

News/What to Watch For:

Watch lower leaves of all fruit trees for stippling damage caused by spider mites
Monitor peaches for water-soaked, oozing lesions that indicate lygus bug feeding
Continue to prune out fire blight strikes to reduce inoculum in the orchard
Examine apple fruit for first generation codling moth damage; watch pear leaves for pear psylla (honeydew, browning foliage)
Spray timing (codling moth and peach twig borer), pages 7-8
Spray materials, pages 9-10

Insect and Disease Activity/Info

APPLES/PEARS

Codling Moth

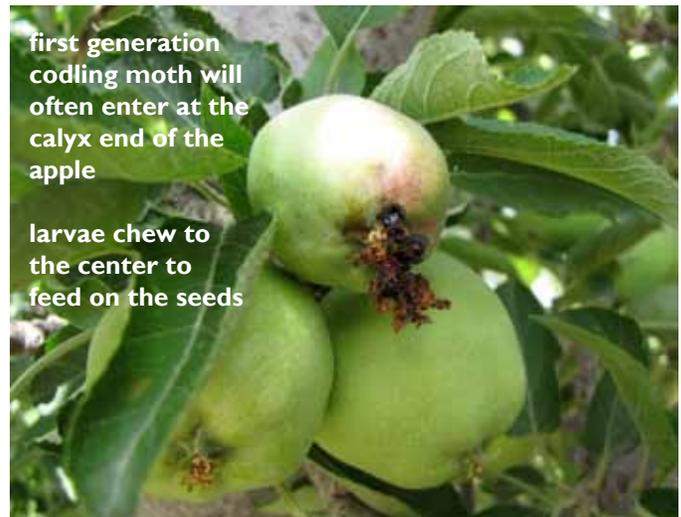
First generation egg hatch is just about over for most areas of northern Utah except Cache and Wasatch counties. Now is a great time to assess your first generation codling moth control.

Commercial orchards should examine 5-10% of the fruit, and residential growers should check as many fruits as possible. Do not neglect fruit at the top of the tree where sprays may not have reached, or where residual insecticide may have broken down more quickly due to higher UV exposure.

A successful codling moth **entry** will show frass (sawdust-like excrement) pushed out of the apple at the entry hole. Most first generation entries are through the calyx end because, while fruit is still firm, it is easier for the larvae to enter at that location. Although not as common, side entries can also be found now, usually where two fruit touch or where leaves touch the fruit.

A codling moth **sting** is a small brown blemish on the fruit where the codling moth larva did not successfully enter the fruit, either because it was killed, or it moved to a different spot. Stings from first generation are usually not as noticeable at harvest.

If you cut into the fruit to look for the larva inside, you can sometimes tell when control failed. If larvae are large or there is no larva in the fruit, then the entry occurred approximately 4-6 weeks ago (at the beginning of egg-hatch). Medium-sized larvae (1/3-2/3-inch long) indicate that entry occurred at the early to mid egg-hatch period (early June), and if the larvae are small, they entered in late June.



first generation codling moth will often enter at the calyx end of the apple

larvae chew to the center to feed on the seeds

If you are finding a lot of damage, re-evaluate your management program and look at alternative materials, spraying methods, or length of time between treatments for second generation control. If possible, select a material in a different chemical class than what you used for 1st generation control. By changing the pesticide's mode of action (how the insect is killed), we are reducing the chances of pesticide resistance. Mode of action/classification groups are provided in the spray materials table.

STONE FRUITS

Peach Twig Borer

Like codling moth, most areas of northern Utah are between first and second generation egg hatch. Notice that there are as many as 16 days where no activity is occurring between generations. Take a break!

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Spotted Tussock Moth



This week, scouting the orchards revealed an egg case of the spotted tussock moth on a peach leaf. This insect is actually a generalist feeder, and can be found on many different species, including landscape trees. It is not considered a pest because damage is minimal due to its solitary feeding behavior.

The spotted tussock moth is in the same family as the woolly bear, the tiger moth family.

