

Welcome to Foothill Grape Day 2009!

Special thanks to:
Amador Grape Growers Association
Wine donations

Robin Cleveland- UCCE-EDC staff
Renee Heidecker- UCCE AC staff
Sean Kriletich- UCCE AC staff
Scott Oneto- Farm Advisor, UCCE Tuolumne County

InCahoots and Andrae's Bakery
Mid Valley Ag.

All of our speakers!



What's happening locally in El Dorado and Amador Counties

Lynn Wunderlich

Farm Advisor

University of California Cooperative Extension

El Dorado and Amador Counties

Foothill grape projects 2007-present

- Grape grower needs assessment survey *completed*
- Spider mite control (collaboration-Zalom) *completed*
- Vine mealybug trapping survey (collaboration-Amador Ag. Dept) *completed*
- Syrah decline disorder (collaboration-Rowhani, Smith)
- **Gill's mealybug biology and management (collaboration-Daane, Cooper)**
- **“Red leaf” and grape virus survey (collaboration-Golino, Sim)**
- Wild Turkey damage/distress call (collaboration-Delwiche, Salmon) *completed*
- Heritage Zinfandel field plot data collection (collaboration-growers, Hirschfelt)
- Canker disease chemical control trial (collaboration-Gubler)
- Foothill grape marketing (collaboration-grower group)

Mealybugs in the foothills



***Grape mealybug: Pseudococcus maritimus: common, pest every few years**



***Vine mealybug: Planococcus ficus: isolated, severe pest, demands treatment**

Gill's mealybug, *Ferrisia gilli*, a “new” mealybug pest in foothill vineyards



Gill's mealybug on pistachio

1990s: first noticed;
2003: 200 acres in Tulare;
2005: 3,000 acres across 8 counties;
2006: 11 counties

Gill's mealybug on grapes

2003: first record in EDC
backyard grapes;
2004: commercial vineyard
2007: at least 12 vineyards
(180 acres)
2009: at least 270 acres



2008-present: Gill's mealybug seasonal biology studies

Objectives:

1. Determine the seasonal phenology of Gill's mealybug in foothill vineyards.
2. Correlate the density of Gill's mealybug with the level of crop damage.
3. Categorize the species of natural enemies and their effect on Gill's mealybug densities.
4. Evaluate insecticide controls.

Seasonal phenology studies

- **Learn where the mealybugs are on the vine, at what time of the year, and in what stage.**
 - Crawler stage is most susceptible to insecticides
 - Canopy the easiest to target with sprays



- Five vineyards-vertical cordon and bilateral cordon trained (all spur pruned). Various varieties. Elevations 1800-3400 ft.
- 3 minute timed searches on each of 7 vine sections on 10 untreated vines/vineyard – “nondestructive”
- 3 minute timed searches on 20 vines (all vine) in treated areas- “destructive”
- Cluster rating at harvest

