

**ARS Grape and Wine Industry Workshop**  
**Monday, July 11, 2005**  
**Physiology, Cultural Practices, & Sustainability Discussion Synopsis**

**Moderators:** Nick Dokoozlian, Julie Tarara, and Kendra Baumgarten

Key issues:

1. Understanding fruit ripening and flavor development, in order to improve quality.
  - Effects of cultural practices on wine quality, in terms of sensory parameters
  - Research on ripening (when are flavor compounds produced in berry, what environmental factors affect flavor compounds, water movement into the berry)
  - Research on the physiological importance of post-harvest period on fruitfulness and, in turn, post-harvest practices that can improve fruitfulness
  - Research on critical periods for nutrient uptake (not just N) & nutrient/resource partitioning.
  - Research on seasonal yield variation and associated yield estimation problems.
  - Effects of light & temperature on maturation in eastern grape-growing regions.
  - Research on maturation and ripening.
  - Research on uniformity in maturation.
  - Investment in facilities to make experimental wines.
  - Effects of cover crops on quality.
  
2. Understanding effects of stress factors on vine physiology.
  - Physiological responses to vine water stress & long-term effects on production.
  - Effects of climate on production, esp. outside of CA, where it's colder and wetter. In terms of eastern US viticulture, winter injury and, in turn, cold-hardiness is important.
  - Benefits of vine stress on quality.
  - Research on production in marginal soils (high pH, low pH).
  - Research on establishing critical ranges for tissue concentrations of mineral nutrients.
  - Research on vine mineral nutrition, soil nutrition, and soil fertility.
  
3. Sustainability
  - Water/air quality.
  - Research on waste streams from processing facilities, to address current and impending regulations.
  - Research on decreased availability of water for irrigation, to address impending regulations.
  - Research on mechanization -- Labor cost is a big issue, in terms of economic sustainability.
  - Research on salinity issues.
  - Sustainable raisin production – after development of DOV, changes had to be made to trellis design, row spacing, canopy management, i.e. multiple levels of production. Now, we need research on effects of these changes on actual drying (it takes longer for the

grapes to dry, because they're shaded, and the texture is different) and storage. There is a need for this research, in order to make our product marketable to Japan, a major buyer.

- Economic analyses of alternative weed control practices.
- Vineyard floor management effects on carbon sequestration & impacts on wine quality.
- Basis research on cover crops (root biology).
- Water management.
- Ground-water issues for herbicides.
- Reducing labor inputs & time spent managing labor inputs, i.e. mechanization systems. It is not just a function of needing better equipment, but also a function of needing research on canopy management, trellis design, and variety selection. In terms of trellis design, other factors that need to be accommodated are water management & pest management. All of these issues are inhibiting adoption of mechanization for practices like harvesting & pruning. This is needed to help the industry compete internationally.