Western Cherry Fruit Fly

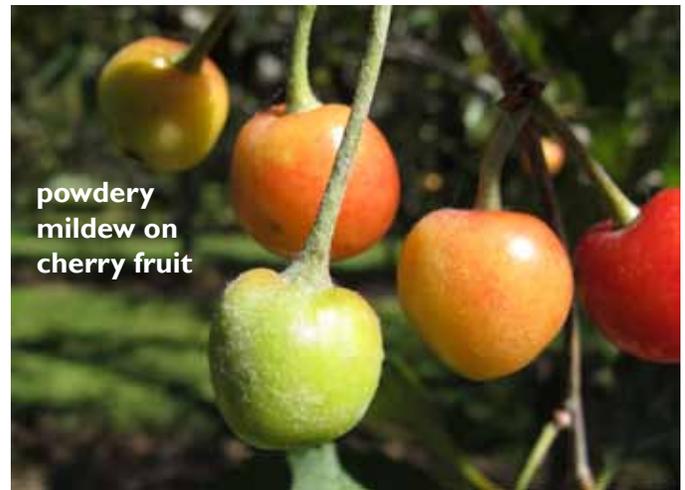
Commercial growers: Most growers are harvesting both sweet and tart cherries now, but that does not necessarily mean the end of control for cherry fruit fly. Fruits are most "attractive" to egg-laying when they are ripe or over-ripe.

Harvesting of sweet cherries often occurs over a long period, which is what makes GF-120 so valuable as a pesticide: it can be used the day of harvest. Other products that have a short pre-harvest interval are Malathion (1 day, 12-hr re-entry interval) and Sevin (3 days, 12 hr re-entry interval).

Tart cherries are harvested all at once, but sometimes, fruit is left on the tree. Fruit flies will continue to lay eggs on these fruits, so to prevent population build-up, apply one cover of dimethoate. Dimethoate kills larvae inside fruit.

Cherry powdery mildew on fruit

Cherry powdery mildew can hinder harvest of tart cherries because when the fruit pedicel is infected, the fruit will not drop. Severe powdery mildew infections may need a treatment, even after harvest, to reduce inoculum and help trees recover from the shock of mechanical harvesters.



powdery
mildew on
cherry fruit

Coryneum Blight - cherries, peaches



Coryneum blight infections are becoming more visible now on peaches and cherries. Most of these infections occurred during rains many weeks ago. Keep in mind that as peaches become softer, they are more susceptible to infection given at least 4 hours of moisture.

Walnut Husk Fly

Walnut husk fly adults are starting to emerge to lay eggs in walnut husks, and treatment should begin now. Husk flies are not a problem after husk split.

The adult walnut husk fly is similar in appearance to the cherry fruit fly, but larger and with a different wing pattern. They have one generation per year. Like cherry fruit fly, they overwinter as pupae in the soil and emerge as adults from mid July until September. The female inserts eggs in groups of about 15 below the surface of the husk. The maggots feed on the husk for 3 to 5 weeks and then drop to the ground to pupate several inches below the soil.

On infested walnuts, the husk will be soft and black while the outer skin remains intact. The kernel is only affected if infestations start early in the season, which causes nuts to shrivel and turn moldy. Nuts are unharmed during late infestations (late August - Sept.), but hull removal becomes difficult.

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For the most part, treatment is not necessary because the kernel is usually not damaged. Place infested nuts in a damp burlap bag for a few days to make the hulls easier to remove.

The only insecticides registered for home use of husk fly are spinosad (see products under codling moth in the spray options table) and GF-120. GF-120 is spinosad mixed with a bait. It comes in 1 gallon sizes only and is expensive. If using plain spinosad, consider adding about 4 to 6 tablespoons of molasses per gallon of water applied. The spray should be applied as large droplets, evenly spaced throughout the entire tree. It is not necessary to cover all the nuts, just to have large droplets. The spinosad+bait will attract the adults to feed, and then the insecticide kills the flies.