Nondestructive sampling for Gill's mealybug



Trunk base



Trunk



Armpit/under cordon



Old Spur



New Spur

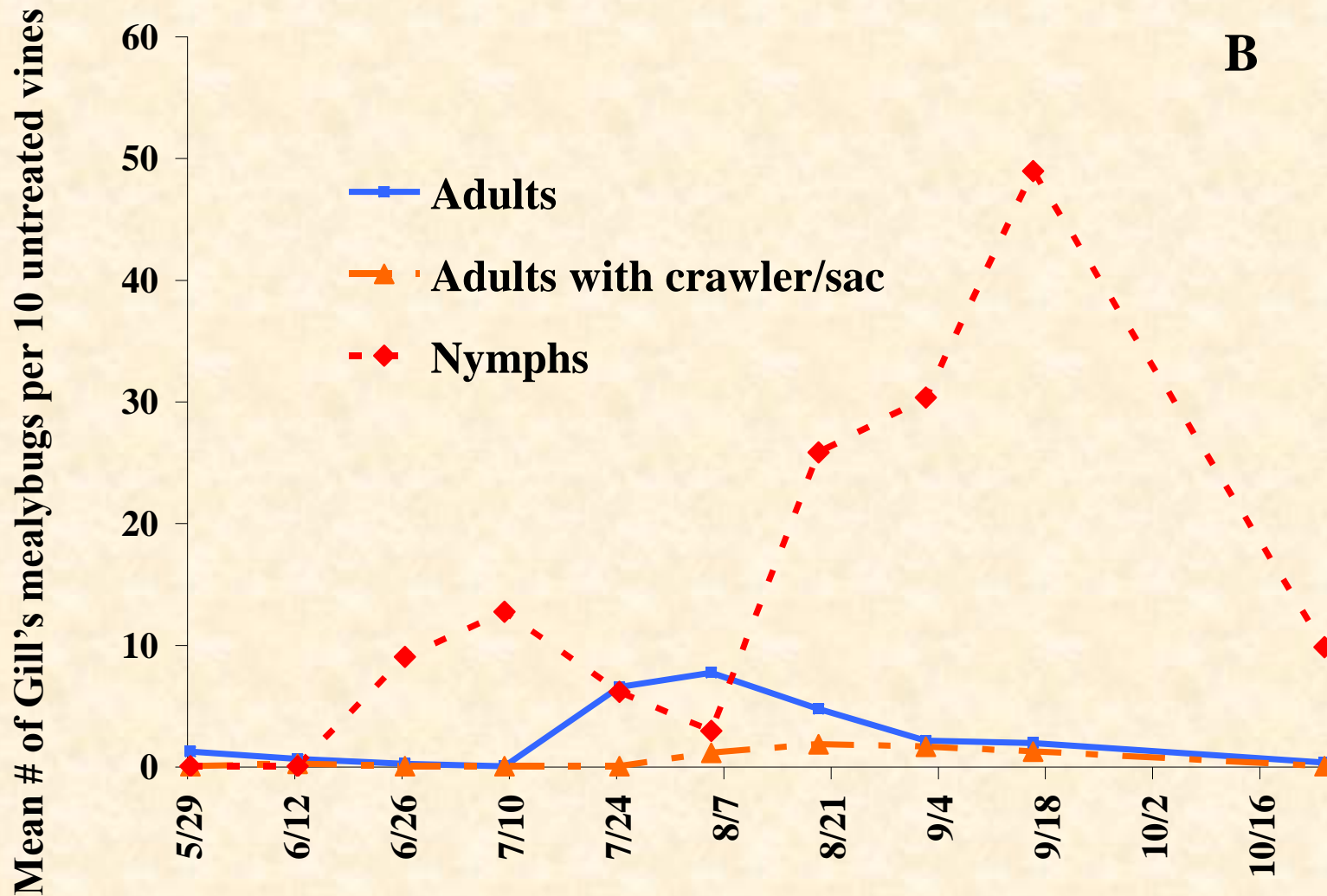


Leaves

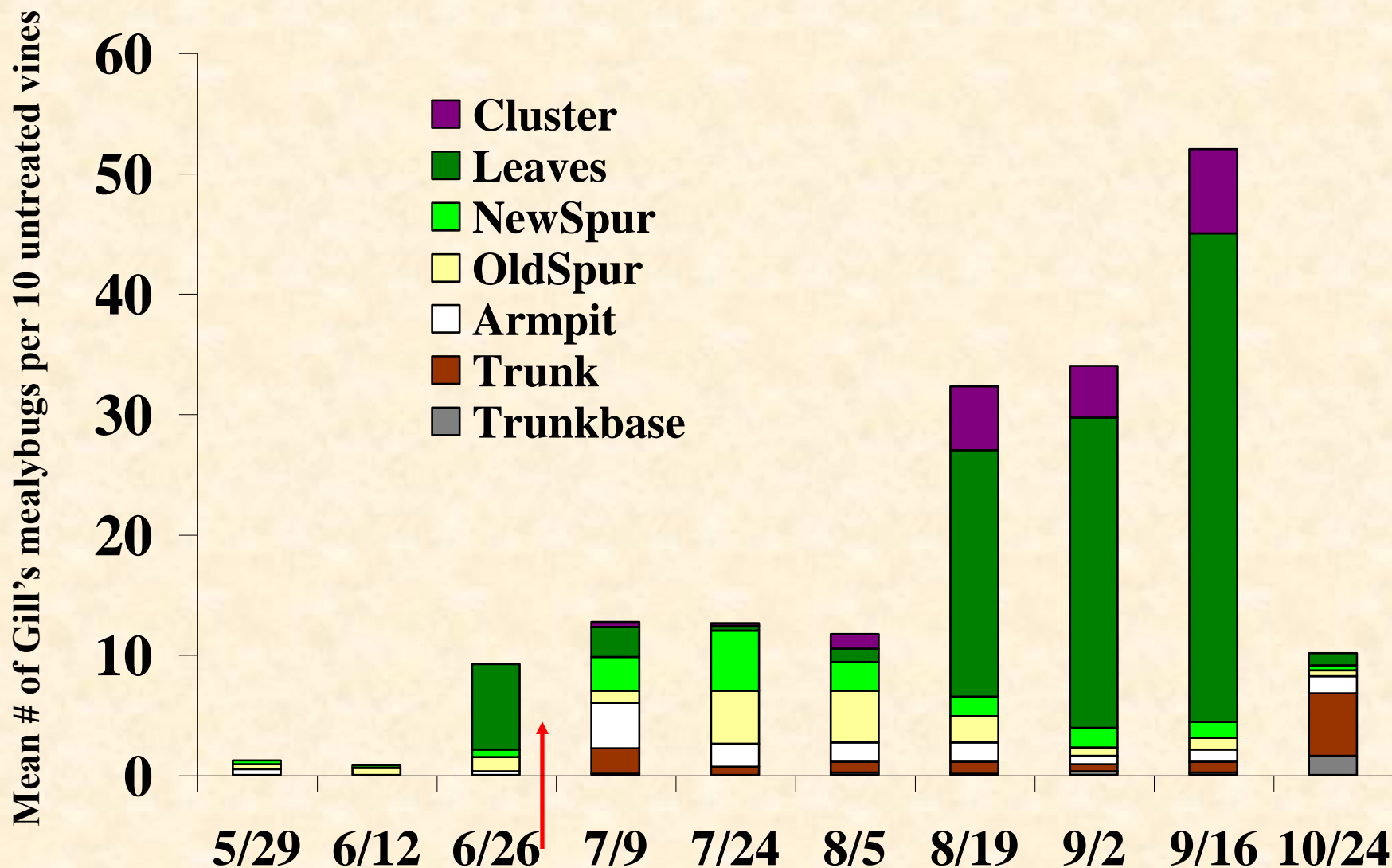


