



## Apple Horticulture and Postharvest Research Priorities

Some of the priorities listed do not specifically ask for organic options. Considering the significant amount of organic apple acreage in WA, we are interested in having organic practices considered in all proposed work, when appropriate. Also, proposals are expected to include an industry outreach component, if the sought-out project outcomes are anticipated to directly translate into management changes. Maintaining profitable and sustainable tree fruit companies is of utmost importance to our industry and economic considerations need to be included in project designs.

Novel ideas in areas not listed as priority are encouraged. It is suggested to contact Ines Hanrahan (hanrahan@treefruitresearch.com) to discuss any ideas outside of the priorities identified by the RFP, before submitting a preproposal.

### 2021 RESEARCH PRIORITIES

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#### **Achieving sustainable production and consistent fruit quality for profitable orchards:**

Optimization of yield potential via development of integrated systems and interrelated models:

- understanding of pollination biology/fertility
- water management (canopy development vs. cropping system support)
- managing soils: how to measure, manage, and maintain soil fertility
- Systems approach for understanding and managing the root cause of bitter pit & calcium-related disorders under Washington conditions
- fruit maturity and storage management
- prevention of physiological disorders
- utilization of genetic/genomic and other tools to understand the inherent mechanism that guide cropping system performance

Abiotic stress management:

- Systems approach to understanding the basis of fruit over color development:
  - o Genetic, biochemical, physiological, environmental factors
  - o Practical ways to manage and increase over color
- understanding chilling requirements for apple trees

- understanding maturation patterns and storage potential based on in-season climate (examples: frozen fruit protocol, heat damage of fruit, dramatic temperature drops in season, abnormal maturation patterns)

### **COSMIC CRISP®**

- Horticultural management: Develop SOP's to achieve consistently high yields by ascertaining the development of fruiting wood on an annual basis, understanding fruit set/pollination/fertilization and rootstock interactions (including grafted trees) (*highest priority for 2021*)
- Greasiness: Develop practical solutions to mitigate the impact of greasiness on the ability to wax fruit, determine detailed protocols for use of ethylene action/synthesis inhibitors/promoters
- Extension: Implement a bilingual extension program to support a successful variety launch and ramp up
- Green spot: Determine the extent of the issue, the underlying cause and develop management strategies to mitigate green spot in COSMIC CRISP® (*lower priority in 2021*)

### **Preharvest fruit pathogen management**

- Patulin: develop updated whole supply chain best practices to manage patulin, with special focus on organic apples

**Food safety and sanitation** (practical approaches to be implemented directly into operations, when appropriate in conjunction with pathology):

- Cost-benefit analysis of food safety controls
- Develop a training program for postharvest water management strategies
- Optimized sanitation protocols and decay pathogen reduction of orchards pre-harvest
- Develop guidelines for drenching and fogging to avoid bacterial and fungal growth
- Organic approaches to packing line food safety

**Technology projects** for apples alone or across several different crops are encouraged. Of special interest are proposals addressing methods assessing labor utilization and/or for the reduction of manual labor needs in orchards. Those projects may be moved into the technology committee. Specific priorities:

- Cost-effective high-density systems for automation
- Non-destructive crop stress modeling
- Real time fruit growth measurement
- Smart Orchard Project
- Economic analysis: for available and novel technologies (how to make the economics work), focus on Key Performance Indicators (KPI's)