Mealybug Management and Leafroll Virus in California Vineyards

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Mealybug management

Species-specific

Situation-dependent

Mealybugs in California Vineyards:

Pseudococcus maritimus (Grape MB)
Pseudococcus viburni (Obscure MB)
Pseudococcus longispinus (Longtailed MB)

Planococcus ficus (Vine MB)
Planococcus citri (Citrus MB)

Ferrisia gilli (Gill's MB)

Rhizoecus falcifer (Ground MB)
Rhizoecus kondonis (Ground MB)

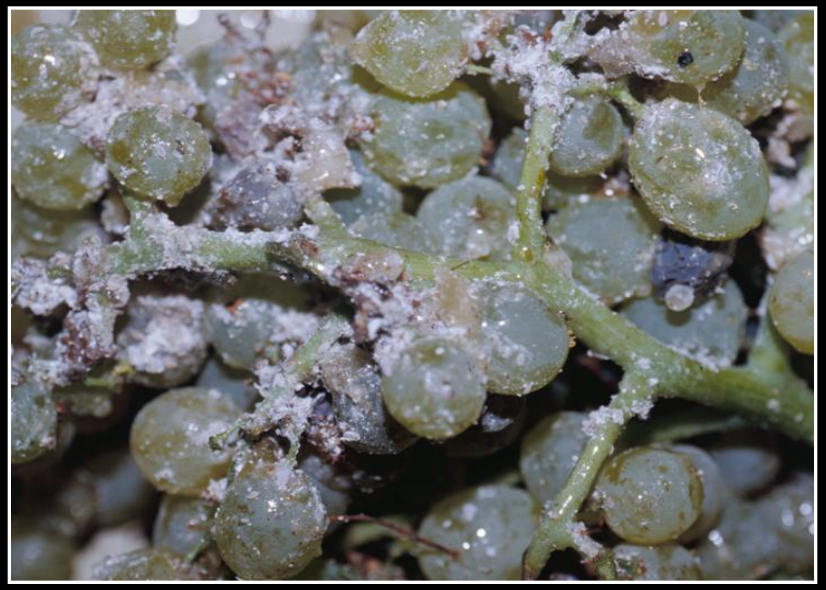
Maconellicoccus hirsutus (Pink hibiscus)


Grape


Gill's


Obscure


Vine



Mealybug damage

Direct

Indirect:
vector pathogens

Mealybug management

Ant management

Biological control

Mating disruption

Insecticides

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	Ant bait	BC	MD	Insecticide
Grape 	Stand-alone	Present	No product	Target young MB Rotate chemistry to avoid resistance Use with other tools in IPM program
Obscure 	Combine	Release	No product	
Vine 	Combine	Release	Check-Mate	
Gill's 	?	Present	Not identified	

Grape mealybug in North Coast:

Small, endemic populations rarely cause economic damage

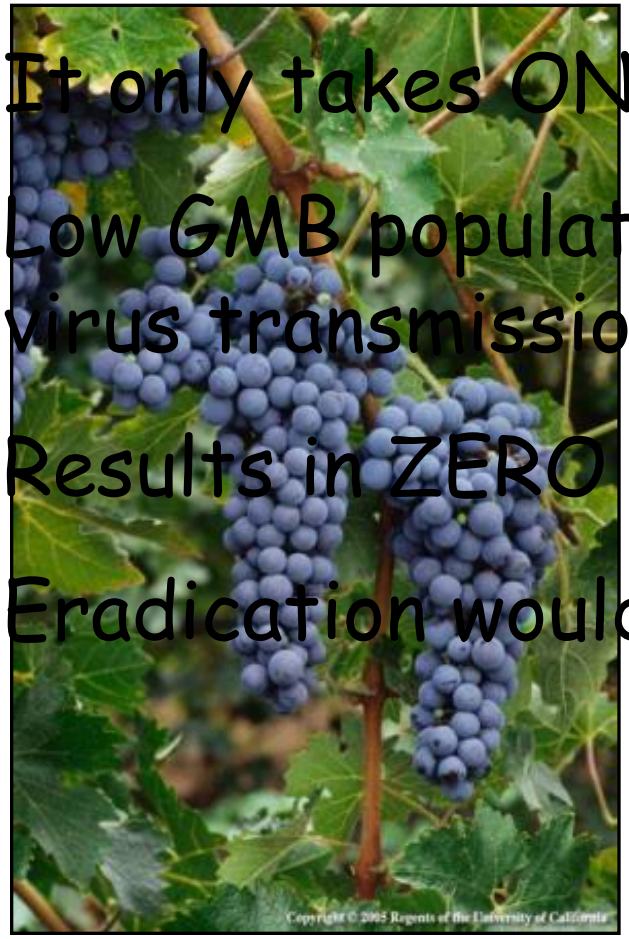
As a Vector:

