

**Western Washington Fruit Research Foundation (WWFRF)
WWFRF Fruit Garden Management Plan**

Version History	Date
Version 1.05. Revised and unanimously ratified at Fruit Garden Committee meeting Jan. 10. Present at the meeting: Kristan Johnson, Sam Benowitz, Bill Davis, Tom Wake, De Arbogast, not attending due to injury: Jay Scott	Jan. 10, 2013
Version 1.1 SW incorporating Tom Thorton's comments	Feb 21, 2013
Version 1.2 SW adding content at direction of BOD	Feb 24, 2013
Version 3.0 revised content at direction of Carol Miles. Approved for WSU and submission to WSDA.	May 28, 2013

Document Approvers

Name	Title	Date Approved
Carol Miles	WSU Horticulture Manager	5/28/13
Steve Jones	WSU –NWREC Mt Vernon Director	
Sue Williams	WWFRF President	
De Arbogast	WWFRF Fruit Garden manager	
Tom Wake	WWFRF Fruit Garden manager	
Kristan Johnson	WWFRF Fruit Garden Designer	

Purpose

This Garden management plan will detail how WWFRF volunteers will maintain the fruit trees and plants growing in the seven acre Fruit Garden under the guidance of WSU-NWREC horticulture program. We will move towards sustainable practices for pest management which includes the least toxic methods.

Change Management of this document

This is a living document which, as new information is available, will be reviewed and considered for updating. The guidelines for accepting changes will be changes to be reviewed first by the Garden Committee and an assessment of the impact provided. If the change is controversial or there is uncertainty of the impact of the change, the requested change shall be sent to a third party for review. Final acceptance of the change will be with Carol Miles or WSU-NWREC representative.

Introduction

The WWFRF exists to advance fruit horticultural programs for our unique Western Washington maritime climate through advocacy, research, education, and demonstration for the benefit of the general public, related commercial interests, and the home gardener/orchardist.

WWFRF goals include but are not limited to:

- ³⁵₁₇ Support fruit research in the Pacific Northwest maritime region.
- ³⁵₁₇ Maintain the WWFRF Fruit Garden to demonstrate fruit growing methods and fruit varieties and provide education to home gardeners/orchardists.
- ³⁵₁₇ Hold events with a focus on education and demonstrations to advocate good fruit growing practices and showcase the Fruit Garden.

The WWFRF Fruit Garden is located at the WSU Mount Vernon Northwest Washington Research and Extension Center (NWREC). The Fruit Garden is open to the public seven days a week from dawn to dusk. WWFRF is responsible for all costs associated with the maintenance of the garden.

The Fruit Garden is maintained by WWFRF volunteers. Garden managers direct, supervise and train volunteers as well as guide overall garden health, field trials and future planning. Work parties currently are conducted every Thursday throughout the year (except December). Garden fruit is available to active volunteers. General WWFRF members are allowed to harvest fruit at two annual harvest events. Harvest Events are open to non-members for one-day-only fees.

The Fruit Garden Committee will determine when and which plant varieties are added or removed from the garden. The Fruit Garden Committee will submit the list of changes to a qualified fruit garden designer (professional background in park design). The fruit garden designer will subsequently respond to the Fruit Garden Committee by confirming the proposed changes or presenting alternative designs integrating the requested changes while maintaining the integrity of the originally approved overall Fruit Garden design. Fundamental principles for successful large scale park design include consideration of circulation (path layout and related functions i.e. tractor access), maintaining view corridors and open space for events (oval), space for future growth, variety disease and insect pest resistance, and tree maintenance compatibility especially in regards to pesticide applications. An agreed upon design modification will then be presented to the WWFRF Board for ratification. WSU faculty liason will be advised.

