California system to disseminate disease models

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Background

- Interest in disease models since 1994
- “System” is a blend of multiple systems
  - Participants
  - Weather networks
  - Dissemination points
- What we deliver and how
- Improvements needed
- Recommendations

The California System

- Public, private, public–private partnerships
- Multiple weather data sources
- Delivery of model results
- Training and interpretation for end users

Some parts are well blended, others less so

Available models

- Disease models on 13 crops (almond, apple, celery, **grape**, lettuce, **pear**, pistachio, potato, strawberry, sugar beet, **tomato**, turfgrass, **walnut**)
- Powdery mildews, downy mildews, gray mold, scab, fire blight, Botrytis, late blight, blackmold

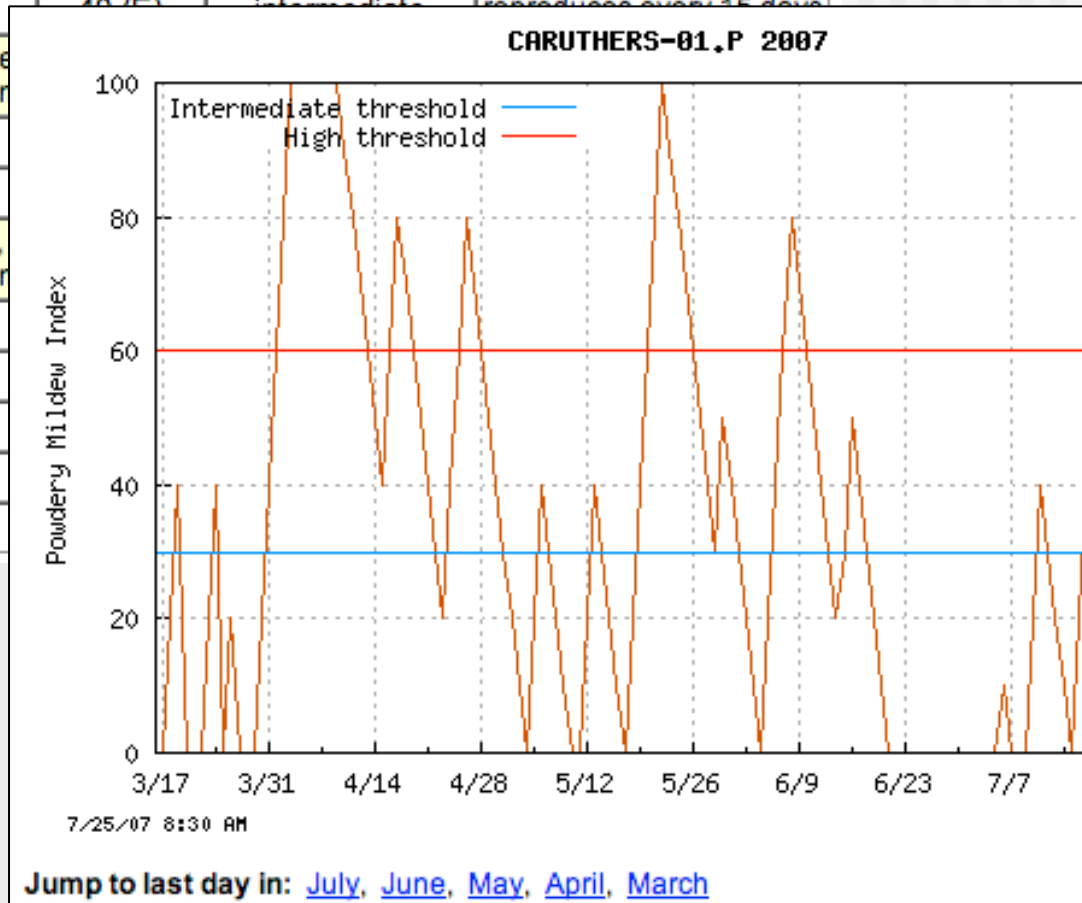
G-T grape powdery mildew by far most available and used