It only takes ONE mealybug to transmit virus.

Low GMB populations: no bunch damage, but virus transmission.

Results in ZERO tolerance.

Eradication would be difficult.



…except in the presence of ants

If virus

biological

control

How will we manage MB vector populations?

Mealybugs & Leafroll virus

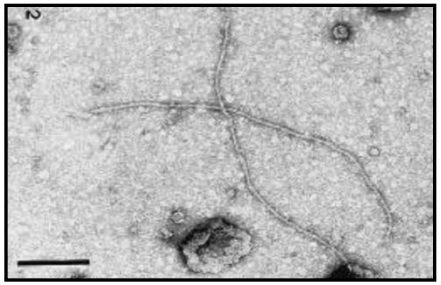
Host

Vector

UC Statewide IPM Project

Environment

Virus



Scagliusi et al. 2002

Mealybugs & Leafroll virus

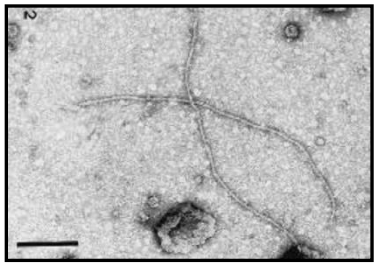
Vector(s)

UC Statewide IPM Project

Host

Environment

Virus



Scagliusi et al. 2002

GLRaV-3 Insect Vectors in California

Grape mealybug

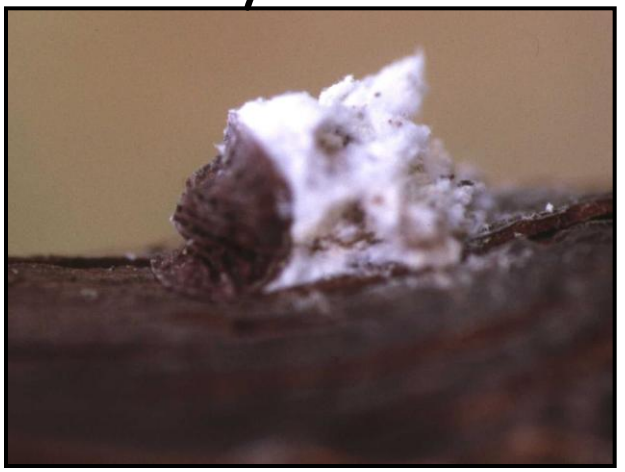
Obscure mealybug

Longtailed mealybug

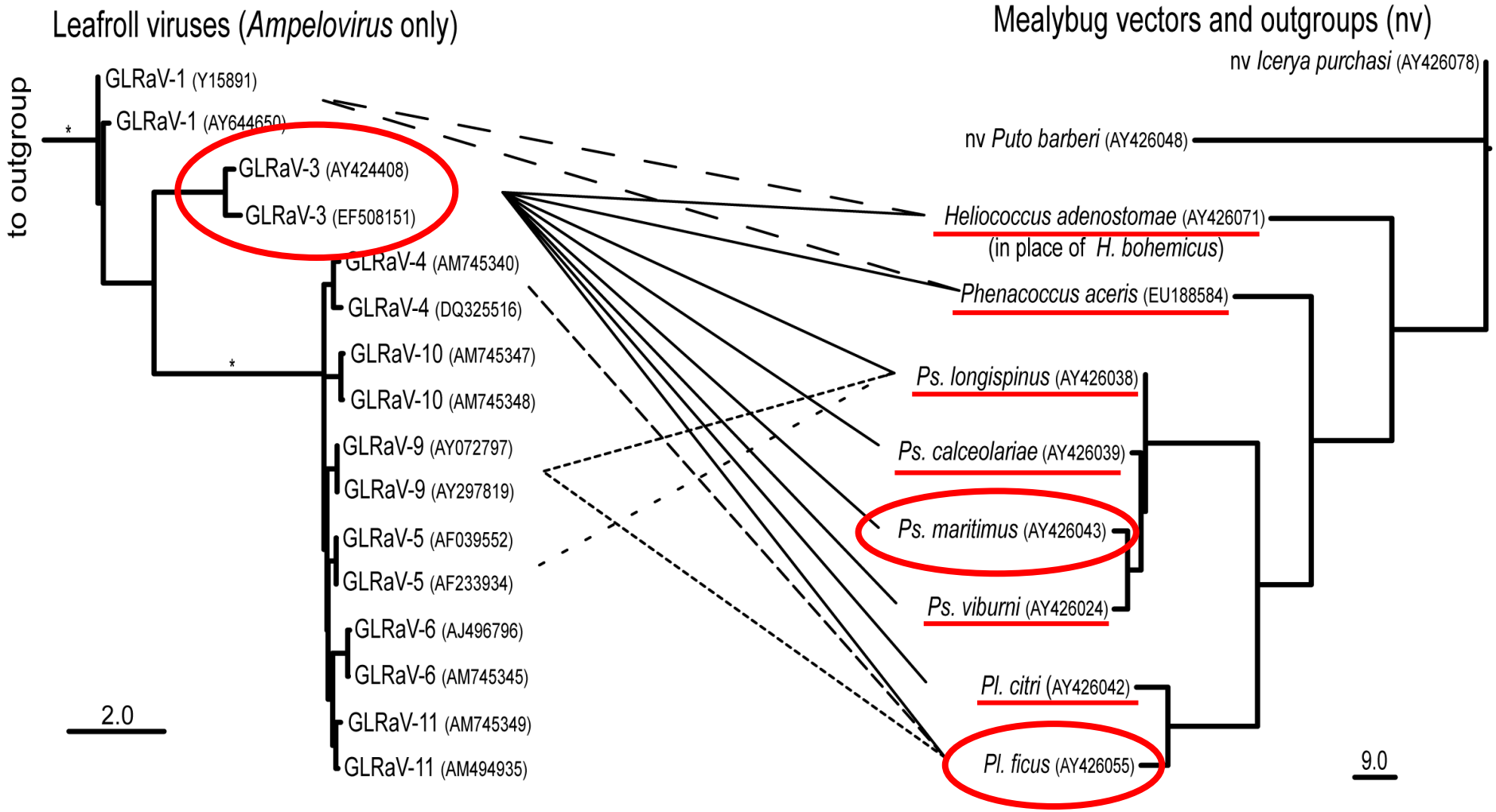
Vine mealybug

Citrus mealybug

