

2026 Apple Horticulture and Postharvest Research Priorities: Request for Proposals (RFP)



Introduction:

The Washington Tree Fruit Research Commission (WTFRC) invites research proposals focused on advancing apple horticulture and postharvest practices. Of particular interest are projects addressing labor utilization and efficiency in orchards. For detailed background information, please refer to our current Technology Roadmap: <https://treefruitresearch.org/about-us/technology-roadmap/>

General Considerations:

- **Field Trial Design:** Horticultural field trials should comprehensively document seasonal climate, water, and nutrient management effects. We encourage researchers to analyze naturally occurring mineral and nutrient levels in soil and irrigation water, as these factors significantly impact trial outcomes and facilitate comparisons with applied research.
- **Economic Viability:** Maintaining profitable and sustainable tree fruit operations is paramount. Therefore, all project designs must incorporate economic considerations.
- **Organic Practices:** While not explicitly stated in all priorities, we encourage the integration of organic practices where applicable.
- **Industry Outreach:** Proposals with outcomes that directly translate into management changes must include a robust industry outreach component.

Preproposals are due October 24th using the new grants portal. For more information, please visit our website at <https://treefruitresearch.org/proposal-process-instructions-and-documents/pre-proposal/instructions/>.

Topics marked with an * are of special interest to the committee for the FY 25 funding cycle.

Priority Research Areas:

1. Achieving Sustainable Production and Consistent Fruit Quality for Profitable Orchards:

- **Increase Return Per Acre Through Yield Optimization, Crop Load Management, and Tree/Fruit Consistency:**
 - ***Understanding pollination biology/fertility and developing Best Management Practices (BMPs) (including new pollinizer performance, using pollination to optimize crop load, and weather integration).**
 - Pruning:
 - ***Developing a tree physiology-based pruning timeline for robotic pruning integration. (Technology Roadmap priority #2)**
 - Utilization of hedging as labor saving tool and to improve orchard profitability
 - ***Develop an understanding of stem-bowl cracking physiology for Gala and Honeycrisp (major source of decay/patulin)**
 - Optimizing water and nutrient management:

- Balancing tree growth and development to maximize premium fruit production, including stress scenarios such as evaluating drought management strategies, understanding the effects of overwatering (e.g., in heavy soils).
 - Highlighting automated control-enabled watering strategies (Technology Roadmap Priority #1).
 - *Developing effective soil fertility measurement, management, and maintenance strategies.
 - Nitrogen management in organic systems (variability of organic N-sources, release rates)
- Implementing a systems approach to managing bitter pit and calcium-related disorders in Washington conditions (including genetics, soils, and plant growth regulator effects).
- * Determining BMPs for pesticide efficacy under prolonged evaporative cooling (collaborate with pathologists; see Apple Crop Protection (ACP) RFP). Explore cycling, fogging, and preharvest fungicide timing (including organic options). Develop an early alert system for reduced pesticide efficacy (especially for decay management) and integration with autonomous controls.
- *Developing best practices for pre-harvest decay pathogen reduction in conventional and organic systems (chemistries against mucor, postharvest connections, resistance management; see ACP RFP).
- *Update cost of production documents and ensure outreach to industry (special focus on unprofitable blocks/varieties)
- *Projects to increase labor use efficiency.
- *Develop comprehensive BMP's to minimize bruising and stem punctures (including punctures from clipped stems in bags/bins)

2. Enhanced Postharvest Efficiency for Sustainability and Economic Viability:

- **Increase Packouts by understanding, managing, and reducing decay and physiological Disorders:**
 - *Developing next-generation maturity indices as risk assessment tools.
 - New harvest maturity indexes (e.g., timing, layering, matrix approaches, independent product evaluations, background color charts, decision-making with variable data, non-destructive ethylene).
 - Analyzing heat effects during harvest on postharvest performance.
 - Optimizing packing processes to minimize losses and avoid re-packing.
 - Establishing BMPs for sanitation and sanitizer application for bin and storage room decay pathogen reduction.
 - *Determining the viability of presorting (in-field or pre-storage) to reduce fruit variability and increase ROI.
 - *Developing a training program for postharvest process water management to control decay and foodborne pathogens.
 - Evaluating the efficacy of drench versus fog fungicide applications and determining the cause of skin bitterness.
 - *Decay control within the entire process continuum (field to consumer) especially to avoid re-pack and assessing new biocontrol and novel agents for decay control (cross-link with ACP RFP). Analyzing the impact of sequential fungicide applications on resistance

development (cross-link with ACP RFP). Decay projects need to consider harvest maturity and organic.

- Improving food safety and sanitation practices:
 - Evaluating and comparing brush cleaning and sanitizing protocols and investigating novel methods.
 - Developing best practices for drenching and fogging to prevent bacterial and fungal growth.
 - Estimating the financial benefits of optimized sanitation protocols for high-value varieties.
 - *Optimizing water treatment options for packing lines.
 - *Developing safe methods for integrating ozone into postharvest processes.
 - Organic practices.
 - Residue management when switching between organic and conventional packingline runs.

3. Abiotic Stress Management and Seasonal Weather changes:

- **Understanding and Managing Weather-Related Challenges:**

- *Implementing a systems approach to understanding fruit over-color development.
- Determining chilling requirements for key cultivars and understanding long-term freeze damage effects.
- Look at payback on block netting or single row drape net for sunburn, birds, and codling moth).
- *Analyzing maturation patterns and storage potential based on in-season climate extremes.
- Developing BMPs for harvest management tools, especially organic ReTain.
- *Understanding fruit abscission physiology for precision harvest management (cross-link with cherry and stone fruit RFP).

4. Cosmic Crisp® Specific Research:

- **Optimizing Cosmic Crisp® Production and Quality:**

- Developing detailed protocols for in-field ethylene action/synthesis inhibitors/promoters (special interest in organic ReTain).
- BMP for dealing with fruit greasiness.

5. Technology Projects:

- **Encouraging Innovation in Apple and Cross-Crop Technologies:**

- Smart Orchard Project.
- Cost-effective high-density systems for automation.
- Non-destructive crop stress modeling.
- Evidence-based water management strategies.
- Accurate crop estimation.
- Economic analysis of available and novel technologies.

Novel Ideas and Assistance during the Proposal Process:

We encourage **novel ideas** beyond the listed priorities. For projects outside the 2026 Request for Proposals (RFP) priorities, please **contact Ines Hanrahan** (hanrahan@treefruitresearch.com) for a discussion before submitting a pre-proposal. **WTFRC staff** are also **available** at any time to discuss your ideas, provide feedback, and offer guidance **to help you craft a successful proposal**.