

**Meeting 2. Tree Crop Food Safety, May 7, 2008**  
**Research Needs**

**Group 1.** *Establishment of science-based water quality standards. Research that leads to appropriate standards for foliar, irrigation, processing water. Research that leads to an evaluation of the short- and long-term risks to orchard fruit associated with unintentional water (e.g., flood) or weather.* **Trevor Suslow**, Amber Bailey, Peter Chaires, Bob Elliot, Ines Hanrahan, Martha Roberts, Chris Zanobini., Bob Whitaker

**Group 2.** *Transference Mechanisms. How does transfer occur (environment and crop)? How does this differ among water, air, humans, animals, dust, soil amendments, surfaces, etc.?:*

**Michelle Danyluk**, Bassam Annous, Bonnie Fernandez, Mary Jo Gash, Bob Klein, Jim Gorny, Ted Batkin, Dave Gombas.

**Group 3.** *Microbial Ecology: Pre- and post-harvest growth and survival of foodborne pathogens in the crop.:* **Linda Harris**, Dan Botts, Wally Ewart, Keith Matthews, Sheri Merau, Tim Spann, Deborah Carter, Guangwei Huang

**Group 4.** *Methods to evaluate, validate, and verify post-harvest handling and processing steps that reduce risk.* **Randy Worobo**, Larry Beuchat, Jim Cranney, Chris Schlect, Don Roark, Lori Berger, Tim Birmingham.

- 1) Develop a database of water sources to identify the predictive value of current indicator organisms to quantify the presence of key pathogens in irrigation and foliar applications applied to tree crops. (*Group 1*)
- 2) Develop an affordable, fast, and accepted indicator-based method for water testing to be used directly on the farm. (*Group 1*)
- 3) Determine the threshold pathogen population in irrigation or foliar applied water that would result in detectable survival and would represent a risk at the point of consumption These threshold levels may be influenced by crop, crop management practices, water source, time and application method (foliar sprays, overhead sprinklers, etc.) (*Groups 1 and 2*)
- 4) Determine factors that impact the growth and/or survival of foodborne pathogens in water and under various water applications, in the soil and on the crop, and the impact of environmental conditions. (*Groups 2 and 3*)
- 5) Determine the potential for pathogens in water to survive, grow on the peel or edible portions of the crop or become internalized when delivered at different fruit developmental stages, by different application methods, and at different locations on the crop (calyx, stem etc) (*Groups 1, 2, and 3*)
- 6) How do tree morphology and edible crop position on the tree (i.e. pruning practices effects) impact risk for environmental contamination and pathogen survival?
- 7) Determine the comparative risks of bio-solids, non-composted animal manures, and animal manure-containing soil amendments to contaminate the harvested fruit/nut among tree crops. This may be influenced by crop type, application and management practices source of

amendment, fruit position on the tree, in season orchard management, and specific harvest operations. Determine if there are ways that these types of soil amendments can be used that would maximize soil fertility and minimize food safety risks. (Groups 2 and 3)

- 8) Determine the main environmental and biological factors that influence survival of pathogens in orchard floor and soil and that allow transfer to the crop.
- 9) Evaluate the ability of foodborne pathogens to grow or survive on harvest equipment crop contact surfaces that may be unique to tree crops (including cotton and leather gloves; canvas harvest bags). Determine transfer coefficients to and from this equipment or contact surfaces. (Group 2 and 3)
- 10) Identify and validate surrogates for use in field studies in order that some of the research described above can be done under field conditions (Group 4).
- 11) Develop standardized microbiological methods for pathogen challenge studies, especially field studies, to allow for comparison and reproducibility among research groups.
- 12) Conduct risk assessments/analysis of tree fruit and nut production, harvest, and post-harvest practices to provide a ranking of practices with respect to potential food safety risks.