The guiding principles for deciding what to add or remove are:

- ³⁵₁₇ Replacement of trees lost due to disease, with a preference given to heritage varieties to replace heritage apple trees
- ³⁵₁₇ Provide a home to fruit plant varieties from research trials that might be destroyed if not moved into garden
- ³⁵₁₇ Interest in new varieties of edible fruit plants appropriate to the Northwest climate, i.e: tree size (root stock), cultural methods (training), cultural (historical value), pest and disease resistance, pollination potential, flavor, culinary, nutritional value, fruit storage capability, plant growing habit, unique beauty of plant (e.g.red leaved plum).
- ³⁵₁₇ Types of plants under or over represented in the Fruit Garden
- ³⁵₁₇ When appropriate, the Fruit Garden will focus on representing the selections listed in the *Fruit Handbook for Western Washington WSU* (EB0937) and *New Alternative Fruit Crops for Western Washington WSU* (EB2002)
- ³⁵₁₇ Garden design and space available for new material
- ³⁵₁₇ Effort it takes to maintain the Fruit Garden, i.e. volunteer time to maintain existing trees as well as new plants/trees

Since the focus is on home gardening/orcharding and gardener safety, tree height will be kept to 10-12 feet where possible, and disease and pest control methods, whether mechanical or

chemical, will be appropriate for home gardens/orchards. The exceptions will be the antique apple trees and nut trees.

The WWFRF Garden Committee reserves the right to make specific changes as warranted, i.e. due to insect pest infestation.

Management of fruit diseases and insect pests

Disease and insect pest management in the Fruit Garden is based on monitoring where appropriate, and preventative spray applications where essential. Several pests are controlled by applying a preventative spray application based on crop growth stage and degree days, prior to pest incidence, as described in EB0419 Crop Protection Guide for Tree Fruits in Washington (2013, updated annually).

Monitoring

Pheromone insect pest-monitoring traps will be placed by WWFRF volunteers at appropriate times during the season to monitor for apple maggot and codling moth (see list below). Weekly tree inspections for insect pests and diseases will be performed by knowledgeable volunteers.

Pesticide applications

Disease and pest infestations vary in incidence and severity each season, therefore control measures will be adjusted each year based on need. The Fruit Garden Manager will notify the spray schedule and product preference (based on the list below) to the WSU-NWREC faculty liaison, who will make arrangements for a certified applicator to apply pesticides at the appropriate time. A member of the WWFRF Fruit Garden Spray Committee will monitor the Ag Weather Net at NWREC to chart infection periods to maximize efforts and give better control.

The WSU website <http://pep.wsu.edu/hortsense/> is the source for pest management information for home gardeners and will be used by volunteers as a guide for managing pest problems in the Fruit Garden. Cultural controls and integrated pest management (IPM) methods will be the first choices when possible. Only Washington-registered pesticides are included on this site and will be used in the Fruit Garden.

Pesticides will be sprayed on days when the weather is conducive; however, if there is an event on that day where the public or any work parties are present, or the re-entry interval would interfere with such scheduled events/work parties, then no pesticides will be sprayed.

A WWFRF volunteer who has a valid, current Washington State pesticide applicators license can spray home garden products in the Fruit Garden provided the following:

- A copy of the volunteer's applicator's license is on file at NWREC.
- WWFRF must keep a copy of the label for each product that is applied in the Fruit Garden in the notebook that is kept in the shed in the Fruit Garden; additionally, a copy of the label must be given to the WSU NWREC faculty liaison so that it can be added to the NWREC pesticide records.
- Prior to any pesticide application, a notice of 'intent to apply' is sent to the 'all NWREC' email list per NWREC pesticide application protocol.
- A notice of pesticide application must be posted on the pesticide notification board in the Fruit Garden and in the NWREC main building; the Fruit Garden, or areas within, will be posted closed if needed..
- WWFRF must keep a record of all application dates, rates, and areas in the notebook in the Fruit Garden shed.

- The applicator must apply the product accordingly to its label directions.
- Any concentrated products that must be mixed, this includes Roundup, must be mixed at the WSU pesticide area. NO MIXING WILL OCCUR IN THE FRUIT GARDEN.
- Any volunteer who does not follow these guidelines will be dismissed from the Fruit Garden.

