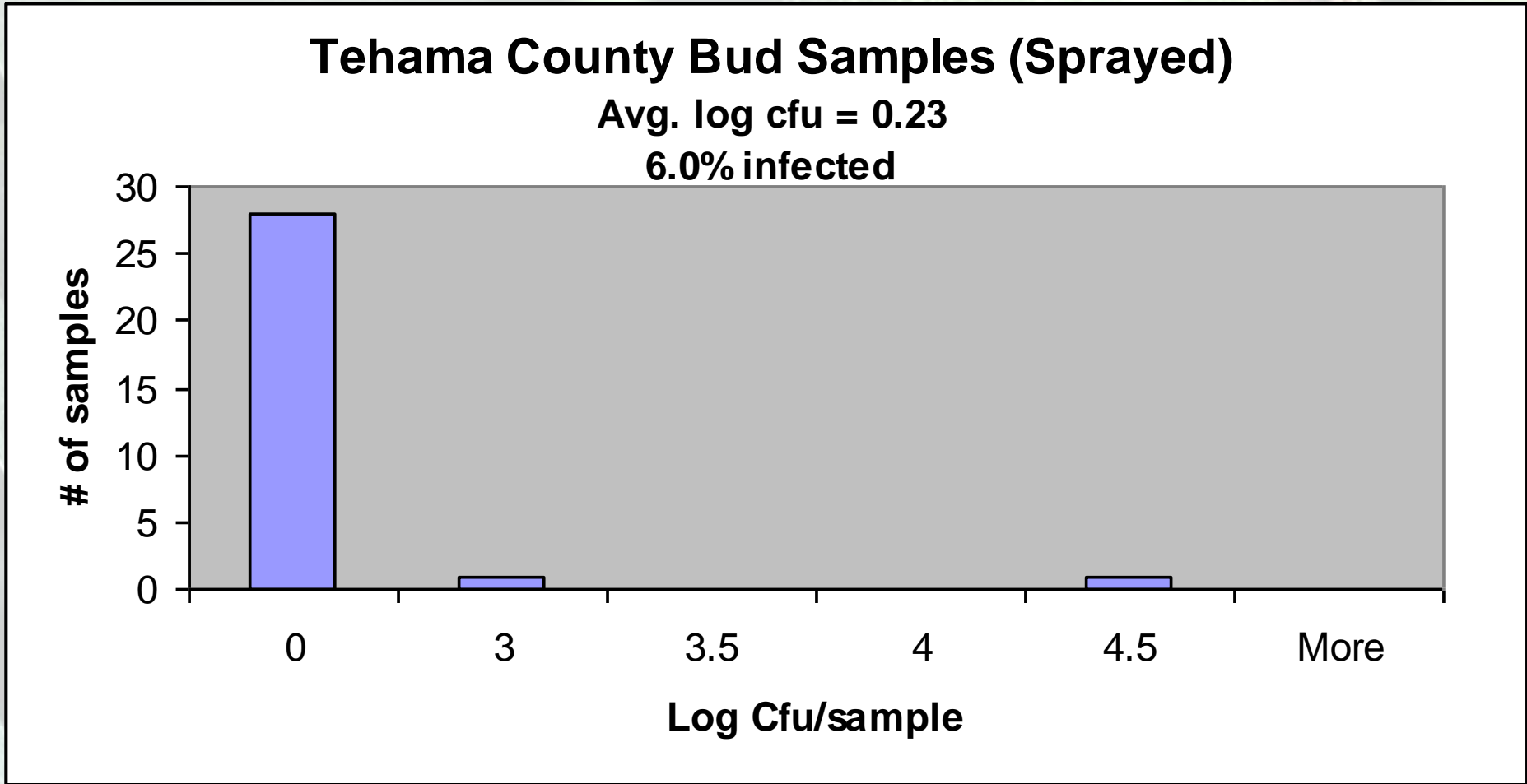


Figure 6. Incidence of populations of *X. juglandis* on unsprayed Chandler walnut buds sampled following harvest on 12/1/10.