Begin sprays now, continuing every 7 days until within 1 month of harvest. Eggs laid later than this will not have time to develop and cause damage.

Update on Monitoring for Spotted Wing Drosophila

-by Cory Vorel, USU CAPS Coordinator

Spotted Wing Drosophila (SWD), an invasive pest from Southeast Asia, was first found in central California in August 2008 and has since moved up the west coast into Oregon and Washington. SWD attacks a large variety of fruit, including cherries, peaches, raspberries, and strawberries. This pest is of particular concern because females' serrated ovipositors allow them to attack fruit earlier than other Drosophila species, often before the fruit ripens.



We began monitoring northern Utah orchards for SWD in late May 2010. We placed traps in ten orchards located in Box Elder, Weber, Davis, and Utah counties. Fruits being monitored include sweet and sour cherries, peaches, apricots, apples, and raspberries. Both apple cider vinegar and yeast/sugar water solution are being used as lures, to maximize the possibility of detecting SWD.

We check traps biweekly, and thus far, no SWD has been detected. With the season progressing, traps will now be checked weekly to ensure that if SWD is introduced to Utah orchards, we are aware of it as soon as possible.

Biology of Aphids in Utah Orchards

The dormant oil you apply each spring does do some good--it targets most of the aphids listed below (except woolly apple aphid). But sometimes, populations can build on fruit trees to a point where a second treatment in early spring is warranted. As you'll read, most aphid species leave fruit trees for alternate hosts for the summer (although you'll still see the curled leaves) and then return in early fall to lay the eggs that are susceptible to oil.

Green apple aphid



Host: apple, pear

Damage: curled leaves, honeydew

Life Cycle: Green apple aphid overwinters as shiny black eggs, usually under buds or in leaf scars near the tips of twigs. Eggs hatch in spring as the leaves emerge. Newly hatched nymphs are all females. After about two weeks, the nymphs mature into adults that are able to give birth to live young. Each female produces 50 to 100 offspring that reach maturity in about seven to ten days.

There are many generations per year, and green apple aphid usually stays on apple throughout the summer. Late in the season, winged males are produced that mate with females. Their offspring are then able to lay the overwintering eggs.

Rosy apple aphid

Host: apple; weeds

Damage: curled leaves, honeydew, deformed fruit (in heavy infestations)

Life Cycle: Rosy apple aphid overwinters as eggs that turn from yellow in fall to shiny black by spring. They can be found in bark crevices. Eggs begin hatching around half-inch green stage of apple, although they cannot be easily seen until

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around first pink. Nymphs mature into rosy-colored females that give birth to live young without being fertilized by males. Each female produces an average of 200 offspring, which can lead to rapid buildup of large populations. Some leaves can have more than one layer of aphids.

The crowded conditions will induce the formation of winged individuals that disperse to their summer host, which is narrow-leaf plantain or dock. By late July, most of the rosy apple aphids have left the apple trees.

In late summer, winged male and female aphids again form on the weed hosts, and they migrate back to apples to produce a generation that will lay eggs for the winter.

Woolly apple aphid



Host: apple, rarely on elm

Damage: feeding causes galls on twigs and roots, honeydew

Life Cycle: Woolly apple aphid overwinters as nymphs on apple roots or in protected sites in the tree. Deep frosts will kill overwintering nymphs in the canopy. Aphids start activity in spring (females give birth to live nymphs), but they are not visible in the canopy until early to late June. Young nymphs will crawl to new feeding sites (or are blown by the wind) as the season progresses to start new colonies. Older stages are less mobile. They look like fluffs of cotton due to their waxy excretions, but if you touch the colony, it is very sticky.

Some aphids remain on the apple roots while others colonize parts of the canopy. In late summer, eggs are only formed when elm trees (an alternate host) are nearby. Woolly apple aphids are the most difficult aphid to manage due to their waxy protection and overwintering habit on the roots.