Required Communications of Spray Applications

- To Garden volunteers: Sign board on the outside of the shed at the back of the Fruit Garden; past spray records will be kept in the Fruit Garden notebook inside the shed. Area will be posted 'do not enter' as appropriate.
- All beekeepers with apiaries registered with the WSDA within 2 miles of NWREC: Any material listed as harmful to bees. (Tim’s comment: Bees can fly up to 5 miles but 2 miles is a reasonable distance for notification purposes – it is fine to use a larger distance but I would not reduce it.)
- To general public: All entrances to Fruit Garden will be roped off with spray warning signs.

Volunteer Training

All WWFRF Fruit Garden volunteers will be required to complete Worker Protection Standard (WPS) training before they participate in garden maintenance activities. WWFRF garden managers will be trained by WSU-NWREC Horticulture staff to provide training to new garden volunteers. A record of all trained volunteers will be maintained by WWFRF garden managers and a permanent record will be kept by WSU NWREC.

Pest Management Plan for WWFRF Fruit Garden

This management plan is intended to provide a framework for making pest management decisions in the Fruit Garden that is maintained by WWFRF. This plan provides identification and timing of pest management tools. The chemical materials listed have been historically used in the region. WWFRF will consult annually with the WSU faculty liaison as to current label changes. No materials listed in this document should be applied without consulting the product’s current label.

WWFRF recognizes the importance of honey bees and native pollinators such as bumble bees and mason bees, and the need to protect these beneficial insects. No applications of materials listed as harmful to bees shall be applied when trees are in bloom. No spray listed as harmful to bees shall be applied when ground cover within the spray area has blooming plants. No systemic pesticides shall be applied to any trees, bushes, or vines before or during bloom.

The Fruit Garden is a public demonstration of how to grow fruit in the region. Utilizing pest management procedures that the public can emulate is one of our goals. We will be transparent with our approach and remember that one of our goals is to inspire people to grow more of their own food.

*Products marked in RED are known to be harmful to bees

Crop	Disease or Insect	Action ¹	Methods
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Apple & Pear	Anthracnose	Management/ Application: Monitor Copper Sulfate	Continually inspect trees, torch cankers , cut out infected limbs, and remove severely infected trees throughout the season. The best time to inspect for cankers is in late May or early June when it is raining – you will be able to see darkened areas in the bark that are not visible when bark is dry. Two Copper sulfate applications applied post harvest. 1 st application as soon as fruit harvest has been completed. 2 nd spray 3 weeks later or before first cold spell.
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Apple & Pear	Codling Moth <i>Ag weathernet for decision making tool</i>	Management/ Application: Monitor	Use heat unit data to identify 1 st cover spray. Use Ag Weather Net – open IPM DAS in left hand column, click on Codling Moth. Monitor with pheromone traps.
		Spinosad/ Granulosis virus	Spinosad (Entrust) or CYD-X HP an upgrade of the granulosis virus. OMRI listed with 4 hour REI. Very effective. Most years apply 1 application late June - early July, 1 application if summer is mild, 2 if total seasonal heat units are going over 1900 DD's.
		Surround (Kaolin Clay)	1 st Application at petal fall. Make applications every 7-10 days if it has rained.
	Oblique banded leaf roller	Thuricide, Javelin, BT	2-3 applications. 1 st application: stage 3-4 (with first fungicide spray). 2 nd application: pre-bloom. If fresh damage is apparent when fruit is at 10mm do a 3 rd application. Use pheromone traps for good timing data.
	Apple Maggot	Monitoring	Place pheromone yellow sticky traps in 'early' apple varieties.
		Surround (Kaolin Clay)	Apply 2 sprays 7 days apart before first expected egg hatch or first detection. Continue applications every 7-14 days to keep fruit completely covered during egg lay period.

