Welcome to Foothill Grape Day 2013:

"*Quality* Collaborations"

UC CE | University of California
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Thanks to:

Robin Cleveland, UC Cooperative Extension

Nancy Starr, UC Cooperative Extension

Bill and Carrie Manson, Cielo Estate for their generous hospitality

Sierra Rizin Bakery

Sheila Bush for her gluten-free bread

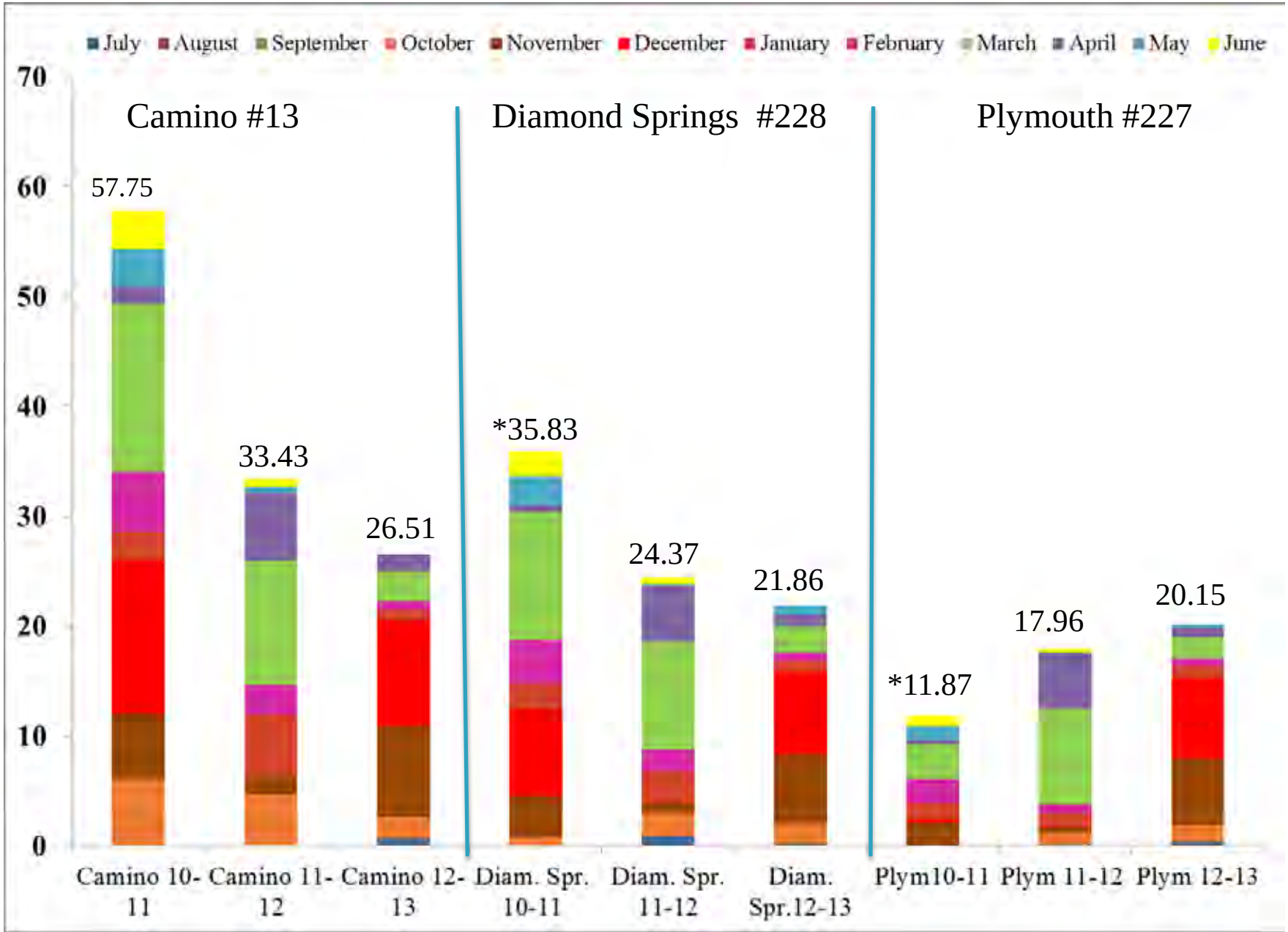
Mid-Valley Ag for our wine glasses

Our UC, USDA speakers:
Dr. Andy Walker and Dr. Sudhi Sudarshana

The grower/winemaker panelists:
Stephen Colum, Scott Klann, Carol Laubach, Kris Mapes, Bill Naylor and Jonathan Lachs.

All of the wineries who donated wine and everyone who volunteered to help pour so we could taste, share, and enjoy.

Precipitation (inches) from Foothill CIMIS Stations for Past 3 Years



Foothill Research Update: Tools You Can Use to Improve Quality.

Lynn R. Wunderlich,
UC Cooperative Extension Farm Advisor, Central Sierra

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Foothill Research projects 2012-2013

1. Early leaf pulling for Botrytis management

Collaborators: Rhonda Smith, UCCE Sonoma; Holly's Hill Vineyard, Goldbud Farms, Cedarville Vineyard and Naylor Vineyards. ***Quality goal: Botrytis bunch rot control, improved juice parameters (?)***

2. Powdery Mildew Index Stations

Lead/Collaborators: Doug Gubler and Brianna McGuire, UCDavis Plant Pathology, *USDA Specialty Crop grant, *Various donors (Gubler), Joyce Strand, Marty Martino, UCIPM; American Screaming Eagle, Renwood Winery, Lauzere Vineyard Services, Oleta Vineyards, Amador Winegrowers. ***Quality goal: Improved p.m. control, cost savings? (reduced number of sprays), logistics***

3. ET Slope Measurements for Irrigation Management

Lead/Collaborators: Rick Snyder, UCDavis Biometeorology, Tom Shapland, UCD, Ali Montazar, Silvio Lima; Cayle Little, CDWR, Walker Vineyard. **Pressure Bomb Measurements for Irrigation Measurement** Collaborators: Ken Shackel, UCD Irrigation Specialist, Growers. ***Quality goal: Improved irrigation management, efficiency.***

4. Soil Survey Decision Support Tools/Understanding Foothill Soils

Lead: Toby O'Geen, UCDavis LAWR, Growers, *UCANR Core Grant funding.
Quality goal: Improved nutrition and water management, decision making for new plantings, marketing tool (?)