### Tehama County Bud Samples (Unsprayed)

Avg. log cfu = 0.79

23.3% infected

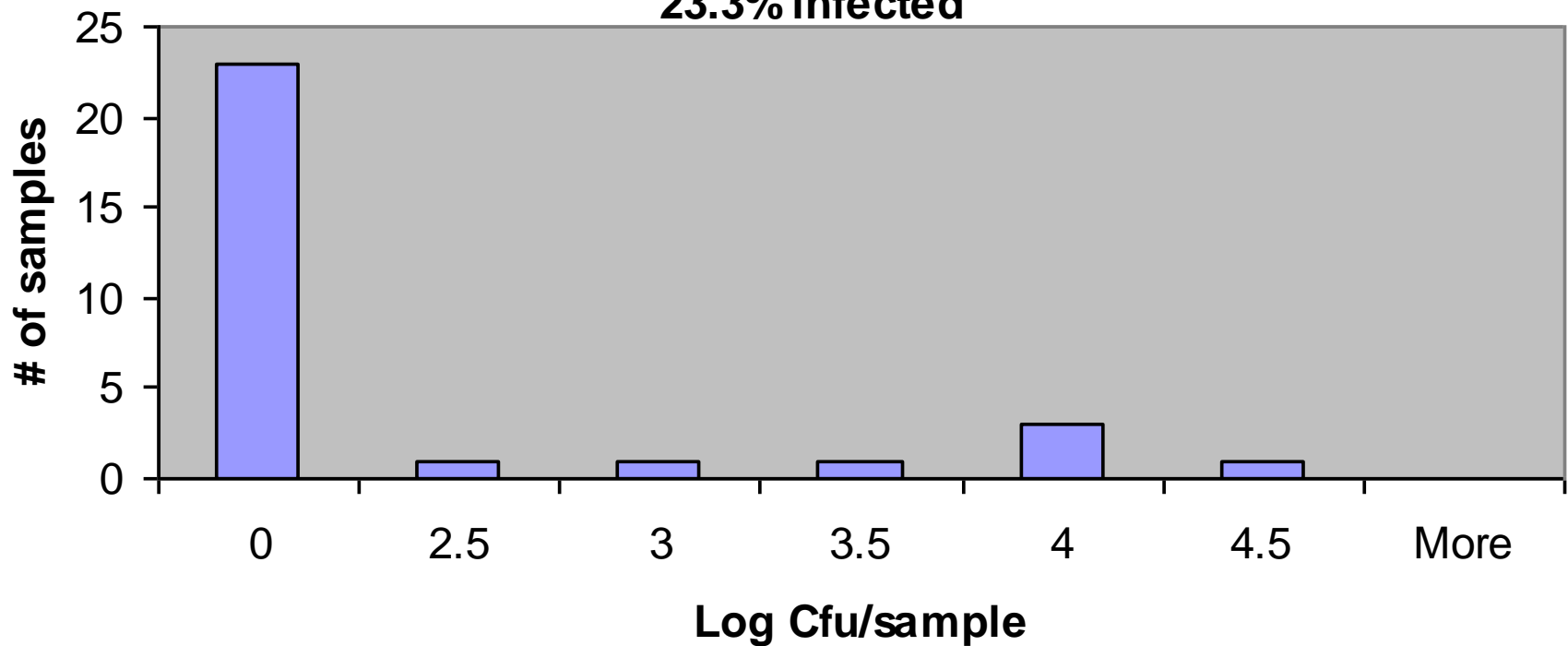