Green peach aphid



Hosts: peach and many others, including vegetables

Damage: curled and yellowed leaves, deformed nectarine fruit (in heavy infestations)

Life Cycle: Green peach aphid overwinters as eggs at the base of buds or on bark crevices on twigs. They hatch at the green tip stage and pass through three generations. Winged aphids then migrate to alternate hosts for the summer. In the fall, winged aphids return to peach where mated females lay overwintering eggs.

Plum leaf-curl aphid

Hosts: plum, cherry

Damage: severe leaf curling, leaf drop

Life Cycle: Overwintering eggs that were laid at the base of buds hatch in spring as new growth emerges. Populations rapidly build through approximately three generations on the succulent plant tissue, causing tight leaf curling. By mid to late

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June, winged forms are produced and they leave the fruit trees for alternate summer hosts in the aster family. In late summer or early fall, winged males and females are formed, and they migrate back to fruit trees to mate and produce the offspring that will eventually lay the overwintering eggs.

Mealy plum aphid



Hosts: Plum, apricot, peach

Damage: Stunted, yellowed leaves

Life Cycle: Mealy plum aphid overwinters as eggs at the base of buds. They hatch in early spring as leaves emerge and pass through up to twelve

generations on the host tree. As the aphids grow, they cover their bodies with a white mealy wax which distinguishes them from other aphids. As temperatures warm throughout the summer, winged aphids form and they move to reed grass or cattails until early fall.

Some aphids may remain on the fruit host all summer, especially if growth is vigorous, but they will not be able to lay eggs. Winged adults leave the alternate host in early fall to return to fruit trees to mate. Only the offspring of these adults are able to lay the overwintering eggs.

Black cherry aphid



Hosts: sweet cherry

Damage: curled leaves

Life Cycle: Black cherry aphid overwinters as shiny black eggs under buds or in crevices on twigs. Eggs hatch before leaves emerge, and will feed on unopened buds and then the new foliage. Adult females give birth to live young without fertilization. More than three generations pass on cherries, and populations can build very quickly. As they feed, the leaves curl tightly around the colony. By summer, most of the aphids will have migrated to weed hosts in the mustard family.

In early fall, winged males and females are produced on the alternate hosts, and they migrate back to cherries to mate and produce the offspring that will lay the overwintering eggs.

Degree Day Accumulations and Insect Development

Upcoming Monitoring/Insect Activity

Pest	Host(s)	DD/Monitoring Action
Codling moth-2nd Gen	apple, pear	Egg-hatch begins mid to late July
San Jose scale	apple mostly	Still time to treat in cooler areas of northern Utah
Cherry powdery mildew	cherry	Mildew is active now
Western cherry fruit fly	cherry	Continue protection through harvest
Pear psylla	pear	Second generation egg hatch begins last week of June
Peach twig borer-2nd Gen.	peach, nectarine	Egg hatch begins approximately early to mid-August
Spider mites	all	Look for activity on lower interior leaves now