Established Networks

- Weather collection
  - In-canopy
  - Maintained
  - Multiple organizations

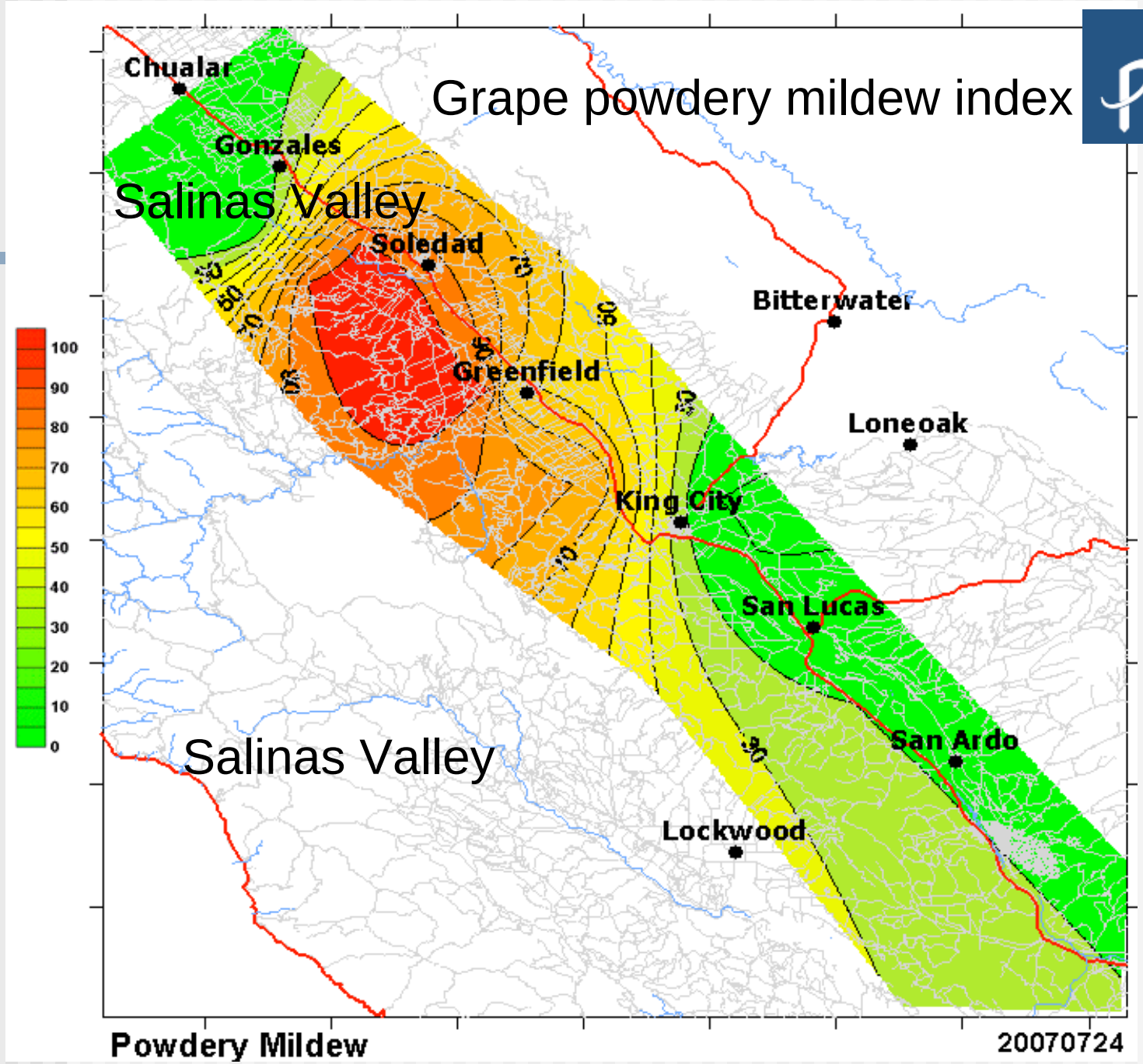
Varying coverage

County	Active weather stations (Click on station for year-to-date graph/daily data)	RAI* for 07/24/2007	Disease pressure	Pathogen status
Fresno (map)	Based on bud break, March 16, in Thompson Seedless, you may need to adjust for other cultivars that emerge earlier than the indicated date.			
	CARUTHERS-01.P, CAR	80	high	reproduces every 5 days
	Del_Rey/Fowler-01.P, DELF	30	intermediate	reproduces every 15 days
	EASTON-01.P, EAS	30	intermediate	reproduces every 15 days
	KERMAN-01.P, KER	90	high	reproduces every 5 days
	KINGSBURG-01.P, KNG	100	high	reproduces every 5 days
	Kearney_Ag_Ctr-01.P, KAC	90	high	reproduces every 5 days
	SAND_RANCH-01.P, SR1			
Madera (map)	Based on bud break, March 16, in Thompson Se you may need to adjust for other cultivars that er			
	FIREBAUGH/ALISO-01.P, FRBA			
	Ripperdan-02.P, RIP			
San Joaquin (map)	Based on bud break, March 15, in Chardonnay, you may need to adjust for other cultivars that er			
	FARMINGTON-01.P, FGN			
	LIVE_OAK-01.P, LIV			
	LOCKEFORD-01.P, LOC			
	LODI-01.P, LOD			
	PETERS-01.P, PET			



Jump to last day in: July, June, May, April, March

Grape powdery mildew index



Networks in distinct, flat areas

6 regions:

3 San Joaquin

3 Central Coast

Tomato Powdery Mildew Spray Forecast

field4

Based on weather data 24 Apr 2007 - 26 Jul 2007 **Updated 28 Jul 2007**

Recommended action

Edit spray dates

Spray immediately. If you do not spray as recommended by the model, then moderate to severe disease is expected to develop.

When at least 3 of the days during an evaluation period are conducive for disease, and the conducive period is not interrupted by 2 or more consecutive nonconducive days, moderate to severe disease is expected and a spray is recommended.

Disease risk

Moderate to severe disease is expected if you do not spray as recommended by the model.

Risk summary table (Spray dates are bold)

Date	Daily Risk	Expected Disease	Next Evaluation	Crop Protection Status
07/26	M	Moderate to severe	Spray needed.	**Not currently protected.**
07/25	C	Moderate to severe	Spray needed.	**Not currently protected.**
07/24	C	No evaluation	After 1 more day.	Not currently protected.

Evaluates past 6 days