Clusters

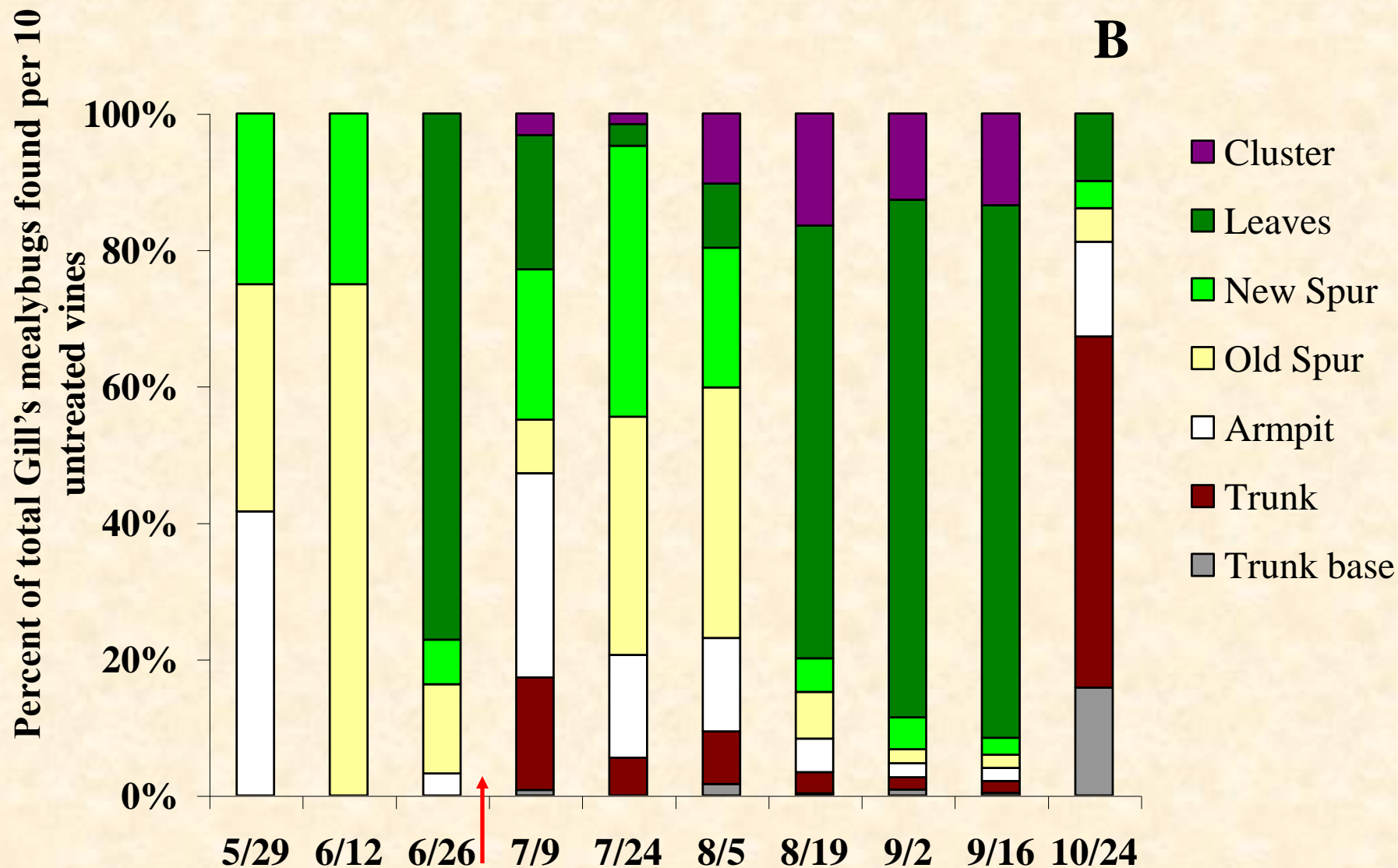
Mean number of Gill's mealybug in each life stage on 10 untreated vines by date: Vineyard B, 2008, 18-21 min. count.



Mean number of Gill's mealybugs on untreated vines by vine section and date (n=10). Vineyard B, 2008.



Percent of total Gill's mealybug found on 10 untreated vines by vine section and date. Vineyard B, 2008.