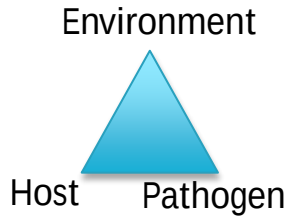
Early leaf pulling for Botrytis Management

Berries become infected, especially in wet springs. These infections *remain latent* until berry ripens

Slide courtesy of R. Smith, UCCE Sonoma

Slide courtesy of R. Smith, UCCE Sonoma

Why pull leaves *early*?



- Reduce fruit set, thus producing looser cluster
- Alter canopy microclimate for reduced rot
- Increase fungicide spray coverage
- Alternative to Gibb. applications (less risky?)
- Growing body of scientific lit. with promising results, and also showing increase in positive juice attributes.

Extension Plant Pathologist Doug Gubler demonstrates the leaf-thinning technique he helped to develop. Thinning reduces the incidence of leafhoppers and various rots.

IPM Leaf removal for pest management in wine grapes

James J. Stapleton ◻ *William W. Barnett* ◻ *James J. Marois*
W. Douglas Gubler

Leaf removal can effectively manage Botrytis bunch rot and the "summer bunch rot complex" of wine grapes in the San Joaquin Valley and coastal growing areas. The practice may help manage such insect pests as leafhoppers. Producers have adopted leaf removal as a routine cultural practice, especially where high-value, premium varietals are grown.

Grapevine canopy management by leaf removal has been shown to be of significant value for integrated pest management (IPM) of Botrytis bunch rot of grape in coastal growing areas (*California Agriculture*, March-April 1989). Adoption by viticulturists in coastal valleys has been rapid and successful, and has been aided by research data showing trends toward improved grape must and wine quality parameters after the leaf-removal treatment. Improvement of wine quality is of highest importance to producers of premium varietals.

Although most of California's premium varietal wine grape production is concentrated in the coastal areas, the majority of wine grape acreage is located inland, in the San Joaquin Valley. This latter production area is characterized by relatively hot and dry climatic conditions during much of the growing season. A complex of diseases including sour bunch rot, Aspergillus bunch rot, Botrytis bunch rot, and powdery mildew, and arthropod pests such as omnivorous leafroller are responsible for causing bunch rots, resulting in yield and quality losses in Valley growing areas.

Before promoting leaf removal as a standard IPM practice, we needed to test its effects on incidence and severity of bunch rots under the different climatic conditions. Objectives of this research also included determining the effects of leaf removal on a broad range of grape pests, since control of problems other than bunch rots can increase the value of leaf removal over its cost of application.

Results of this study showed that leaf removal can significantly reduce incidence and severity of bunch rots in the San Joaquin Valley, as has been shown previously and confirmed here for coastal areas. Leaf removal also can reduce populations of leafhoppers. We found no consistent effects on grape yield and quality parameters during these studies.

Our study in 2012 (repeated this year)

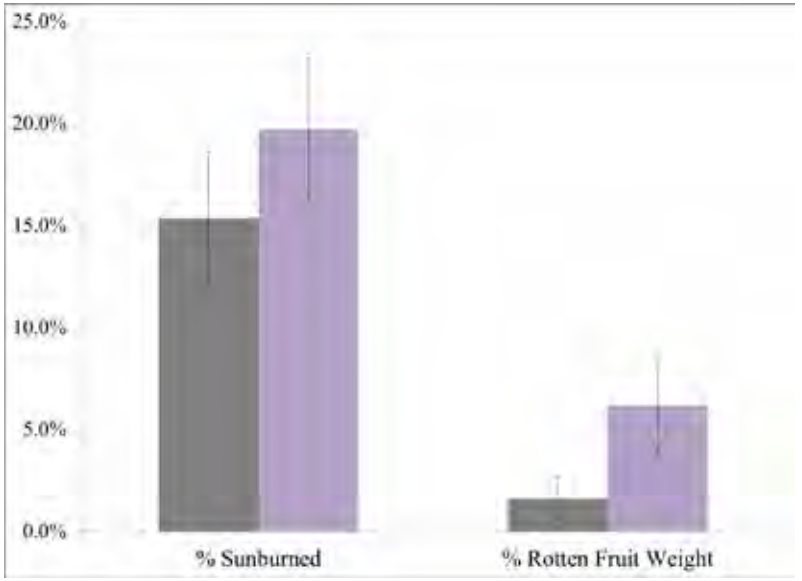
- Petite sirah with heavy Botrytis in 2011
- Split block design with 2 treatments, 4 replicates
  - Leaf Pull Timing
    - **Early** leaf pull (first sign of bloom-June 3, 2012; May 15, 2013)
    - **Normal** leaf pull (July 2, 2012)
  - Botrytis Spray Program
    - **No** botrytis sprays
    - **Botrytis** sprays (timed for bloom-6/11/12 and pre-bunch closure-7/1/12): Vanguard 10 oz/ac
- Measured:
  - #berries/cm. rachis (“looseness”)
  - Percent rotten fruit weight
  - Cluster weight
  - Berry weight
  - Percent sunburn
  - Brix

