2027 Apple Crop Protection Research Priorities

Request for Proposals (RFP)

The Washington Tree Fruit Research Commission (WTFRC) is seeking apple crop protection research proposals in the following priority areas.

Some of the priorities listed do not specifically ask for organic options or pollinator protection. We are interested in having organic practices and pollinator protection considered in all proposed work, when appropriate. Of special interest are proposals addressing methods assessing labor utilization and/or for the reduction of manual labor needs in orchards. Please refer to the current Technology Roadmap for more detailed background: https://treefruitresearch.org/about-us/technology-roadmap/

Collaboration of scientists between institutions and across states and agencies is highly encouraged. 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.

Topics marked with an * are of special interest to the committee for the FY 27 funding cycle.

RESEARCH PRIORITIES

HIGH PRIORITY

Codling Moth (CM): We are not looking for demonstration trials. We request replicated controlled studies and research that provides statistically significant paths forward for pest management. Projects with an organic emphasis are preferred since control of the insect is currently challenging. Priorities are listed in order of importance.

1. CM Management
    a. *Crop protection product efficacy testing of current and new materials and best tank mixes (i.e. Spear®-Lep, Virosoft CP4, Entrust, Pyganic EC 1.4 II, BoteGHA, Bt) especially development, refinement and deployment of new, more ***cost effective organic control strategies*** (i.e. trapping, nematodes, new products, relative contribution of oil, EC and UV effects, extended coverage, best tank mix options);
    b. BMP to ensure efficacy for new modes of action such as peptides.
    c. *Increase economic options for organic production (limited products, reduced product efficacy, pressure and number of sprays) and develop economic analysis for currently employed methods (netting mass trapping, banding).
    d. *Economically feasible hot spot BMP (examples: mass trapping, sterile insects, extra pheromones, sprayable pheromone, bin management: how do they work alone or in combination; better timing of Entrust, new variable rate sprayers: make sure CM are controlled with this new application method, migration patterns from dirty neighbors, depth of border sprays; focus on simple/cheap programs)
    e. Explore feeding stimulants
2. *Resistance bioassays for CM and other pests with suspected resistance evolution to current insecticides.
    a. Followed by next steps for management of resistant populations
3. Mass trapping and sterile insect release: comprehensive approaches.
4. CM management on an area wide basis (education effort, SOP's, implementation, point person to contact)

Fire Blight:

Build program options for growers (focus on entire season and weather events, include Cripps Pink on M9-337 for good data, importance of rootstock)

- Season-long risk assessment in modern orchards including, but not limited to
    - Secondary bloom
    - Summer infections via overhead cooling
    - Risk in fall when temperatures are 70-80°F
    - How to maintain control once infections started
    - Product choice when not cutting out infections
    - Cultural vs. spray controls (timing)
- Product efficacy testing of new materials and development of SOP's for optimized efficacy (especially focus on shoot blight control, getting to the end of the season, orchard sanitation, new materials, organics)
- Continued product resistance testing
- Non-tree host plant: ID & control

Obliquebanded and Pandemis Leafroller

- *Increase organic control options (limited tools: Entrust is destroying beneficials, Spinosad needs to be preserved, Bt is exhausted)
- Resistance bioassays
- Establish economic thresholds

Postharvest Decay:

Projects are sought that connect the field to the warehouse that will result in a SOP between the two

1. Decay Management:
    - Organic preharvest products to manage postharvest decay
    - Resistance management for blue and grey mold (ex. coordination between field and warehouses to avoid loss of products, reduce levels coming into the warehouse, expand into new products)
2. Patulin: Build on ongoing work funded by WTFRC
    - Determine if new strains of blue mold affect patulin production
    - Develop SOP for organic apples to minimize patulin production
    - Develop updated whole supply chain SOP to manage patulin

Soil Health Improvement:

A) Efficacy testing of wide range of new products (i.e. biological inoculants) to increase soil fertility (example: mycorrhizal fungi) including economic feasibility and suitability under Washington state conditions and efficacy testing to verify product ingredients (preferred annual results)
    - Quick test to verify mycorrhizal fungi are present and alive
    - Test consistency of products
    - Develop an SOP to keep 'biologicals' alive

B) Replant best management: steps after fumigation to restore soil health?