Degree Day Accumulations and Insect Phenology

March 1 - Tuesday, July 13

County	Location	Codling Moth, 1st Gen.			Peach Twig Borer, 1st Gen.		
		DD (post biofix)	% Moth Flight	% Egg Hatch	DD (post biofix)	% Moth Flight	% Egg Hatch
Box Elder	Perry	918	2 (2nd gen)	99	767	0 (2nd gen)	99
	Tremonton	654	98	82	578	100	84
Cache	North Logan	631	98	80	356	89	16
	Providence	741	100	91	384	92	22
	Smithfield	603	96	73	373	92	22
Carbon	Price	1004	5 (2nd gen)	100	793	0 (2nd gen)	100
Davis	Kaysville	892	1 (2nd gen)	98	756	0 (2nd gen)	99
Grand	Castle Valley	1583	83 (2nd)	50 (2nd)	1430	92 (2nd gen)	46 (2nd)
Juab	Tintic	717	99	89	536	100	75
Salt Lake	Holladay	979	4 (2nd gen)	99	861	1 (2nd gen)	0 (2nd)
	West Valley City	1066	9 (2nd gen)	0	935	3 (2nd gen)	0 (2nd)
Sevier	Richfield	972	4 (2nd gen)	99	901	2 (2nd gen)	0 (2nd)
Tooele	Erda	789	100	94	789	0 (2nd gen)	100
	Tooele	921	2 (2nd gen)	99	791	0 (2nd gen)	100
Uintah	Vernal	905	1 (2nd gen)	98	751	0 (2nd gen)	99
Utah	Alpine	795	100	95	582	100	84
	American Fork	946	2 (2nd gen)	99	774	0 (2nd gen)	100
	Genola	962	3 (2nd gen)	99	785	0 (2nd gen)	100
	Lincoln Point	885	1 (2nd gen)	98	721	0 (2nd gen)	98
	Orem	1019	6 (2nd gen)	100	817	0 (2nd gen)	100
	Payson	902	1 (2nd gen)	98	760	0 (2nd gen)	99
	Provo	1001	5 (2nd gen)	100	819	0 (2nd gen)	100
	Santaquin	862	1 (2nd gen)	97	687	0 (2nd gen)	96
West Mountain	860	1 (2nd gen)	97	699	0 (2nd gen)	97	
Weber	Pleasant View	935	2 (2nd gen)	99	700	0 (2nd gen)	97
Wasatch	Heber City	546	93	62	306	76	5 (2nd)
Wayne	Capitol Reef	1312	46 (2nd)	11 (2nd)	1137	32 (2nd gen)	2 (2nd)

Spray Timing - Codling Moth

Please check these chart each week for updated dates. These dates are forecasted using the average temperature for each site. Fruit should remain protected through each generation according to interval provided on pesticide label.

Codling Moth, First and Second Generations

For codling moth generation one, egg hatch ends at 920 DD. Egg hatch of the second generation starts at 1100 degree days, and the period of greatest egg hatch occurs at 1320-1720 DD. The time between the end of the first and beginning of the second generation egg hatch is longer than normal because of the cooler weather earlier in the season. You do not need to have the fruit protected in this lag period.

County	Location	FIRST GENERATION	SECOND GENERATION	
		Egg Hatch Ends	Begin protecting fruit (egg hatch begins again)	Period of Greatest Egg Hatch
Box Elder	Perry	July 13	July 21	July 30 - August 17
	Tremonton	July 24	July 31	August 9 - August 27
Cache	N. Logan	July 26	August 3	August 13 - September 4
	Providence	July 21	July 30	August 9 - August 30
	Smithfield	July 26	August 3	August 12 - August 31
Carbon	Price	past	July 18	July 29 - August 19
Davis	Kaysville	July 14	July 21	July 30 - August 15
Grand	Castle Valley	past	past	July 4 - July 18
Juab	Tintic	July 22	July 30	August 9 - August 29
Salt Lake	Holladay	past	July 17	July 25 - August 8
	West Valley City	past	July 14	July 22 - August 6
Sevier	Richfield	past	July 19	July 30 - August 19
Tooele	Erda	July 18	July 25	August 2 - August 17
	Tooele	July 13	July 20	July 28 - August 12
Uintah	Vernal	July 14	July 22	August 1 - August 20
Utah	Alpine	July 18	July 26	August 4 - August 22
	American Fork	past	July 19	July 28 - August 13
	Genola	past	July 18	July 27 - August 12
	Lincoln Point	July 14	July 21	July 30 - August 15
	Orem	past	July 16	July 24 - August 9
	Payson	July 14	July 21	July 29 - August 14
	Provo	past	July 17	July 25 - August 10
	Santaquin	July 15	July 22	July 31 - August 16
	West Mountain	July 15	July 22	July 31 - August 16
Weber	Pleasant View	July 13	July 19	July 27 - August 11
Wasatch	Heber City	August 2	August 12	August 26 - September 29
Wayne	Capitol Reef	past	past	July 13 - July 28

Spray Timing - Peach Twig Borer

Peach Twig Borer, First and Second Generations: End of first generation egg hatch, where you should “keep fruit protected up to” is at 800 degree days. Treatment for second generation egg hatch starts at 5% hatch, which is 1200 DD.