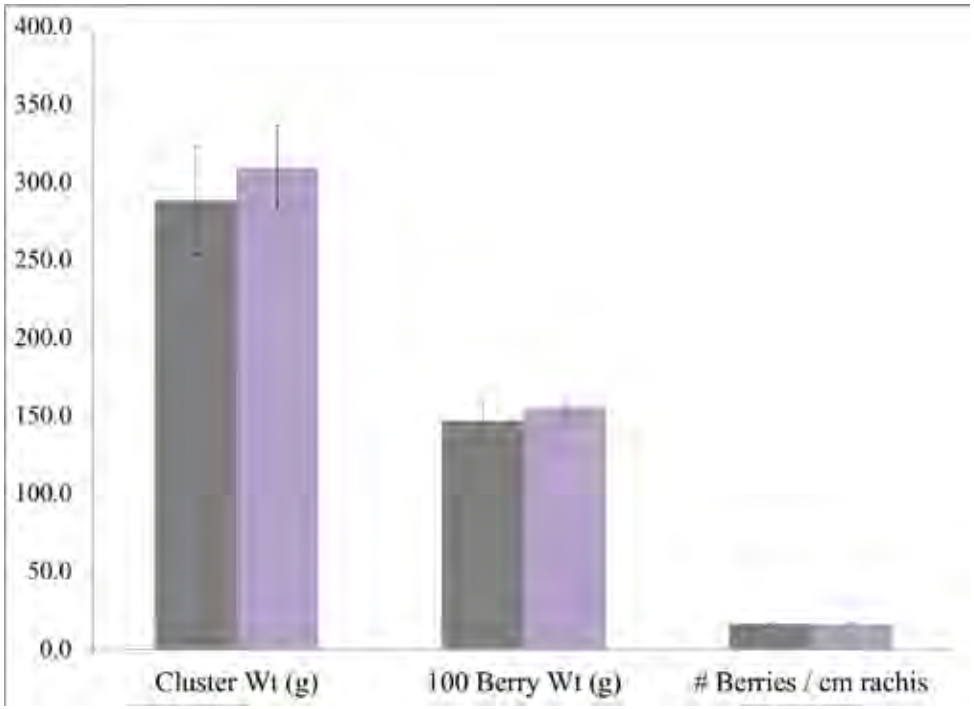
9/11/2012

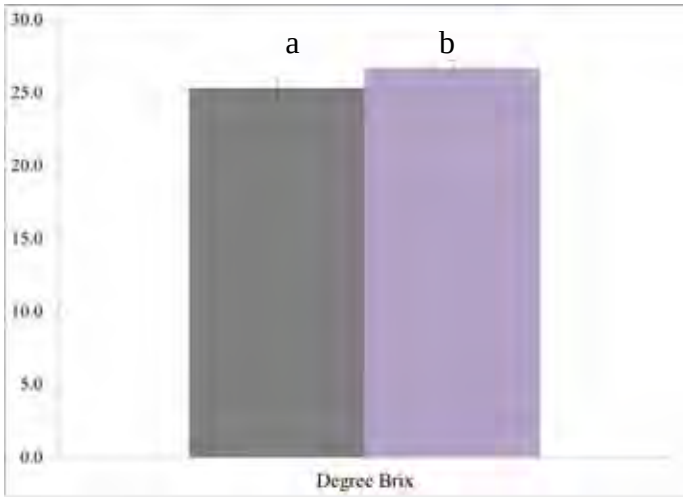
Pre-harvest 10/1/2012

Effect of Botrytis sprays compared to no Botrytis sprays in 2012

No Botrytis Spray 2X Vanguard Botrytis Spray

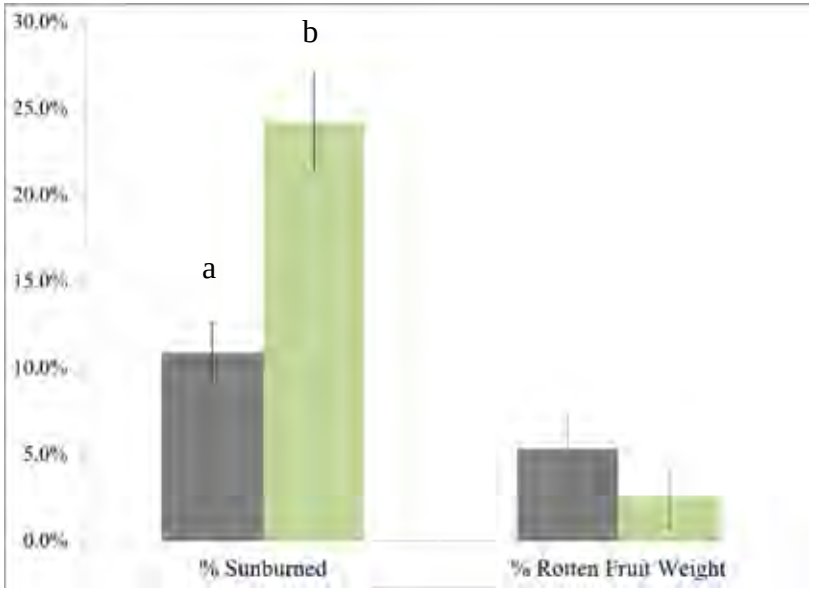


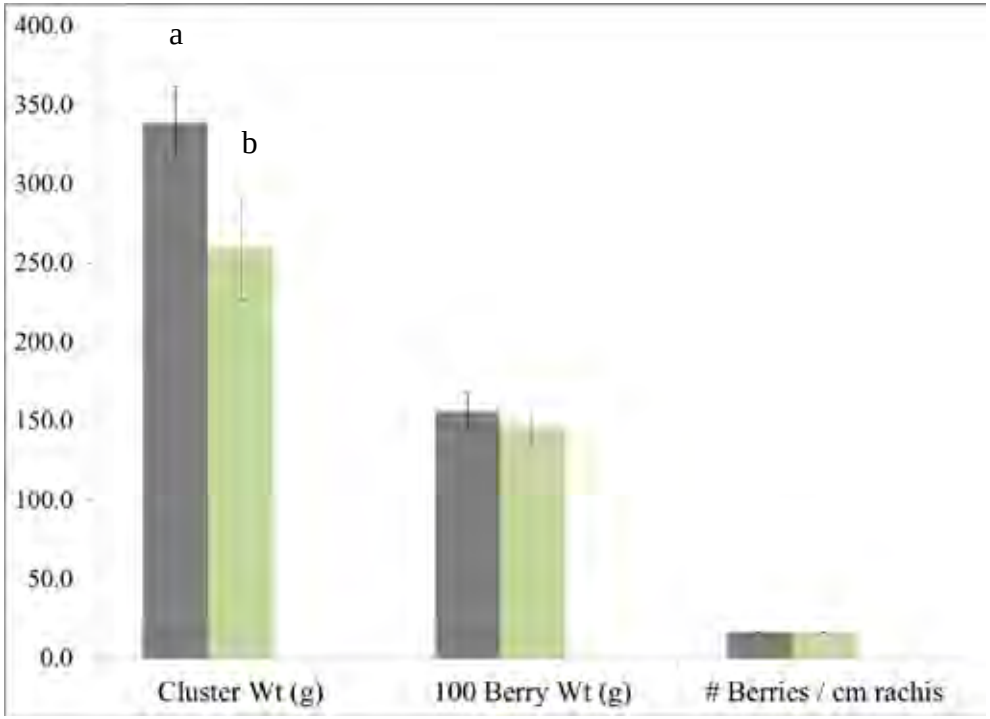


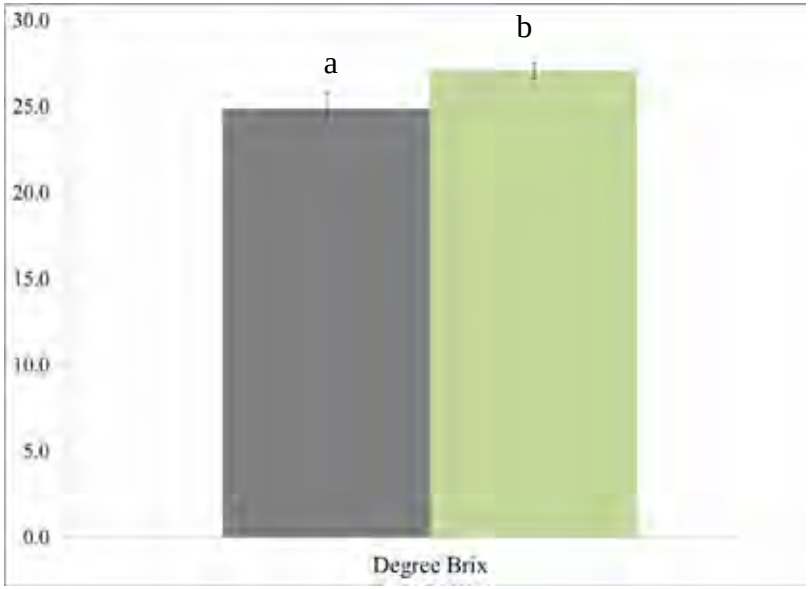