C) Develop/adapt a system of standard soil health metrics for WA conditions.

D) Effects of herbicides on soil biology

Pesticide Residue Management:

Continue WTFRC work (include new fungicides asap, living document: new products, new challenges).

- *****Determine BMP's for pesticide efficacy under prolonged evaporative cooling conditions and current UV (see AHP RFP).
- How do variable rate sprayers affect MRL's? (product penetration, coverage, org. vs. conv., economics).

Weed Management:

- BMP scenarios utilizing products that are still available to use
- New products for young trees (< 3 yrs)
- Develop a regional resistance management program
    - Determine resistant weeds by region
- New technologies (microwave, waterpik): determine efficacy and economic feasibility

Organic tank mix options and what works best

Understanding Carbon Footprint of Apple Orchards

Technology projects in apple crop protection or across several different crops are encouraged. Those projects may be moved into the technology committee. Specific interest:

- Automated insect monitoring and scouting programs
- Adoption of precision crop protection application methods (needs to include efficacy data; reduced rate spray: how does this work for efficacy?)
- BMP for variable rate sprayers especially in organic production (amount of active ingredient, resistance mgt., patterns etc.)
- Plant health monitoring, pest, and disease identification with sensors

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MEDIUM-HIGH PRIORITY

Thrips (org. and conventional): Thrips are becoming more of an issue in varieties such as Honeycrisp, Envy, Granny Smith, Golden Delicious, Cripps Pink, and Cosmic Crisp. Spinosad works but at the cost of our natural enemies and at the worse time. Determine if Spinosad has lost efficacy. We need other options.

- *Alternative/new/softer material that does not impact pollinators and natural enemies and could be applied during the day.
- Spray timing issue? Maybe a phenology model to help with timing sprays.
- Why is the efficacy of programs variable? How long do chemical residues last?

Woolly Apple Aphid:

- *New tools are needed to cut down on excessive scouting time.

MEDIUM PRIORITY

Spider Mites:

- Effect of drought stress on mites and control strategies
- Determine alternate hosts: which weeds push mites into trees?
- Current products are tired: determine optimum timings and rotations

Pollinator Safety:

- Refugia for increasing pollinators
- Best management tactics to protect pollinators

Apple Replant:

- Develop an SOP for mustard seed program

Beneficial insects:

- Determine timing, rates, release techniques of beneficial release
- Rearing techniques that are more economically feasible to growers

Mealybugs (esp. grape):

- Organic and conventional control strategies (and better timing)
- Develop a model or a pheromone
- Mating disruption for organic

Mouse and Rodent Control:

- Organic control methods
- Investigate why some methods seem to have failed

San Jose Scale (Especially Organic):

- Develop an effective spray program
- Determine which beneficials to use
- Use of pheromones

Apple Leafcurling Midge (Organic):

- How to manage it in newer plantings/young trees
- New tools esp. for organic (i.e. attracts and kill, mass trapping)

Powdery Mildew (Conv./Organic)

- Mildew outbreaks caused by neighboring misters for EC and how to best manage

Campylomma/Lygus (Conv.)

- Monitor and tools to manage esp. in Golden, Gala, Honeycrisp

Oriental Fruit Moth/Lesser Apple Worm:

- Determine location and distribution of the insect populations and create awareness and ID (might be mistaken for CM); how can we stay ahead of the pressure?
- Efficacy of commercially available pheromones (application method, type of pheromone)
- Develop/adopt a DD-model for WA and validate accuracy; model relative to temp. (existing table not enough)
- Economic thresholds, what does trap catch mean, once clean: do we have to treat/use MD forever?

Rosy Apple Aphid

- Need chemical control options
- Timing of application of beneficials in the spring

LOW PRIORITY

Eyespotted Bud Moth

Apple Maggot

Extension:

- Update the orchard pest monitoring guide (bilingual)

Novel Ideas and Assistance during the Proposal Process:

We encourage **novel ideas** beyond the listed priorities. For projects outside the 2027 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**.