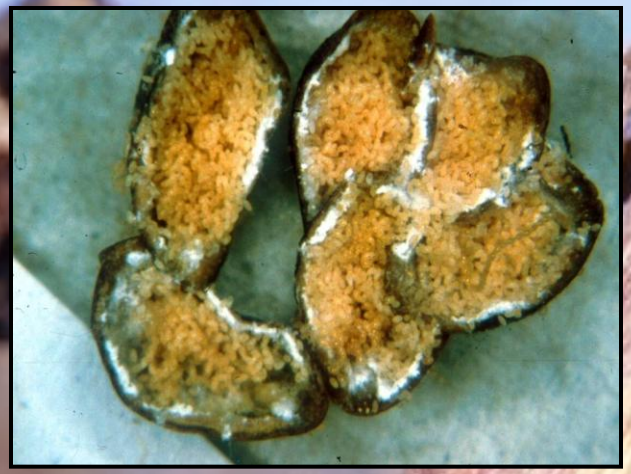
Cottony vine scale



No specificity is evident in leafroll virus transmission



Tsai et al. Phytopathology, submitted

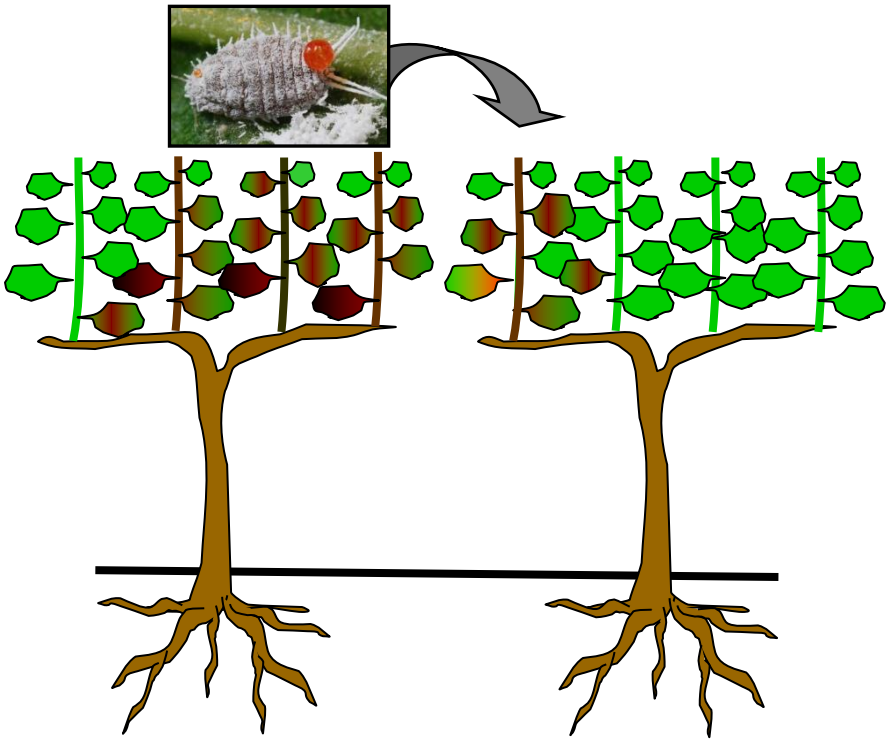


GLRaV-1 Vector in California
European fruit lecanium scale

The vector(s): Virus transmission

Acquisition: 1 hr (max efficiency at 24 h.)

Inoculation: 1 hr (max efficiency at 24 h.)