Effect of early leaf pulling compared to normal leaf pull timing in 2012

Normal Leaf Removal Timing Early Leaf Removal







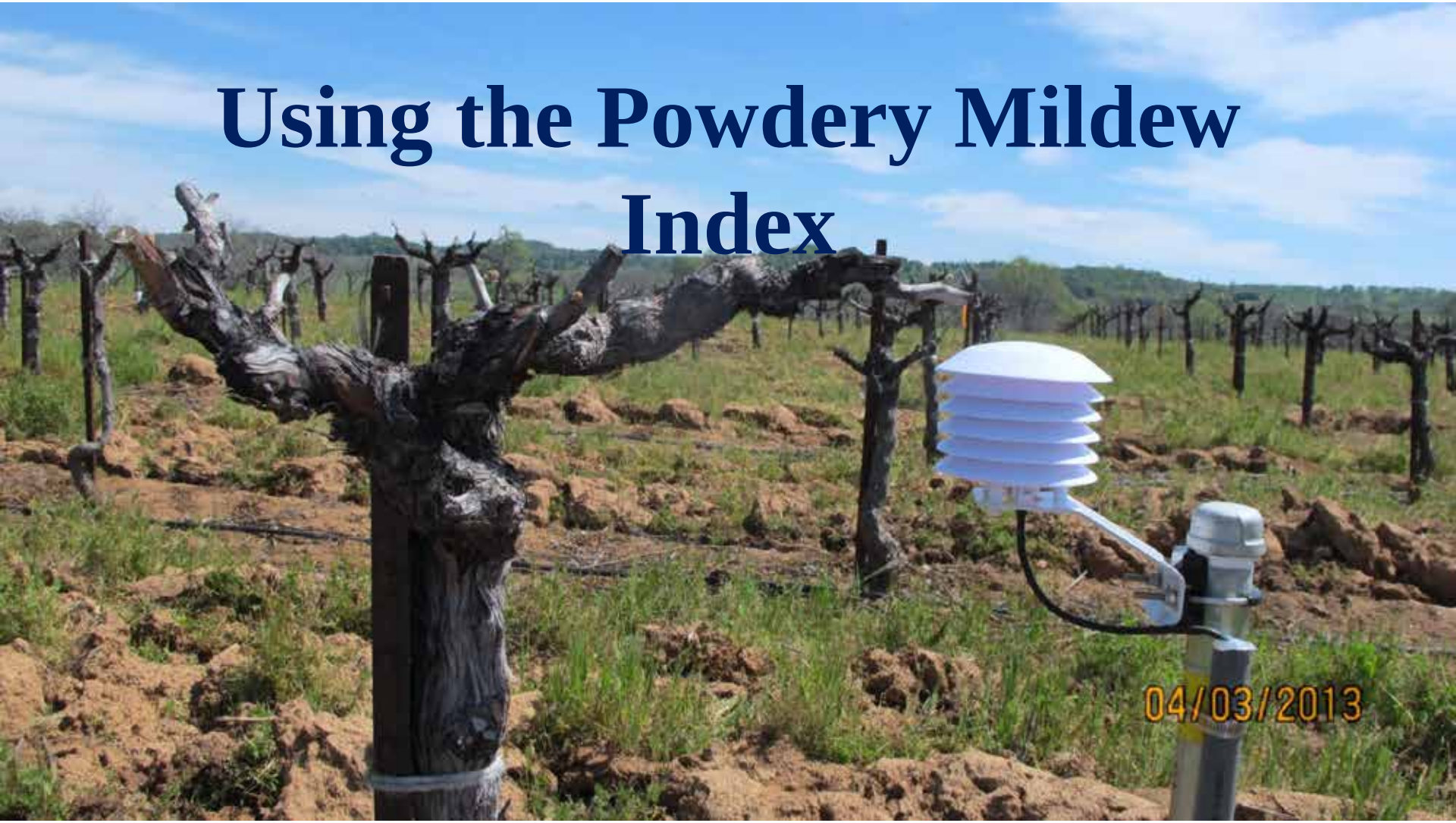
Early leaf pull 2012 summary

- Not much Botrytis in 2012
- Probably went too late with early leaf pull treatment
- No interaction effects (spray x leaf pull)

