Improving Powdery Mildew and Botrytis Bunch Rot Management

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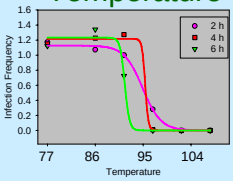
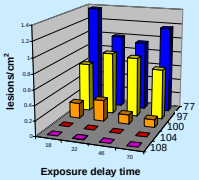
Seek to understand the environmental factors that influence disease development and use this knowledge to develop more efficient approaches to disease management.

Powdery Mildew

Effect of Supra-conducive Temperature on Infection



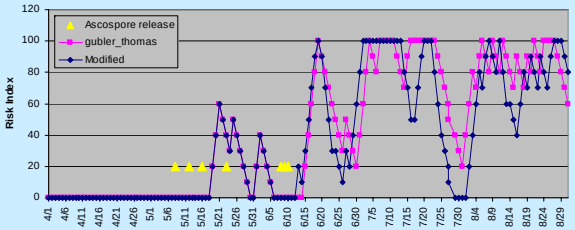
Plants were exposed to respective temperatures for 2, 4, or 6 h immediately following inoculation, then held at 77 F for 12 days.



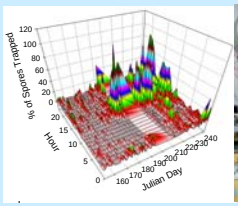
Plant incubated at 77 F for pre-exposure time then exposed to respective temperature for hours then incubated at 77 F.

Current forecasting models do not accurately account for the influence of temperature on infection.

Refining the Gubler/Thomas Model



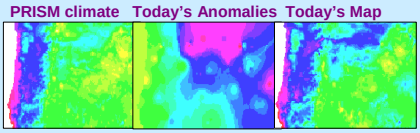
Factors influencing spore movement



Current disease forecasting models assume inoculum availability after ascospore release. This is unlikely. A better understanding of factors influencing inoculum availability will enhance, our ability to predict disease risk.

Improving Disease Forecasting

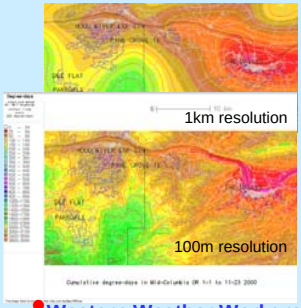
Western Weather Workgroup



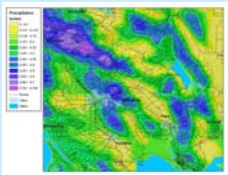
Knowledge of climate can be used to increase precision of weather parameter estimates from remote weather stations.

0.3"

Typical NOAA Forecast on 100km girds for the CA North Coast wine grape region.



Various advanced weighted regression techniques can further enhance resolution.



Forecast for the same time using approaches developed by the Western Weather Workgroup.

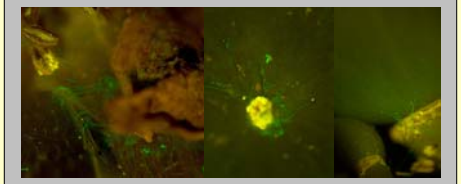
New Methods for Disease Monitoring

PCR techniques are being used for detection and quantification of *E. necator* and to determine timing of fungicide applications. They are being developed to determine the proportion of the population that is resistant to DMI fungicides.

- **Western Weather Workgroup**
  - **Len Coop, Chris Daly, George Taylor - Oregon State University**
  - **Gary Grove – Washington State University**
  - **Doug Gubler, Carla Thomas, Joyce Strand– University California, Davis**
  - **Alan Fox – FoxWeather, LLC**
  - **Dave Gent, Walt Mahaffee, Bill Pfender - USDA - ARS**

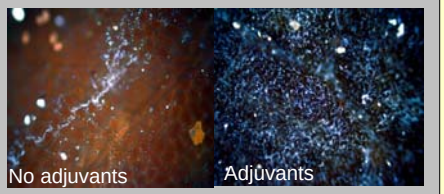
Grape Bunch Rot

Ecology of *Botrytis cinerea*



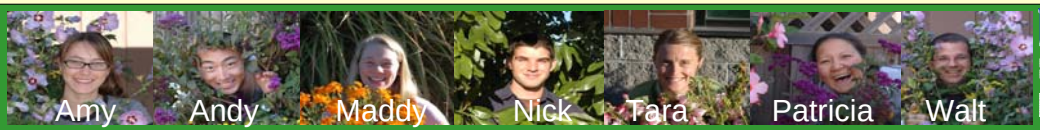
Understanding factors that influence the colonization of necrotic tissue and subsequent infection will help in developing improved disease forecasting models. Genetically modifying *B. cinerea* to express a fluorescent protein allows for nondestructive monitoring of the same fungal structure overtime, thus yielding insights to the ecology of *B. cinerea* previously unavailable.

Use of Adjuvants to Increase Efficacy of Biological Control



Biocontrol agents are notorious for their inconsistency in performance. We believe that this is largely due to inability of the organism to survive or remain on the plant surface immediately after application. Use of various adjuvants could enhance survival and disease control.

Washington State University



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