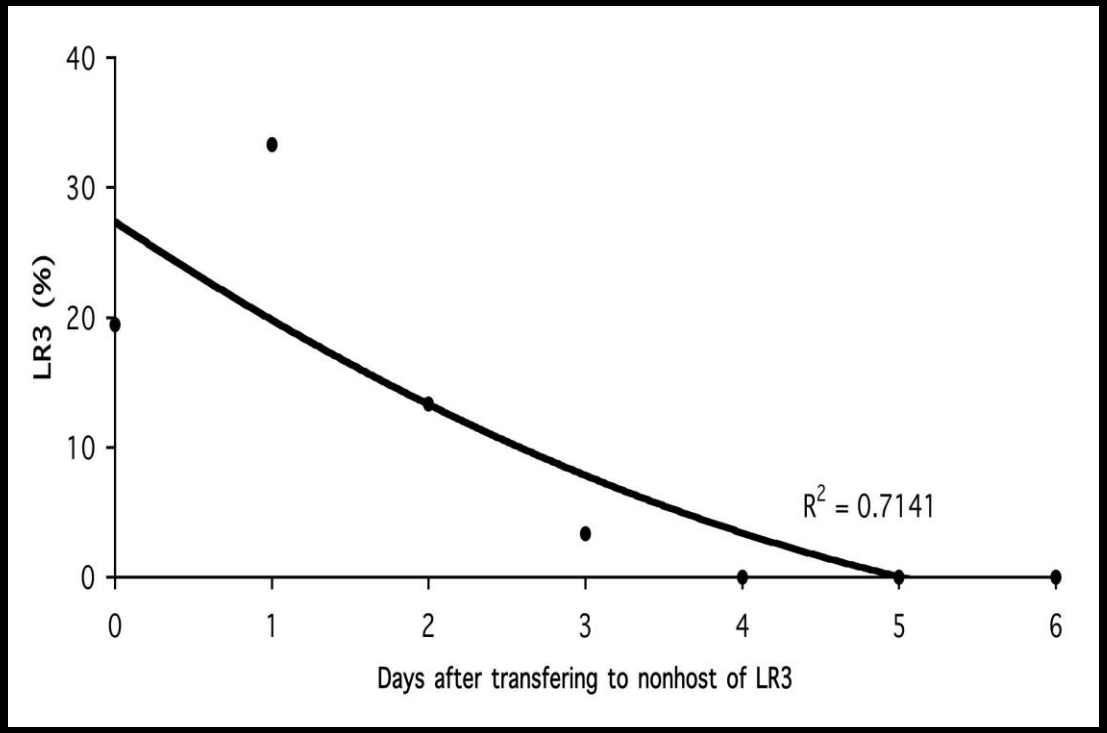


Tsai, Almeida et al. *Phytopath*. 2008

The vector(s): Virus Retention

Mealybug lost infectivity 4 d after acquisition

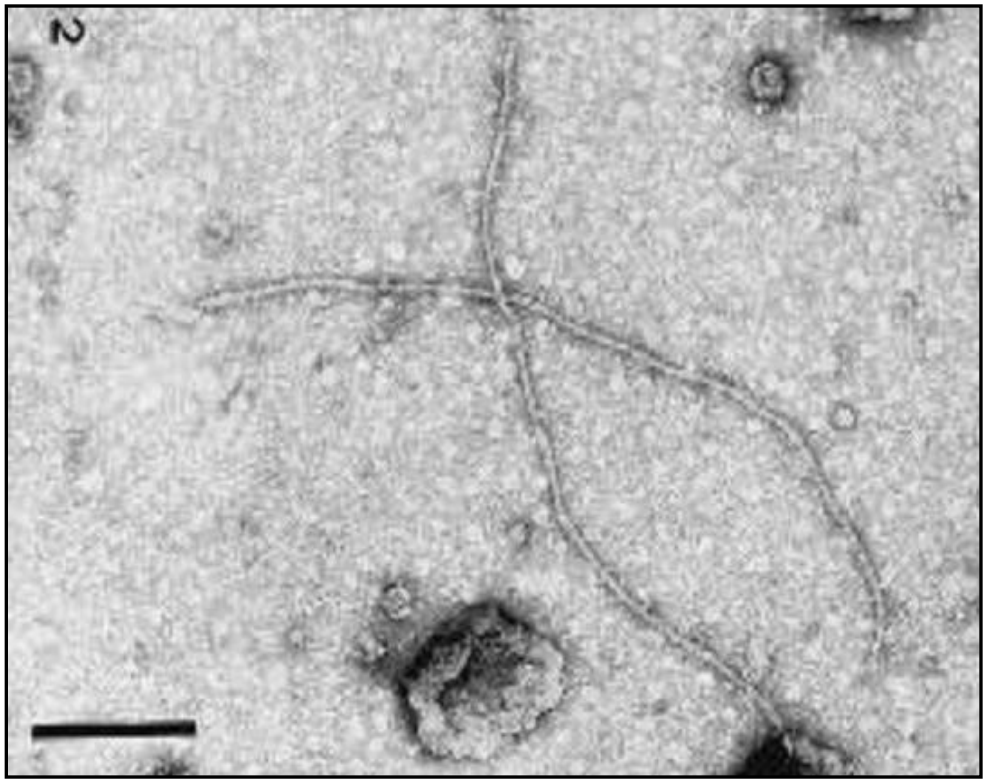
(when transferred to non-host of LR-3)



Tsai, Almeida et al. *Phytopath.* (accepted)
Sforza et al.