Main effects:

- **No difference in botrytis** in sprayed vs. unsprayed as measured by % rotten fruit weight for either spray or leaf pull
- **No difference in cluster looseness** in early leaf pull vs. normal as measured by #berries/cm rachis for either spray or leaf pull
- Degree Brix higher for early leaf pull and for Botrytis spray treatment as measured by 100 berry sample
- Percent sunburned berries higher for leaf pull treatment, cluster weight lower for leaf pull treatment.
- Repeat in 2013 (bigger Botrytis year?)

Using the Powdery Mildew Index



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UC Davis Plant Pathology

RENWOOD WINERY

AMADOR WINEGROWERS


08/01/2012

How the index works

Powdery mildew is a fungus: growth is temperature dependent.
Optimal powdery mildew growth is between 70-85 ° F *(canopy temperatures can be different than ambient).* Too cold or too hot and growth is slowed.

Powdery mildew index (PMI or **RAI**, Risk Assessment Index) is calculated based on temperatures. Scale 0-100 recorded daily.

To initiate the index. At bud break: Spore trap, use a leaf wetness sensor OR assume spores are present after sufficient moisture (rain and leaf wetness).

Starting with the index at 0 on the first day, add 20 points for each day with 6 or more continuous hours of temperatures between 70 and 85F. Until the index reaches 60, if a day has fewer than 6 continuous hours of temperatures between 70 and 85F, reset the index to 0 and continue.

Index number tells you:
1. How quickly powdery mildew is reproducing (ASSUMING it is present).
2. When to spray
3. What to spray
4. How long your chosen fungicide will last (spray interval)

SPRAY INTERVALS BASED ON DISEASE RISK USING THE POWDERY MILDEW INDEX

Index	Risk	Pathogen status	Suggested spray schedule			
			Biologicals[1] and SARs[2]	**Sulfur**	**Sterol-inhibitors[3]**	**Strobilurins[4]**
0-30	low	present	7- to 14-day interval	14- to 21-day interval	21-day interval or label interval	21-day interval or label interval
30-50	intermediate	reproduces every 15 days	7-day interval	10- to 17-day interval	21-day interval	21-day interval
60 or above	high	reproduces every 5 days	use not recommended	7-day interval	10- to 14-day interval	14-day interval

1 *Bacillus pumilis* (Sonata) and *Bacillus subtilis* (Serenade)

2 SAR = Systemic acquired resistance products (AuxiGro, Messenger)

3 tebuconazole (Elite), triflumizole (Procure), myclobutanil (Rally), fenarimol (Rubigan), and triadimefon (Bayleton)

4 methyl (Sovran), and pyraclostrobin/boscalid (Pristine)

We have 2 powdery mildew stations in Shenandoah Valley, data online at UCIPM

Amador-Eagle
Distacio Ranch, 1470 feet
Head trained zinfandel
Budbreak April 1

Amador-Renwood
Renwood, 1580 feet
Bilateral trained zinfandel
Budbreak April 10

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UC IPM Online

Statewide Integrated Pest Management Program

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SEARCH

ON THIS SITE

- What is IPM?
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- Weather, models & degree-days
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- Research
- Publications
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How to Manage Pests

Interactive Tools and Models:
Grape Powdery Mildew Risk Assessment Index

The grape powdery mildew risk assessment index (RAI) is useful for determining disease pressure and how often you need to spray to protect the vines. For information on how to use the RAI, see the pest management guideline.

Powdery mildew risk for stations in counties:
| Fresno | Madera | Amador | San Joaquin |

Choose year 2013 Go

RAIs are based on actual weather data for stations that take appropriate readings.

County	Active weather stations (Click on station for year-to-date graph/daily data)	RAI* for 06/04/2013	Disease pressure	Pathogen status
Amador (map)	Based on bud break, March 29, in , you may need to adjust for other cultivars that emerge earlier than the indicated date.			
	Amador_Eagle-01.P, EAG1, Screaming Eagle	80	high	reproduces every 5 days
	Amador_Renwood-01.P, REN1, Renwood Winery	80	high	reproduces every 5 days
Fresno (map)	Based on bud break, March 14, in Thompson Seedless, you may need to adjust for other cultivars that emerge earlier than the indicated date.			
	CARUTHERS-01.P, CAR	0	low	is present
	Del_Rey/Fowler-01.P, DELF	40	intermediate	reproduces every

Doug Gubler and Brianna McGuire

Powdery mildew experimental sites:
Ostrom and Davancy
4 treatments (p.m. control timing),
3 replicates each:

1. **Grower standard**
2. **Actual model**
3. **"Virtual" model**
4. **Untreated for mildew**

Leaf and fruit evaluations
200 leaves/rep, 600/treatment

Comparison of grower standard to model (actual station) spray program: Davancy site

Actual model:

