USDA-ARS Grape & Wine Workshop

Physiology, Cultural Practices and Sustainability
Acknowledgements

• Group Participants
• Co-Chair - Julie Tarara
• Scribe – Kendra Baumgartner
• Facilitator – David Rust
Grape Production Systems

Site Factors

- Sunlight
- Temperature
- Rainfall
- Wind
- Humidity
- Topography
- Soil texture and depth
- Soil chemistry
- Soil pests and biology

Management Decisions

- Cultivar
- Rootstock
- Plant density
- Vineyard design
- Row orientation
- Training & trellis systems
- Canopy management
- Crop load management
- Water management
- Pests and diseases
- Floor management
- Pre-plant soil preparation
- Fertility management
Physiology, Cultural Practices and Sustainability Research Priorities

• Understand and manage fruit ripening and the development of compounds responsible for the flavor, aroma, color and mouth feel of grapes and grape products

• Understand and manage the influence of environment and stress factors on vine performance

• Understand and manage the elements of sustainability from the vineyard to the end product
Physiology, Cultural Practices and Sustainability

Research Priorities

• Understand and manage fruit ripening and the development of compounds responsible for the flavor, aroma, color and mouth feel of grapes and grape products

• Understand and manage the influence of environment and stress factors on vine performance

• Understand and manage the elements of sustainability from the vineyard to the end product
Understand and manage fruit ripening

- Identify the compounds responsible for the flavor, aroma, color and mouth feel of grapes and determine their relationships to final product quality
- Further understand how environment and cultural practices influence fruit ripening and compositional development
- Examine the relationship between sugar and flavor accumulation
- Understand the mechanisms for water, nutrient and assimilate transport into grape berries
Physiology, Cultural Practices and Sustainability

Research Priorities

• Understand and manage fruit ripening and the development of compounds responsible for the flavor, aroma, color and mouth feel of grapes and grape products

• Understand and manage the influence of environment and stress factors on vine performance

• Understand and manage the elements of sustainability from the vineyard to the end product
Understand and manage environmental stress on vine performance

• Define critical environmental factors that limit vine performance and economic sustainability
  – Climate, soil, water
• Understand how management decisions can help mitigate these limitations
  – Site selection
  – Scion x rootstock interactions (climate, soil, S/R signals)
  – Soil management (microbes, nutrients, salinity, pH)
  – Water management (amounts, quality)
  – Fertility management (nutrient uptake and partitioning)
  – Floor management (nutrients, vine competition)
Physiology, Cultural Practices and Sustainability

Research Priorities

• Understand and manage fruit ripening and flavor development

• Understand and manage the influence of environment and stress factors on vine performance

• Understand and manage the elements of sustainability from the vineyard to the final product
Understand and manage sustainability

- Develop best management practices for minimizing the impact of grape growing and processing on the environment
  - Vineyard development and establishment
  - Soil and water
  - Pests and diseases
  - Labor and energy
  - Waste streams
  - Community interface
  - Economic considerations
Organizational issues

• Current ARS programs in grape physiology, cultural practices and sustainability
  – Personnel
  – Focus

• Future grape program requirements
  – Expand physiology components
  – Incorporate economic criteria as appropriate
  – Wine making, processing, analytical and sensory facilities
Organizational issues

• Acknowledge and reward outreach by Category I Scientists
  – Commodity-focused responsibilities
  – Grape industry funding

• Regular reporting of research outcomes to the grape industry
  – Existing industry meetings and forums
  – New forums
Organizational issues

• Coordinate grape industry research efforts to improve efficiency and reduce overlap
  – Develop regional and national coordination efforts with land-grant and non-land grant universities, industry stakeholders and others involved with grape industry research
    • Coordinate positions and programs
    • Facilities and research infrastructure
    • Funding efforts