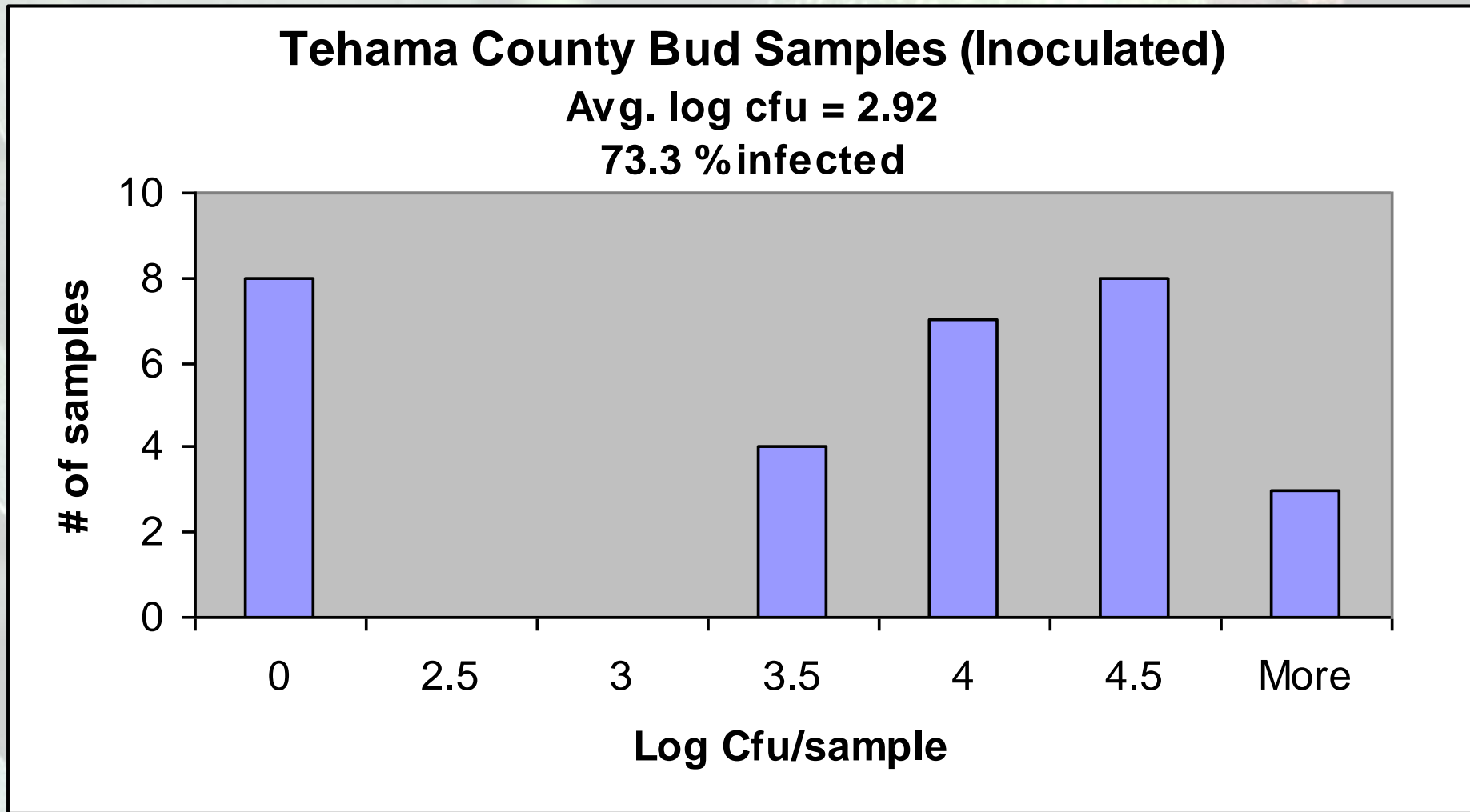
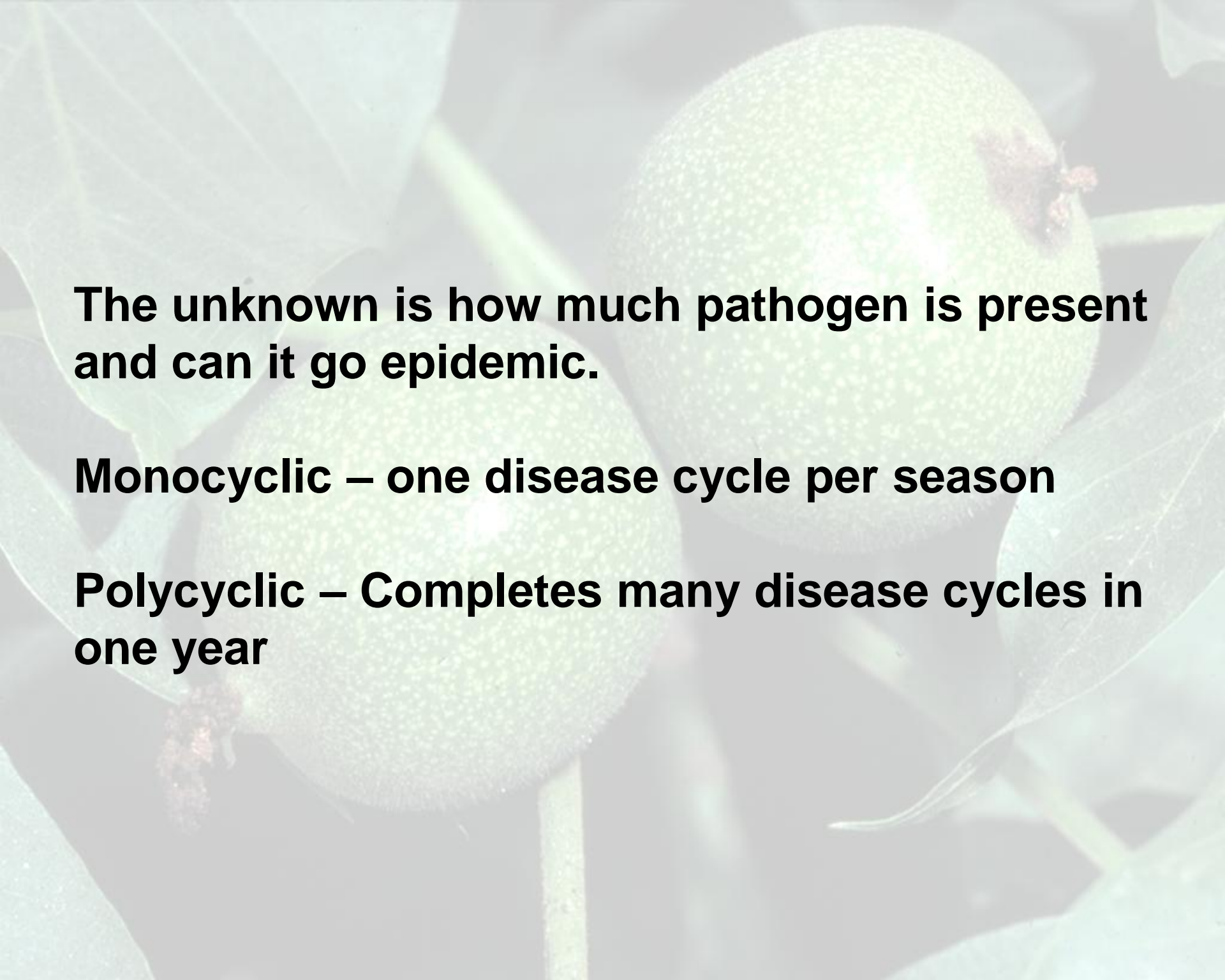