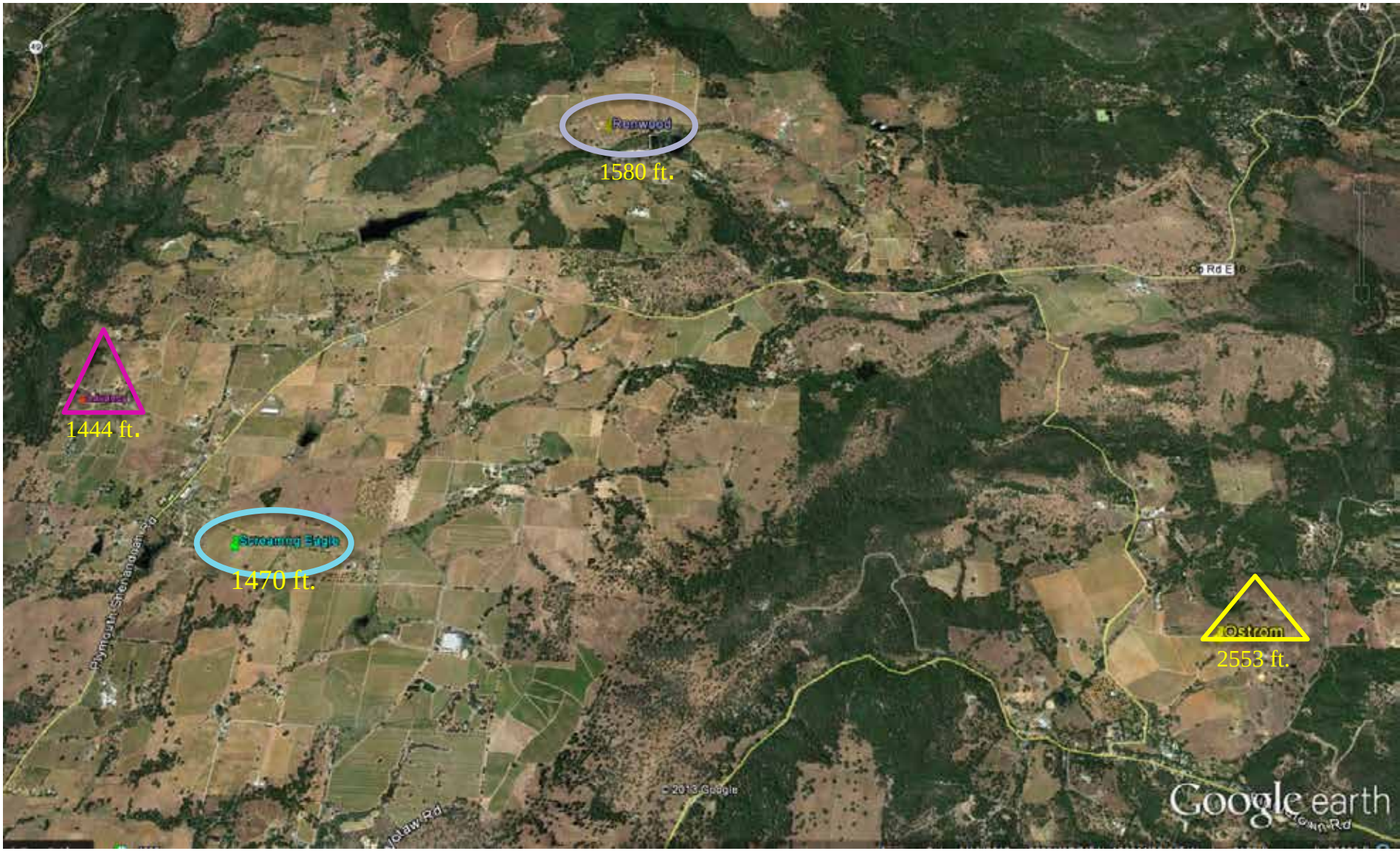
- 4/24/13 micronized sulfur + sticker
- 5/2/13 micronized sulfur + sticker
- 5/10/13 micronized sulfur + sticker
- 5/19/13 Mettle + sticker
- 5/29/13 Pristine + sticker

Grower standard:

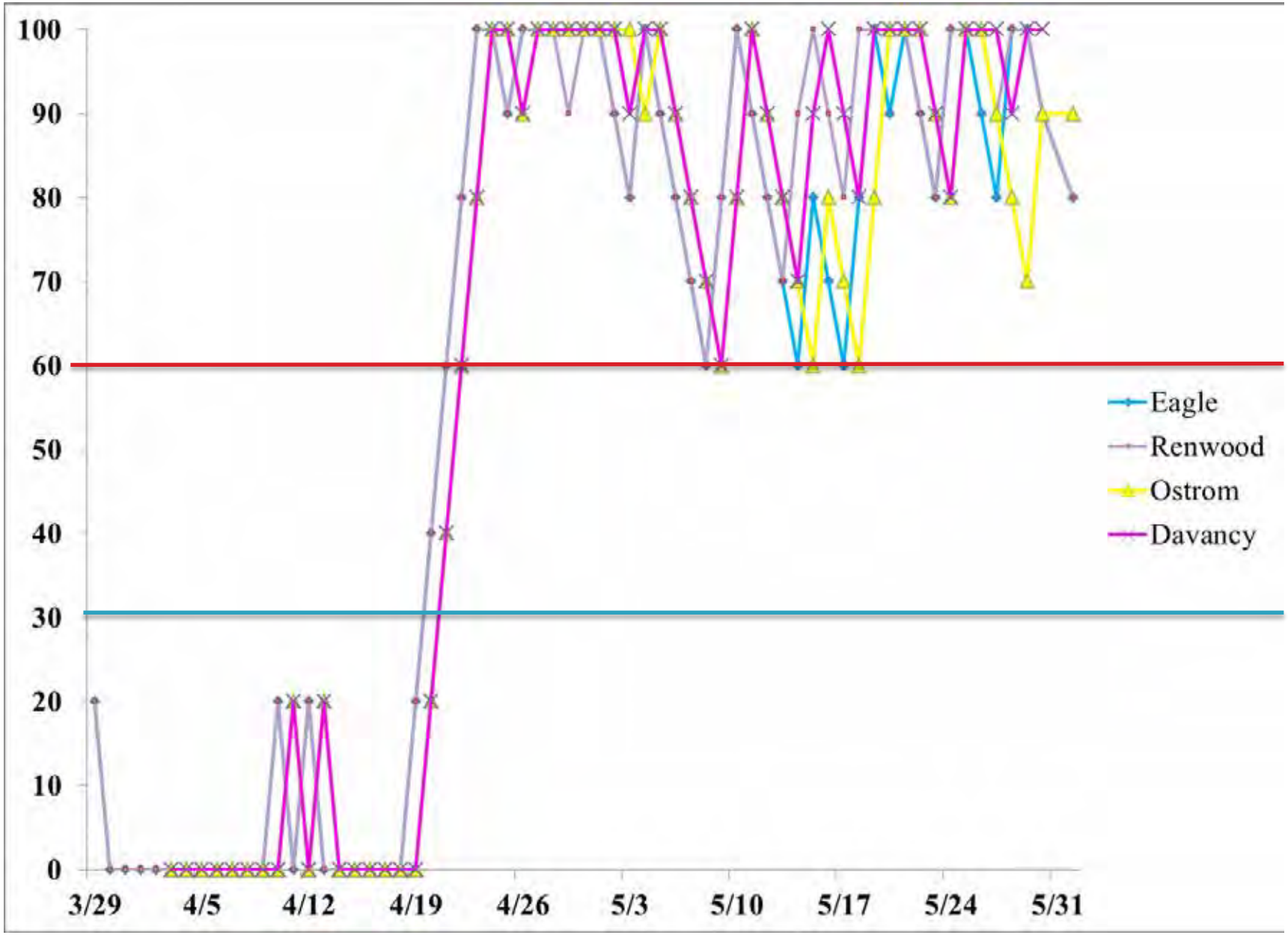
- 4/24/13 micronized sulfur + sticker
- 5/4/13 micronized sulfur +sticker
- 5/14/13 Mettle + sticker