<p>Apple & Pear</p>	<p>Scab</p>	<p>Management/ Application: Micronized sulfur + oil</p> <p>Rally 40WSP/ Vanguard</p>	<p>Delayed dormant application. If using only sulfur begin at stage 3-4. If using 1 conventional fungicide per season begin at stage 4-5. Sulfur is only effective when applied before a scab infection occurs. Sulfur inhibits spore germination, it doesn't prevent viable infections from producing lesions in the fruit skin. Monitor leaf wetness duration via Ag Weather Net to minimize the number of fungicide applications. Critical application periods are delayed dormant, petiole separation, pre-pink, first bloom and petal fall. Over time using only micronized sulfur may not be enough to keep spurs healthy on older wood.</p> <p>Conventional sprays, several approaches to consider: apply Rally or Vanguard alternately 1x per year. Option 1: post harvest application Option 2: 1st application in spring at delayed dormant. Either of these would significantly reduce inoculum of scab and mildew and benefit tree health.</p>
<p>Apple & Pear</p>	<p>Powdery Mildew</p>	<p>Management/ Application: Micronized Sulfur</p> <p>Cultural</p>	<p>Critical time for controlling mildew is at a late delayed dormant stage. Stage 3-4. Scab and mildew can be managed together without additional sprays for individual diseases.</p> <p>Remove infected leaves and prune severely infected shoots to prevent spread of disease.</p>

Peach	Peach Leaf Curl Bacterial Canker Leaf rollers	Management/ Application: Cultural Micronized Sulfur or Copper Sulfate Copper sulfate BT/Thuricide	Add curl-resistant varieties (Frost, Townsend & Betty) to the Fruit Garden. 3 applications beginning with bud swell. 2 nd and 3 rd applications approximately 3 weeks apart. 2 applications, 1 st at leaf fall, 2 nd 3-4 weeks later but before first cold snap. Monitor blossoms at bloom through petal fall for damage. BT applications have best results if sprayed late in afternoons and on cloud cover days.
Plum	Aphids	Management/ Application: Cultural Neem Oil	Scout trees, cut out hot spots. Spray at first sign of aphid infestation. Use heaviest rate that label allows for delayed dormant application.
Cherry	Cherry Bark Tortrix Spotted Wing Drosophila	Management/ Application: Cultural Spinosad Spinosad Pyganic Neem/Azadirachtin	Scrub trees with a stiff-bristled brush or broom to remove frass where insects may be pupating. In late September spot-spray frass tunnels on trunk until well saturated. Only spray trunk and limbs where frass is evident, do not spray upper canopy. Check spray effectiveness by sweeping off frass in a marked area and see if it reappears over the next 1-2 weeks. Spinosad is not systemic and breaks down relatively quickly, follow the label regarding number of allowable sprays. Monitor with current SWD recommended traps. Alternate with Pyganic or Neem/Azadirachtin. Make first application at straw color thru harvest. Spinosad 7 days between applications. Pyganic 3-5 days between applications.

All Stone Fruits	Brown rot	Management/ Application: Cultural	Prune peaches and plums at petal fall. Can achieve 100% reduction in blossom infection for two years by delaying pruning.
		Micronized copper and/or Sernade	1 application at bud break and 1 at post bloom. Apply every 7 days through ripening. Check label for harvest restrictions.
	Bacterial Canker/ Pseudomonas	Cultural	Cut out or torch cankers. Remove highly infected trees. See notes in Peach section.
		Cultural Micronized Copper	Prune trees in morning of dry days. Apply at leaf fall, 30 days later, and at bud swell in spring.
Blueberry	Birds	Management/ Application: Cultural	Net all plants; experiment using balloons and aluminum tape.
	Mummy berry	Cultural	Apply heavy mulch in spring, pick off infected berries.
	Scorch		No low toxicity control program identified for this.
All trees and shrubs	Voies	Management/ Application: Cultural	Mow surrounding grass and weeds to keep low. Install raptor attractors and owl boxes.
	Weed management	Glyphosate	Spray color-tinted product around each tree and bush.