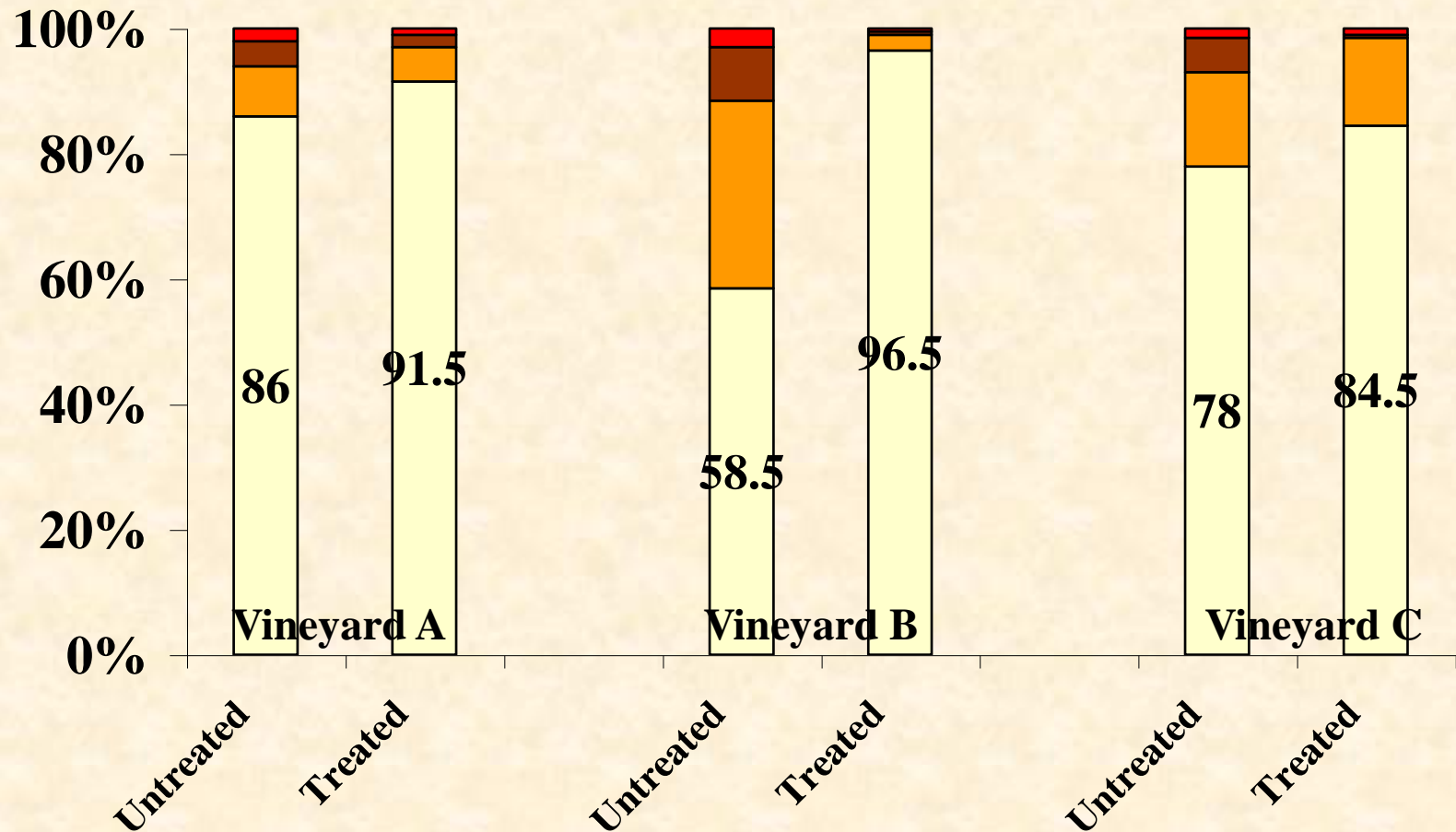
Mealybug treatments

- Applaud (buprofezin) an IGR that prevents molting.
- Assail (acetamiprid)-a chloronicotinyl will kill nymphs, adults. Hard on natural enemies?
- Provado (foliar) or Admire (thru drip) (imidacloprid)-a chloronicotinyl
- Lorsban (dormant only, on the way out). Water quality issues, hard on natural enemies.
- New materials : “Movento” foliar applied systemic (\$\$?)

COVERAGE AND TIMING CRITICAL

Percent of clusters in untreated and treated plots with cluster damage ratings 0-3 (n=200), 2008. Vineyards A, B, C.

- "3": Unmarketable
- "2": Greater than 10 mealybugs
- "1": Honeydew and/or less than 10 mealybugs
- "0": Zero mealybugs found



Mealybug natural enemies



Mealybug Management

- **Monitoring is Critical!!**

- ☐ Training crews to look for signs: honeydew, ants, white “fluff”
 - Talk to your PCA
 - The more “eyes” for early detection, the better
- ☐ Inspect clusters in bins at harvest (at least 100)
- ☐ Call me if you have questions, need help.

How do mealybugs spread?

- Crews
- Equipment
- Wind
- Birds
- Stems, pomace after crush-need to properly compost (Cal Ag. pg. 172)
- Alternate hosts (landscape plants??)

In 2009...

- Hope to repeat phenology studies.
- Add insecticide trials with aim to conserve parasitoids.
- Survey and assist growers with “new finds” in order to prevent the spread, minimize damage.

What causes “Red Leaf”?