Virtual model: Dropped from experiment due to problems.

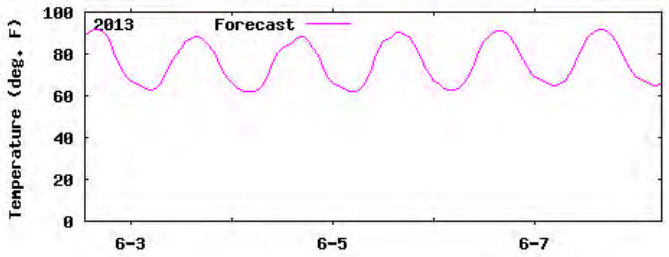
Powdery mildew station locations in Shenandoah Valley, 2013

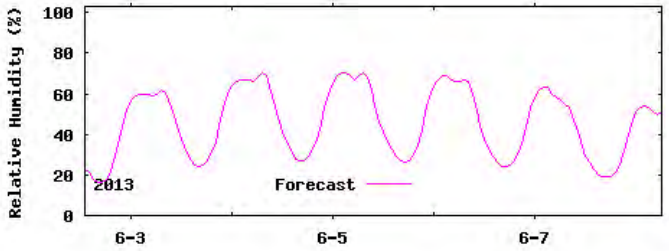


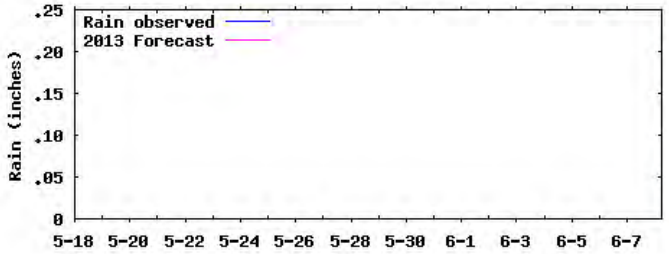
Powdery mildew index for Amador stations, Spring 2013

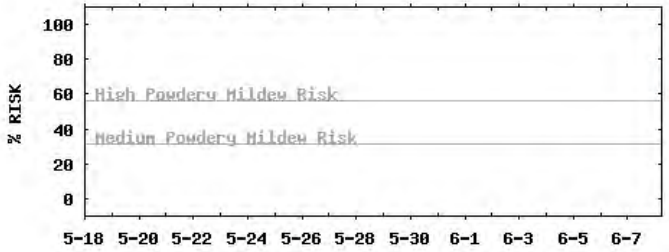


MyPest Page: Hourly Weather, Plant Disease Risk, and Degree-Day/Phenology Models









lat=38.55354 long=-120.68069

REN PESTCAST 38.5439 -120.7967
2013 Renwood-01.P CA elevation: 1580'

Refresh - click to reset display

- ⊞ **Display Dates**
- ⊞ **Weather Parameters**
- ⊞ **Plant Disease/Other Hourly Driven Models**
  - GT Powdery Mildew
  - Botrytis
- ⊞ **Degree-day/Phenology Models**
- ⊞ **Display Settings**