County	Location	FIRST GENERATION	SECOND GENERATION
		Keep Fruit Protected Through This Date	Begin protecting fruit
Box Elder	Perry	July 14	August 1
	Tremonton	July 22	August 7
Cache	All Locations	August 1	August 19
Carbon	Price	July 13	August 3
Davis	Kaysville	July 15	July 30
Grand	Castle Valley	past	past
Juab	Tintic	July 25	August 12
Salt Lake	Holladay	past	July 25
	West Valley City	past	July 18
Sevier	Richfield	past	July 27
Tooele	Erda	July 14	July 28
	Tooele	July 14	July 28
Uintah	Vernal	July 16	August 3
Utah	Alpine	July 22	August 8
	American Fork	July 14	July 30
	Genola	July 14	July 29
	Lincoln Point	July 16	August 1
	Orem	past	July 28
	Payson	July 15	July 30
	Provo	past	July 28
	Santaquin	July 18	August 2
	West Mountain	July 17	August 1
Weber	Pleasant View	July 17	August 1
Wasatch	Heber City	August 9	September 3
Wayne	Capitol Reef	past	July 15

Spray Materials - Commercial Applicators

NOTE: If your trees are in bloom, we do not recommend applying any pesticides unless you are controlling fire blight with antibiotics. Although it is OK to use “softer” materials such as Bt or spinosad during bloom, we still recommend either: waiting until the petal fall stage or applying at dawn or dusk when pollinators are not active.

Target Pest	Host	Chemical	Example Brands (Classification)	Amount per acre	REI	Comments
Codling moth	apple, pear	acetamiprid methoxyfenozide phosmet spinetoram thiacloprid rynaxypyr codling moth virus	Assail (4) Intrepid (18) Imidan (1) Delegate (5) Calypso (4) Altacor (28) Virosoft, etc	3.4 oz 16 oz 5.33 lbs 6-7 oz 4-8 oz 3.5-4.5 ---	12 h 4 h 5 d 4 h 12 h 4 h	<ul style="list-style-type: none"> for all products, ensure good coverage for effective control hort. oil works on eggs only codling moth virus must be applied every 7 days Altacor and Delegate have shown to have good efficacy, and target eggs and larvae
Woolly apple aphid	apple	acetamiprid carbaryl diazinon endosulfan flonicamid imidacloprid	Assail Sevin Diazinon Thionex Beleaf Admire	1.7 oz 1.5-3 qt 4 lb 3-4 lb 2-2.8 oz 7-10.5 oz	12 h 4 d 4 d 12 h 12 h	<p>Beleaf: 21 day PHI</p> <p>Admire: soil application only; 21-day PHI</p>
Greater peachtree borer	peach, nectarine, apricot	chlorpyrifos endosulfan esfenvalerate pemethrin	Lorsban Thionex Asana Pounce	see label see label see label 4-8 oz	4 d 4 d 12 h 12 h	<p>Lorsban: max once/season; do not allow spray to touch foliage/fruit</p> <p>Thionex: max twice/season</p>
Peach twig borer	peach, nectarine	Bt chlorantraniliprole spinetoram spinosad methoxyfenozide endosulfan phosmet	Dipel, Foray Altacor Delegate Success, Entrust Intrepid Thionex Imidan	see label 3-4.5 oz 4.5-7 oz see label 8-16 oz 4 lb 4 lb	4 h 4 h 4 h 4 h 4 h 4 d 4 d	<p>begin sprays according to spray timing table on previous page; maintain residual through end of egg hatch</p> <p>Delegate, Altacor: apply at 14 day intervals</p>
Powdery mildew	peach	azoxystrobin myclobutanil potassium bicarbonate pyraclostrobin + boscalid sulfur products	Abound (11) Rally (3) Kaligreen Pristine (7+11) variety (M)	11-15 oz 2.5-6 oz 2.5-3 lb 14.5-15.5 oz see label	4 h 24 h 4 h 12 h 24 h	
Powdery mildew	cherry	fenarimol myclobutanil propiconazole thiophanate-methyl triflumizole	Rubigan (3) Rally (3) Orbit (3) Topsin M (1) Procure (3)	6-12 oz 5 oz 10-16 oz 1-1.5 lb 10-16 oz	12 h 24 h 12 h 2 d 12 h	<p>All products listed have curative properties.</p> <p>Rubigan: 0 day PHI Rally: 0 day PHI Orbit: 0 day PHI Procure: 1 day PHI</p>
Western cherry fruit fly	cherry	acetamiprid carbaryl malathion imidacloprid spinetoram spinosad spinosad + bait	Assail Sevin Malathion Provado Delegate Success, Entrust GF-120	2.5-3.4 oz 1 pint 12 oz 6-8 oz 4-4.5 oz see label see label	12 h 12 h 12 h 12 h 4 h 4 h 4 h	could use 1 cover spray of Dimethoate post-harvest if any fruit is left in the orchard.