Mealybugs & Leafroll virus

Virus



Scagliusi et al. 2002

Host

Vector

UC Statewide IPM Project

Environment

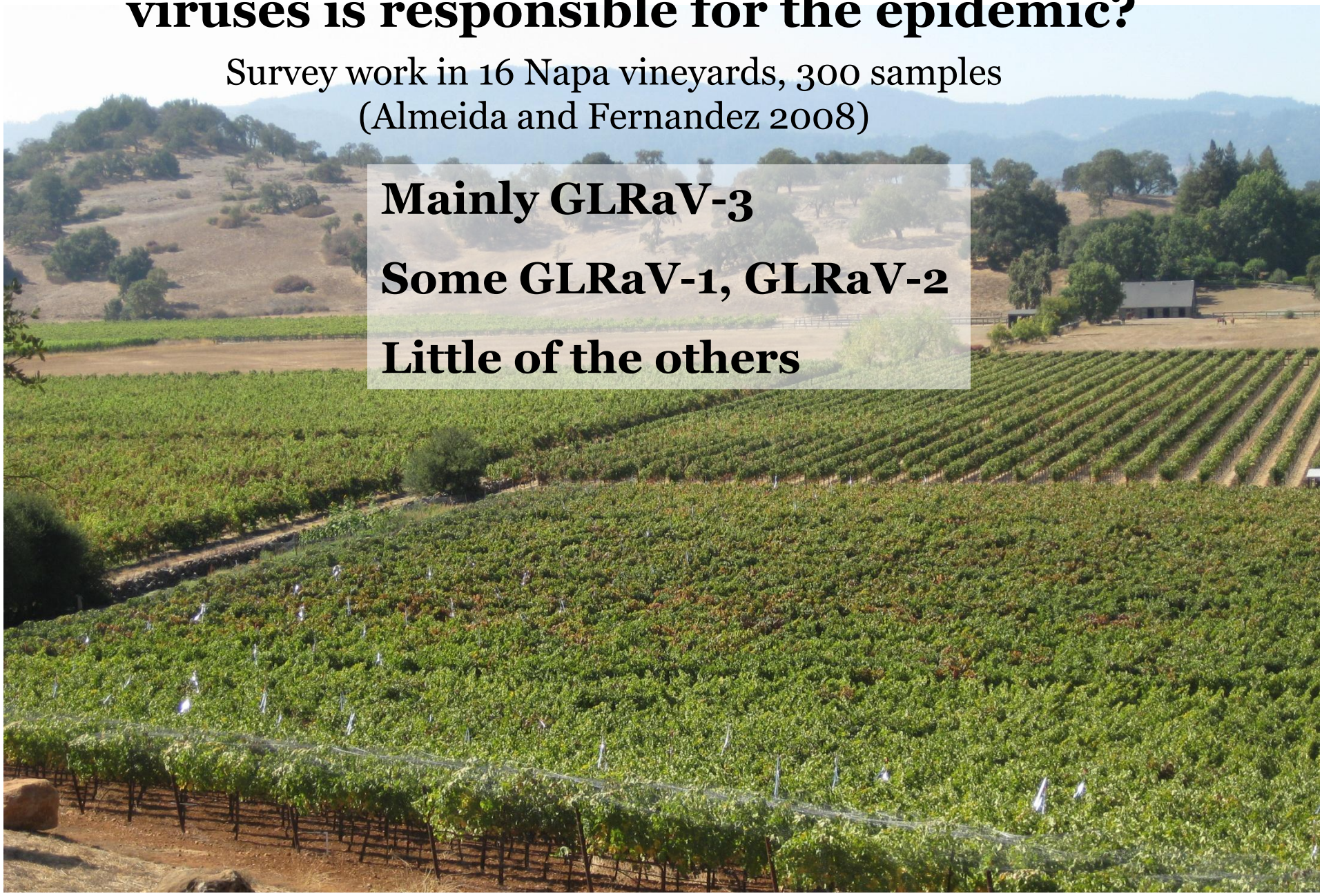
Worldwide, leafroll disease is most significant grapevine viral disease