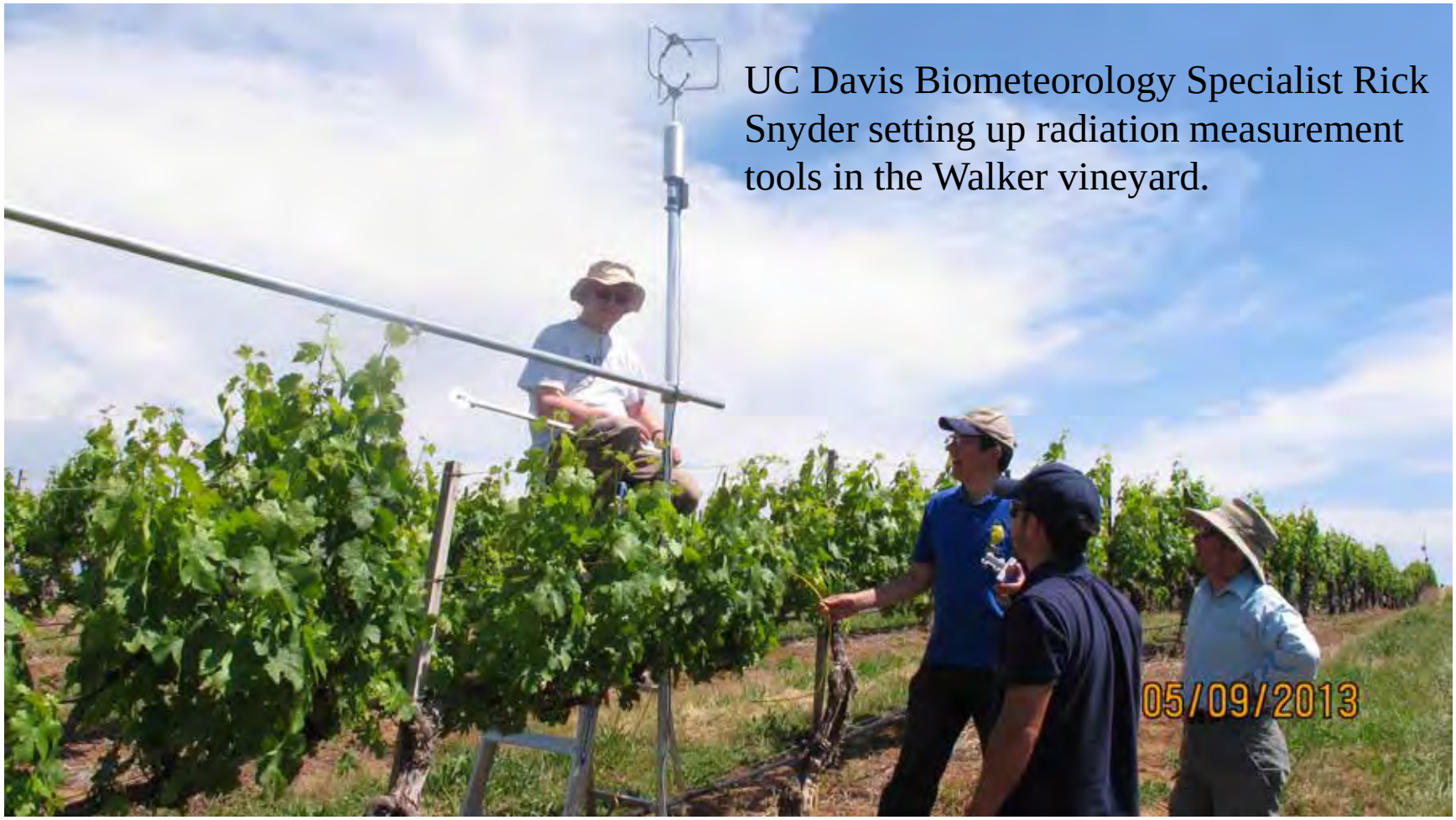
Download Data | Do Not Display Data Table


05/29/2013


05/29/2013

Powdery mildew spore trap

ET Slope Measurements ("Surface renewal") for Irrigation Management



UC Davis Biometeorology Specialist Rick Snyder setting up radiation measurement tools in the Walker vineyard.

CIMIS 228, Walker vineyard, Diamond Springs

ET (Evapotranspiration): water evaporation from plant leaves (transpiration) and soil surface (evaporation).

ET_{kc}: incorporates crop coefficient (canopy, shading)

ET requires ENERGY: **Solar radiation**

Solar radiation has several “sinks”: soil surface, sensible and latent heat flux.

Surface renewal estimates ET based on energy equation for solar radiation.

Napa study using surface renewal method to estimate ET on slope.

Level vineyard: 2.4 mm/day (June-Sept.)

NE aspect: 2.2 mm/day

SW aspect: 2.7 mm/day

Irrig Sci (2012) 30:471–484
DOI 10.1007/s00271-012-0377-6

ORIGINAL PAPER

Estimation of actual evapotranspiration in winegrape vineyards located on hillside terrain using surface renewal analysis

T. M. Shapland · R. L. Snyder · D. R. Smart · L. E. Williams

Received: 29 July 2011 / Accepted: 2 July 2012 / Published online: 1 September 2012

Abstract Sensible and latent heat flux densities were estimated in a level vineyard, a northeast aspect vineyard and a southwest aspect vineyard in the Napa Valley of California using the eddy covariance and surface renewal methods. Surface renewal is theoretically not limited to level or extensively homogeneous terrain because it examines a more localized process of scalar exchange as compared with eddy covariance. Surface renewal estimates must be calibrated against eddy covariance data to account for unequal heating of the air parcels under a fixed measurement height. We calibrated surface renewal data against eddy covariance data in a level vineyard, and the calibration factor (α) was applied to the surface renewal measurements on the hillside vineyards. Latent heat flux density was estimated from the residual of the energy balance. In the level vineyard, the average daily actual evapotranspiration (ET_a) for the period of June through September was 2.4 mm per day. In the northeast aspect vineyard, the average daily ET_a was 2.2 mm per day, while in the southwest aspect vineyard it was 2.7 mm per day. The net radiation values for the level vineyard, the northeast aspect vineyard, and the southwest aspect vineyard were compared against the Ecosystem Water Program with good agreement.

Communicated by E. Fereres.

Introduction

Grapevine water status and irrigation management are known to be closely tied to winegrape quality (Jackson and Lombard 1993; Downey et al. 2006). Water deprivation is known to enhance red grape quality under some conditions (Kennedy et al. 2002). For this reason, many growers rely on leaf water potential measurements to schedule the first irrigation of the season. These same growers will often rely on gross regional estimates of daily evapotranspiration (ET) and idealized crop coefficients to determine the frequency and quantity of irrigation applications (Allen et al. 1998). The overall objective of this irrigation strategy is to arrest vegetative growth and direct carbon allocation to fruit, although a poorly characterized component apparently involves increasing the amount and typicity of fruit and seed secondary compounds like phenolics (Kennedy et al. 2002).

The crop coefficient (K_c) is a crop- and management-specific multiplier for converting standardized reference evapotranspiration for short canopies (ET_o) into crop evapotranspiration (ET_c) for a well-watered crop without

Leaf water potential ("Pressure bomb")
Ken Shackel, UCD

Strategy based on research and experience.

*Less than -10 bars: no stress
-10 to -12: mild stress
-12 to -14: moderate
-14 to -16: high stress
Above -16: severe stress

*Pritchard and Smith, Irrigation Short course 2009

Soil Survey Decision Support Tools/Understanding Foothill Soils

Toby O'Geen, UCDavis LAWR

Geographic Nutrient Management Zones
Water Management
Rootstock selection, vineyard design

Terroir: What makes the foothills unique?

Soil Pit Field Days:
August 29: El Dorado,
Sept. 6: Calaveras

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Thank You!

http://cecentralsierra.ucanr.edu/Agriculture/Viticulture/