Local investigation with growers

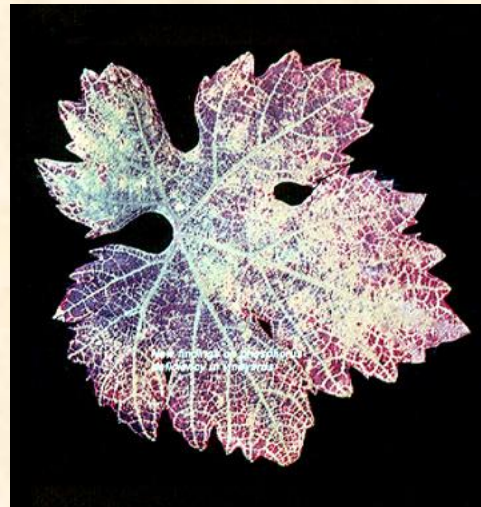
- 12 blocks: various symptoms; scion/rootstock combinations; fertilizer practices.
- Complaints: won't ripen, can't get sugar levels up, "chocolate to burnt" leaf color symptoms; turns red after veraison.
- Petioles sampled 6/11/08 (full bloom-post)
- Sent to A&L labs for analysis



Nutrient deficiencies



Potassium deficiency



Phosphorous deficiency

Interpretive Guide for Grape Tissue Analysis at Bloom (Christensen)

<http://groups.ucanr.org/iv/>

Nutrient	Deficient (below)	Adequate (above)	Sample value range
P (total),%	0.10	0.15	0.18 - 0.77
K (total), %	1.0	1.5	1.79 - 3.87

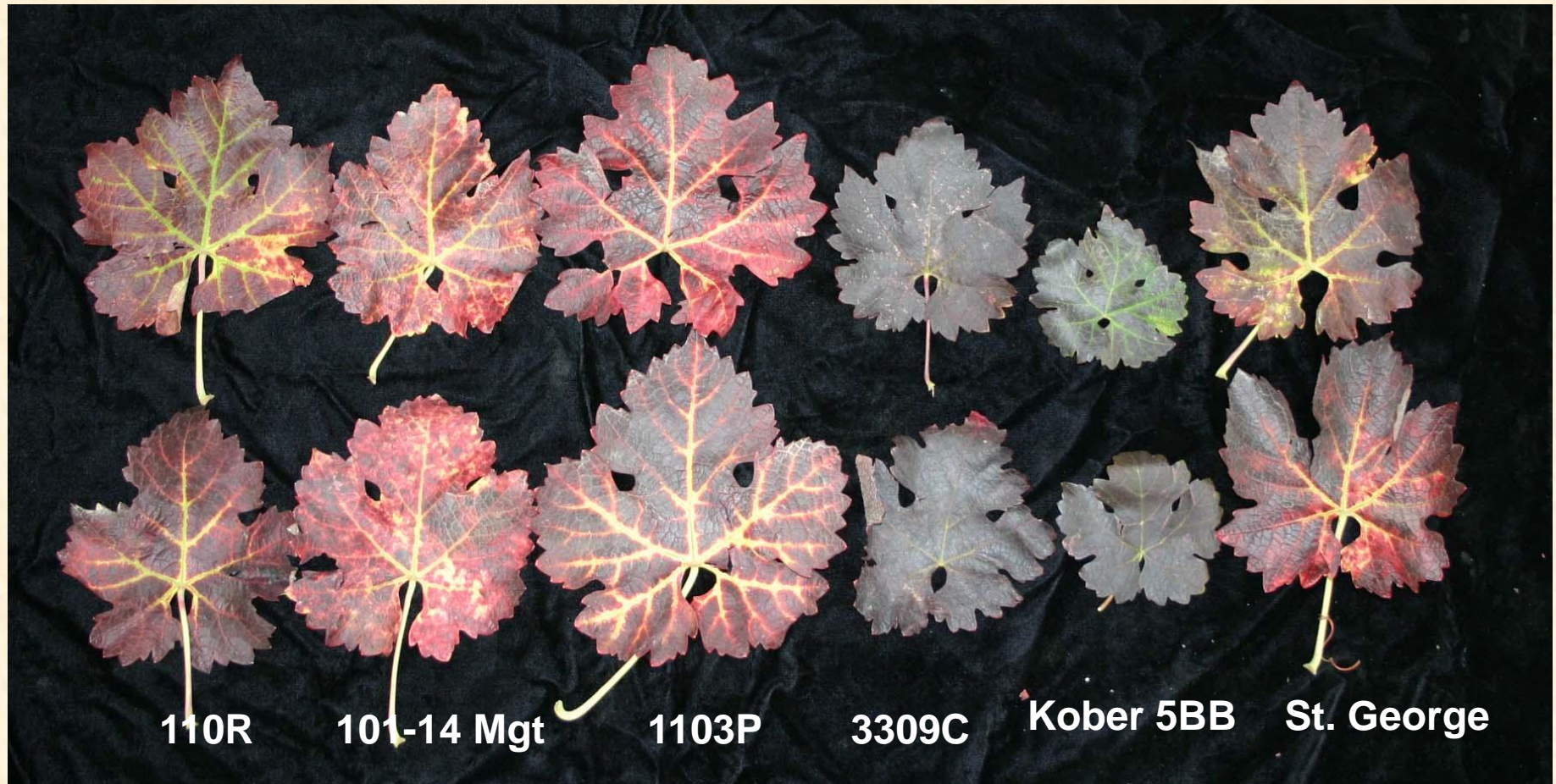
Leafroll and other viruses can cause “red leaf” symptoms