Model result displays

- Model output varies
  - Table, chart, GIS
  - No pest status
- How to use results
  - Links to publications
- Disclaimer

Deliver to whom?

- Consultants: Educated, licensed pest management professionals
  - Want consistent results
  - Protect the crop
  - Save grower money
- Growers
  - Maximize profit

Delivery infrastructure

- University prepares and distributes model results from data it collects
  - Models must be validated or in test mode
  - Grower organizations support data collection, redistribute results (e.g., California Tomato Research Institute, Sun-Maid Raisin Growers)
  - Networks aren't comprehensive
  - Support development and demonstration
  - Private sector role

Delivery infrastructure

- Private industry role
  - Collect data and distribute results

    (e.g., Western Farm Service/Precision Agri-Lab; Western Weather; Irrigate.net)
  - Free access sponsored by agribusiness (Dow, BASF, Gowan) and linked from their sites
  - Subscriptions--individual or memberships
  - Support for users

Delivery support

- Databases, programming languages; Web, wireless devices, other technology
- Cooperative Extension
  - Demonstration
  - Promotion
  - Training
  - Interpretation

Critical element in the dissemination infrastructure; without support, lose energy, confidence, participation

California System

- Planning and coordination
- Cover more areas
- Need between-station results
- Include forecasts as appropriate
- Models require validation and acceptance for university support
- Limited innovations in display and distribution
- Good infrastructure for demonstration, training, and support by Extension

Recommendations

- Technology to support fields between weather stations
- Standards/guidelines for displaying model results
  - Assumptions
  - Interpretation
  - Confidence: Risks of using, or not
- User-centered: Mechanism for user input and feedback

Usability**: ability of a user to **find** what they **need
*To **understand** what they find*
*And to **apply** it in the way it was intended*
*With the **time** and **effort** they're willing to expend*

Thank you

And to

- Brenna Aegerter, UC Cooperative Extension, San Joaquin Co.
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- Stephen Vasquez, UC Cooperative Extension, Fresno Co.
- Ken Wahlen, Precision Agri-Lab