Figure 7. Incidence of populations of *X. juglandis* on inoculated Chandler walnut buds sampled following harvest on 12/1/10.



The background of the slide is a photograph of two green citrus fruits, likely lemons or limes, hanging from a branch. The fruits are round and have a bumpy, textured surface. They are surrounded by several large, green leaves with prominent veins. The lighting is soft, and the overall color palette is dominated by greens and yellows.

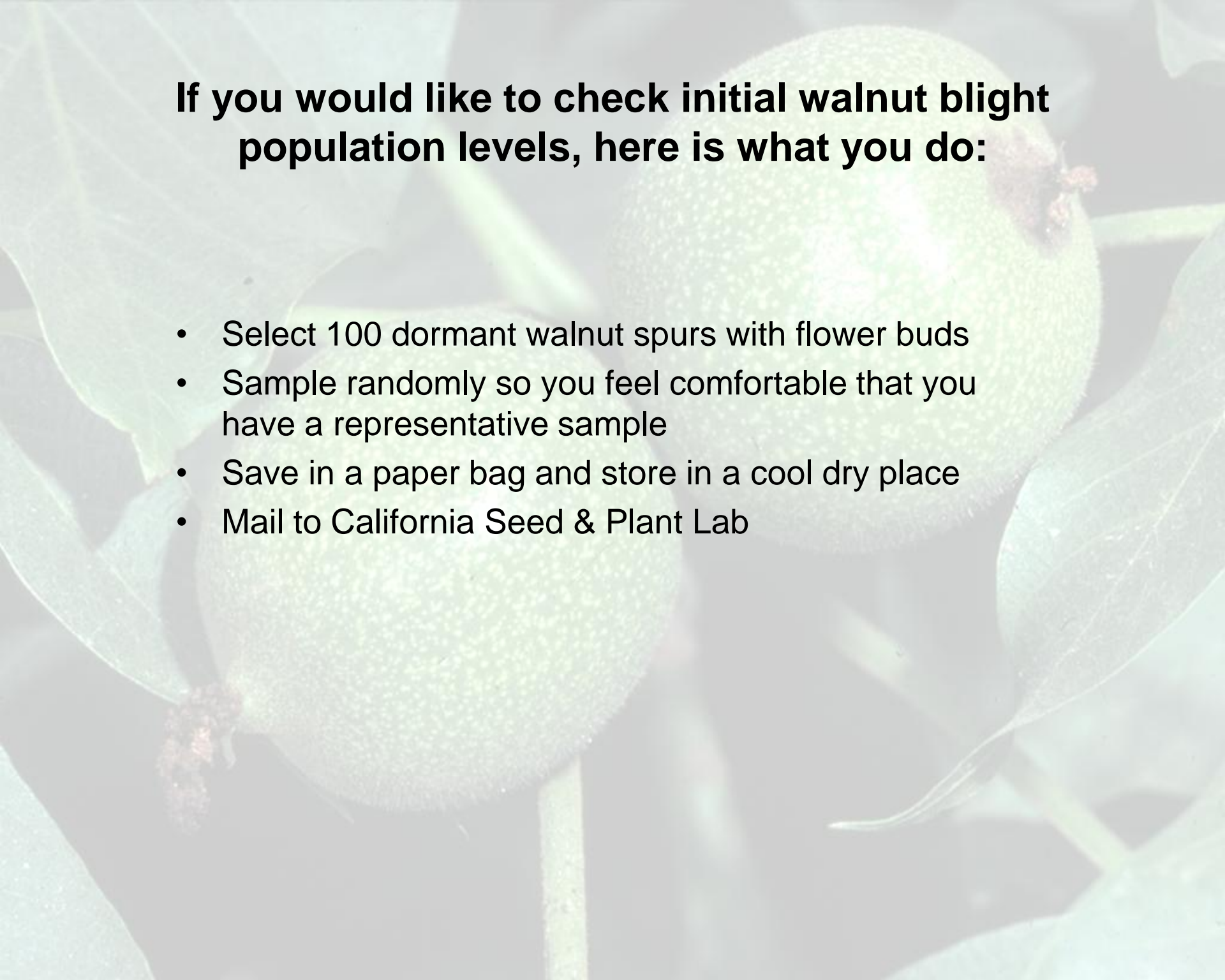
**The unknown is how much pathogen is present and can it go epidemic.**