10 serologically distinct viruses (GLRaV's) associated with leafroll disease

Spread documented by Golino and Weber (*Calif Agric*, 2008, v. 62(4))

The virus: Which of the leafroll associated viruses is responsible for the epidemic?

Survey work in 16 Napa vineyards, 300 samples
(Almeida and Fernandez 2008)



Mainly GLRaV-3

Some GLRaV-1, GLRaV-2

Little of the others

Mealybugs & Leafroll virus

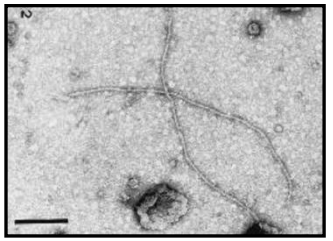
Host

Vector

Virus

Environment

UC Statewide IPM Project

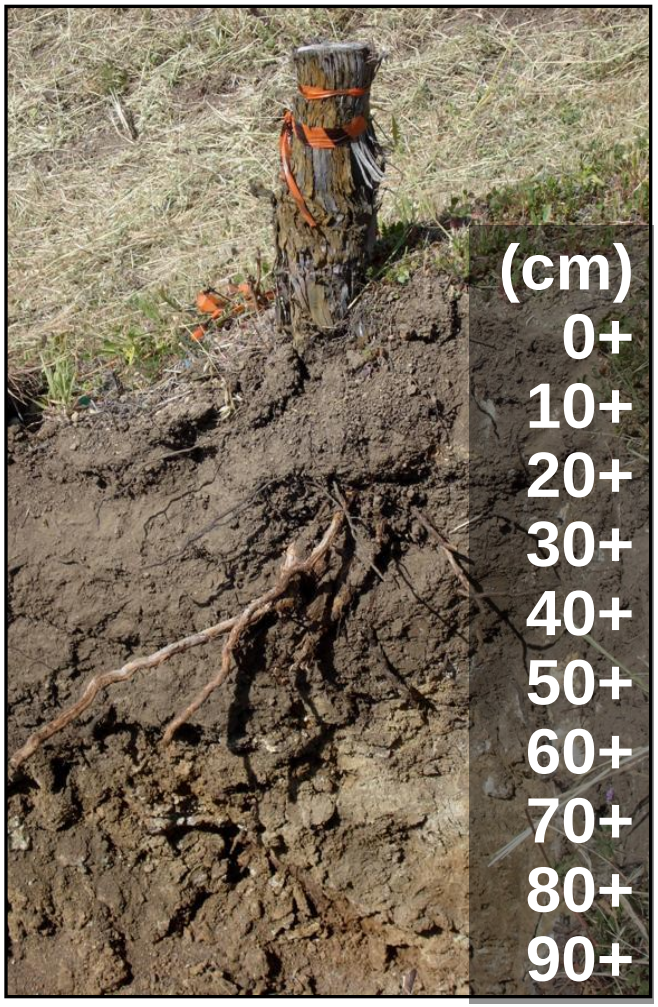