Spray Materials - Residential Applicators

Note that these treatments are only recommended if you know you have the particular pest in your trees. We recommend learning about specific pests, and scouting your trees at least once/week.

Target Pest	Host	Chemical	Example Brands	Comments/Insecticide Mode of Action Group (group)
Codling moth	apple, pear	<i>Conventional</i> acetamiprid carbaryl malathion gamma-cyhalothrin bifenthrin <i>Soft/organic</i> spinosad codling moth virus	Ortho Max Flower, Fruit, and Veg. Sevin, Bonide Fruit Tree Spray, etc. Malathion Spectracide Triazicide Ortho Max Lawn and Garden Green Light Lawn and Garden Spinosad; Gardens Alive Bull's Eye; Ferti-Lome Borer, Bagworm, Leafminer & Tent Caterpillar; Monterey Garden Insect Spray Virosoft, Cyd-X	acetamiprid: every 14 days; group 4 carbaryl: every 14 - 21 days; group 1 malathion: every 7 days; group 1 gamma-cyhalothrin: every 14 days; group 3 bifenthrin: every 14 days; group 3 spinosad: every 7 days; group 5 codling moth virus can only be purchased online
Greater peachtree borer	peach, nectarine, apricot	permethrin, bifenthrin carbaryl	Bonide Eight, Ortho Bug-b-Gone, Green Light Borer Killer, Bonide Borer-Miner Killer, Enforcer Outdoor Insect Killer, Hi-Yield Broad Use Including Gardens; Lilly Miller Multi-Purpose Insect Spray, Spectracide Bug Stop Sevin, Bonide Fruit Tree Spray	permethrin: apply every 14-21 days until mid-September in highly infested areas; apply twice (now and one month later) in low infestations carbaryl: must be applied every 7 days
Peach twig borer	peach, nectarine	<i>Conventional</i> acetamiprid carbaryl malathion permethrin <i>Soft/organic</i> spinosad kaolin clay	Ortho Max Flower, Fruit & Veg Sevin, Bonide Fruit Tree Spray, etc. Malathion Basic Solutions Yard & Garden, Bonide Eight see 'codling moth' above Surround	see comments under Codling Moth permethrin: every 14 days; this ingredient is becoming less available in stores Surround: every 3-5 days; works to repel, not kill insects; only moderate control; must purchase online
Western cherry fruit fly	cherry	carbaryl malathion pyrethrin spinosad (<i>Soft/Organic</i>)	Sevin Malathion Concern Multi-Purpose see above	start applications when fruit in sunniest locations develop a salmon blush spinosad: every 7 days
Walnut husk fly	walnut			

Precautionary Statement: Utah State University Extension and its employees are not responsible for the use, misuse, or damage caused by application or misapplication of products or information mentioned in this document. All pesticides are labeled with ingredients, instructions, and risks. The pesticide applicator is legally responsible for proper use. USU makes no endorsement of the products listed herein.

Tree Fruit IPM Advisory

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Editor: Marion Murray, marion.murray@usu.edu

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