What symptoms you see depends on:

- Rootstock, scion and the interaction
- Stress of the vine (drought conditions, other pest issues, etc.)
 - “worse some years than others”
- Nutritional status.
- Viruses are unevenly distributed
 - In the vine
 - In the vineyard
- Some viruses can be present but asymptomatic
- Leafroll: 10 strains identified, vary in virulence and transmissibility.
- Not much known about a lot of other viruses.



Cabernet Sauvignon 05 infected with LR 102 (GLRV-1, -2, -5, GVB)



Virus panel PCR conducted on 20 samples.

- Collected from several vineyards, blocks; rootstock and scion combinations.
- Individual vines sampled noted and flagged.
- Canes (6 pencil sized/plant) and petioles sampled 9/24/08.
- Golino lab collaboration.

Goal: to identify which viruses are present in the region.



Sue Sim, Staff Research Associate
with Golino lab at FPS

RT-PCR (reverse transcriptase polymerase chain reaction) greatly increases virus detection

- Amplifies the RNA so that small quantities can be detected.
- Fluorescent dye used to detect virus RNA.

Samples tested (and retested) for 13 viruses:

Leafroll strains: (GLRaV)- 1, 2, 3, 4, 5, 7, 9;
GLRaV2-RG;

Vitiviruses: GVA, GVB, GVD


Fleck: GFkV

Rupestris Stem Pitting: RSPaV

Virus testing results

- Several samples + for GLRaV-2, graft transmissible. (not mealybug vectored)
- A few samples + for GLRaV-3, which is graft and mealybug transmitted.
- One sample + for GLRaV2-RG; odd?.
- Several samples + for GVB.
- A couple samples + for GVD, gives red leaf symptoms.
- Several samples + for GFkV. (mealybug transmitted?? Symptoms in *V. rupestris*; otherwise not economically important...we think)
- Several samples + for RSPaV (common; not economically important?)
- Almost all samples that were positive for one virus *also were positive for at least one* other virus.

What does this all mean?

- Viruses in grapevines are *really common* .
- Our knowledge is relatively “young”-only researched for 20-30 years and detection is improving.
- We do not know much about other vectors (i.e. Phylloxera?)
- Use CERTIFIED WOOD if you can.
- Do not top work graft onto rootstock that had a scion that showed virus symptoms. Rootstock  Scion
- If field selected, visit the field the fall before and flag vines without symptoms to take budwood from.
- Remember you still may see symptoms if you use a different rootstock, or if your cultural conditions are different.

Want more info?

Leafroll Virus Symposium 2

Tuesday June 2

Freeborn Hall, UC Davis

UC Davis Extension

<http://extension.ucdavis.edu/contact/>

Thanks to:

- American Vineyard Foundation
- Grower cooperators
- Field assistants: Kelly Brehm, Laurel Schwarzbach
- Sue Sim, Golino lab
- UC Collaborators: Monica Cooper and Kent Daane