Pest Management Breakouts

ARS Grape Workshop

July, 2007

Pest Management

- Decrease pesticide use and environmental risks as a result of:
  - Improved understanding of vine and pest/pathogen interactions (4.6.1)
  - Improved understanding of postharvest product and pest/pathogen interactions
  - Better pest management and improved application technologies (4.5.2)

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Pest and Pathogen List

- **PD/GWSS**
- **Powdery Mildew**
- **Downy mildew**
- **Nematodes**
- Black rot
- Viruses/GTA
- Wood Rot Complex
- Bunch rots
- Crown gall
- Mealy bugs
- Light brown apple moth
- Mites
- Skeltonizer (lepidopterans)
- Phylloxera
- Grape Berry Moth
- Cotton root rot on grapes (Texas)

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Top 3-5 grape-related ARS accomplishments in the past 3 years

- Pierce's Disease
  - Marker-assisted introgression of PD-resistance into commercially important grape varieties; candidate PD response genes identified in resistant and susceptible grape genotypes
  - GWSS utilizes olfactory cues for host selection (synergies with color)

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Powdery Mildew Accomplishments

- Screened 1200 accessions for PM resistance
  - revealed race-cultivar specificity in disease interaction
  - found PM & DM resistance in a mutagenized population of Chardonnay
- Early detection systems that allow rapid diagnosis and optimization of spray programs
- PM resistance identified in seedlings populations; up to 50% of the seedling populations are resistant (single dominant gene)

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Nematodes

- 9 new rootknot nematode resistant varieties about to be released (Cousins)
- Ring nematodes maybe a replant issue (young versus mature vines—different in response)

Gaps/Research Projects/Teams

Alternatives to chemical control strategies (PD/GWSS, PM, DM, Bunch rots)

- Biocontrol strategies/habitat enhancement/new agents
- Experimental materials as alternatives
- Research team members
  - Hoddle, James Hagler, Joe Patt, Kent Daane, Rodriego Krugner, Jessie DeLeon, M. Setamou

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Gaps/Research Projects/Teams *(cont.)*

PD/GWSS

- Artificial diet for rearing GWSS/parasitoids
- Research team members
  - Tom Courdron (USHRL, Florida)

Gaps/Research Projects/Teams *(cont.)*

PD/GWSS (cont.)

- Genetic modification of GWSS and/or Xf to control PD
- Research team members
  - Steve Lindow, Bruce Kirkpatrick, Dean Gabriel, Harvey Hoch
  - ARS Parlier (Drake Stenger)

Gaps/Research Projects/Teams *(cont.)*

Improve the efficacy of current control disease techniques

- Predictive forecast models (PM, DM, Bunch Rots, etc)
  - Early real-time pathogen detection
  - Access to accurate data to run the model (weather data, inoculum load, etc)
- Research team members
  - Mark Sisterson, soybean rust project at Penn State, Zedex, Wayne Wilcox, Mark Gleason, Forest Nutter, Terra-Space, etc.

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Gaps/Research Projects/Teams *(cont.)*

Additions to current Nematode research

- Broad resistance (i.e. pyramiding genes)
- Alternatives to fumigants
- Virus/vector host interactions and transmission of nematode viruses
- Research team members
  - Peter Cousins, Dave Ramming, Andy Walker, Mike McKenry
  - Filling ARS positions (Sally's old position, Pacific Northwest Small Fruit Research Center)

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Gaps/Research Projects/Teams *(cont.)*

Wood Rotting Canker Diseases

- Molecular tools to understand the biology of the disease complex
- Wound physiology
- Biomarkers for onset of disease
- Mechanism(s) of infection

- Research team members
  - Doug Gubler, Epstein, Kendra B., Philippe R., Trinchero, Kearneysville, Penn State, Lance Cadle-Davidson

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Increasing ARS Impact with Existing Resources

- Refill open positions— Jerry Uymemoto, Sally Schneider and open Pacific Northwest Small Fruit Research Center
- Early integration of extension and growers in the research process
- Effectively implement the federal paperwork reduction act

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Extending ARS research

- Early partnership with industry stakeholders
- Reinvent extension
- New research extension outlets that meet the needs of all partners

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