**Monocyclic – one disease cycle per season**

**Polycyclic – Completes many disease cycles in one year**

## 2010 Walnut Blight Survey Orchards

Orchard	Spray Mix 8lbs. Nu-Cop 50DF, 2.4 lbs. Manzate Pro-stick, 4 oz. Sylgard, 1 lb. Zinc Sulfate	Spray Mix 6 lbs. Nu-Cop 50DF, 2.4 lbs. Manzate Pro-stick, 4 oz. Sylgard, 5 lbs. Potassium Nitrate	Spray Mix 6 lbs. Nu-Cop 50DF, 1 qt. Regalia, 4 oz. Sylgard, 5 lbs. Potassium Nitrate	Spray Mix 6 lbs. Nu-Cop 50DF, 4 oz. Sylgard, 5 lbs. Potassium Nitrate	Number of ½ Sprays	% Buds with Pathogen	Population Log (cfu/g)	% Blight
1) Howard	4/6, 4/17, 4/23	5/5	—	5/13	5	23	3.079	0.4
2) Howard	4/6	—	—	—	1	3	3.183	1.8
3) Chandler	4/10, 4/17	4/22	5/5	5/13	5	0	0	0
4) Hartley	4/16, 4/23, 5/5	—	—	—	3	0	0	.03
5) Chandler	4/10, 4/18, 4/24	5/5	—	5/15	5	0	0	0
6) Howard	4/8, 4/10, 4/18	4/25	5/6	5/14	6	0	0	0
7) Chandler	4/9, 4/17, 4/23	5/5	—	5/14	5	70	3.547	.16
8) Howard	4/9, 4/17, 4/23	—	5/6	5/14	5	10	2.739	.83
9) Howard	4/10, 4/19, 4/24	5/6	—	5/14	5	0	0	.56
10) Chandler	4/7, 4/16, 4/23	5/3	—	5/13	5	0	0	0
11) Chandler	4/8, 4/16, 4/25	5/6	—	5/13	5	0	0	0

A close-up photograph of two walnut flower buds on a branch. The buds are green and fuzzy, with small brownish structures at their base. The background is a soft-focus green, suggesting other leaves and branches.

**If you would like to check initial walnut blight population levels, here is what you do:**

- Select 100 dormant walnut spurs with flower buds
- Sample randomly so you feel comfortable that you have a representative sample
- Save in a paper bag and store in a cool dry place
- Mail to California Seed & Plant Lab



The background of the image shows two green kiwifruit fruits hanging from a branch. The fruits are round and covered in fine, light-colored hairs. They are surrounded by several large, green, serrated leaves. The lighting is soft, highlighting the texture of the fruit and the veins on the leaves.

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