Scagliusi et al. 2002

The host: Re-development & virus reservoirs

Live roots harbor pathogens

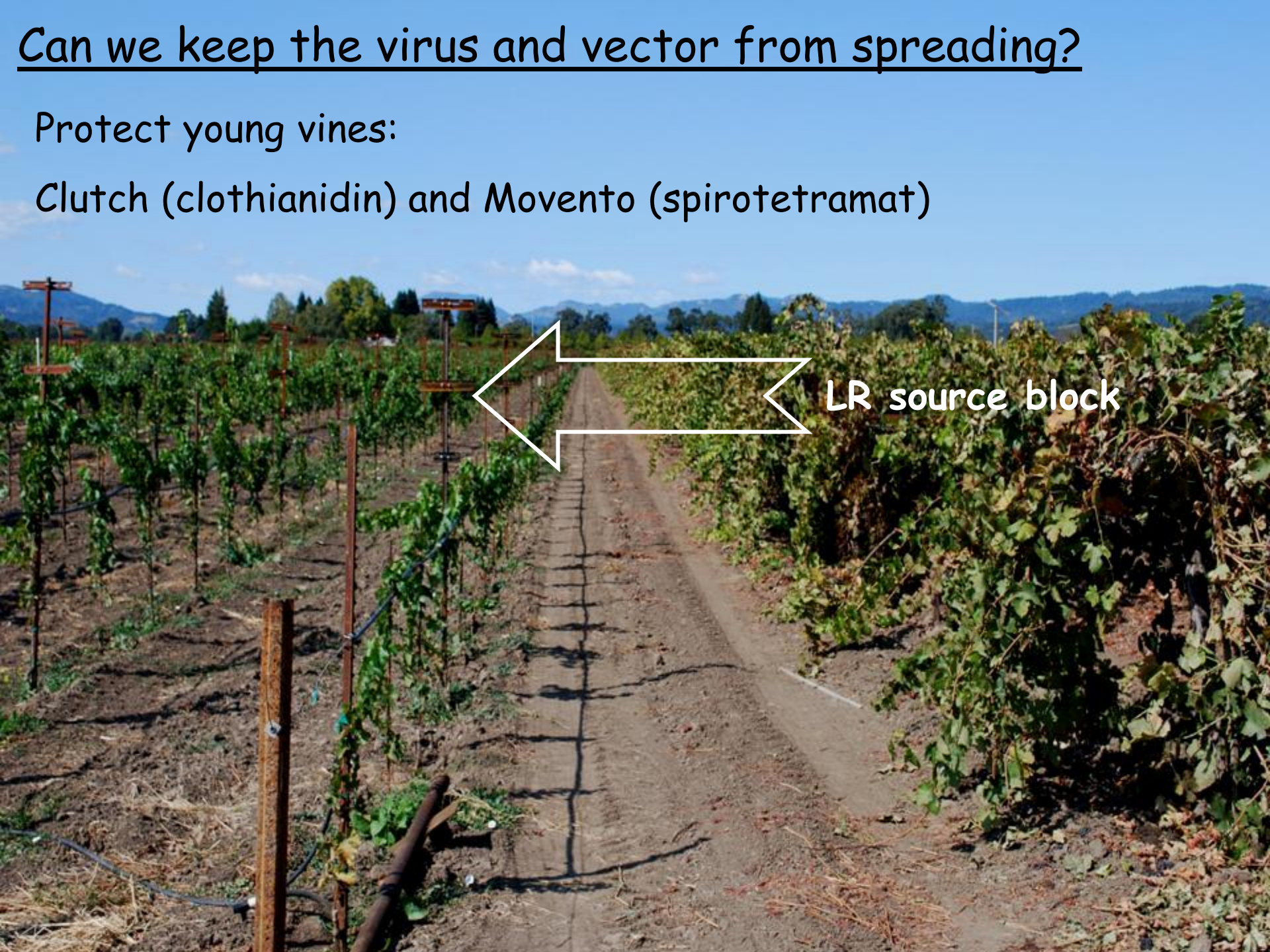
(30% of samples positive for LR)



Can we keep the virus and vector from spreading?

Protect young vines:

Clutch (clothianidin) and Movento (spirotetramat)



Movement of GLRaV from a point infestation

MB movement

An invasive mealybug pest and an emerging viral disease: a dangerous mix for West coast vineyards

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