

News/What to Watch For:

- Second generation start dates for codling moth added to spray timing table.
- Watch for spider mites.
- Continue monitoring for cherry powdery mildew and treat if necessary
- Greater peachtree borers have been caught in the Wasatch Front area.
- Commercial growers mark your calendar: USU Extension Tree Fruit Field Day, Utah County, August 18

Insect and Disease Activity/Info

APPLES/PEARS

Codling Moth



Determine the success of your first generation spray program in the next few weeks. Check fruit for stings (where the larvae was unsuccessful in entry) and entries. Look where fruit touch each other, or where fruits and leaves touch. Often, this is where larvae will enter the fruit, either due to the fact that the fruit is not protected by insecticide in these areas, or it offers the larva better protection from predators.

The “when do I spray” table, on page 7, has been updated with the start date for 2nd generation codling moth egg hatch. The first generation egg hatch will end late next week for most locations along the Wasatch Front (near the end of July for cooler locations). The “break” between end of 1st generation egg hatch and beginning of 2nd generation ranges from about 4-6 days. So keep this in mind if you still need to apply one last spray for 1st generation. If it lasts until the end, then you won't need to spray again until the beginning of the second generation.

Leafhoppers



Leafhoppers have been active since egg hatch around petal fall, and are very noticeable now that they have matured to adults. If you look on the underside of a leaf showing symptoms, you will notice white “skins” where leafhopper nymphs have molted from one stage to the next. There are two generations of leafhopper per year, and the second generation which will show up in late summer, can be large if the first generation is not controlled. Apple trees can tolerate a large population (more than 6 nymphs/leaf) before any damage occurs to fruit, but hopping and flying insects can be a nuisance during harvest.

Growers who are using acetamiprid (Assail, Ortho Max) for codling moth should see leafhopper control, too. Otherwise, consider Belay or Actara. (Leafhoppers are usually not pests on backyard trees.)

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Spider Mites



Spider mite activity is slowly increasing, on apples, peaches, and cherries. Check for mites on your own trees by examining the leaves on the lowest branches first. (Mites overwinter in groundcover and migrate up the tree in hot, dry weather.) Look for stippling (whitish spots) on the leaves, and turn them over. Using a hand lens, look for the slow-moving mites.

Before making a decision on whether to treat, look for predatory mites within the pest mite population. These are fast moving mites, about the same size, that can prevent spider mite densities from exceeding economic thresholds. If predators are present, then a treatment may not be necessary.

A 0.5-1% application of horticultural oil is very effective on mites, especially when populations are low. When treating, good coverage is essential.

Appleleaf and Pearleaf blister mites



Damage from blister mites is becoming obvious at this time of year. These minute, 4-legged mites feed inside the blisters that form on the leaves, and in late summer, they migrate to leaf buds to continue feeding and to spend the winter.

The blisters have started turning brown (apple) to black (pear), and will continue to darken as the summer progresses. Note that there is nothing to do for treatment at this time of year, but an application of 1% oil just before leaf drop, and 2% oil at the delayed dormant timing, can effectively control this pest.

STONE FRUITS

California Prionus Root Borer



Prionus larvae of this insect bore within the roots of stone fruits, in particular sweet cherry. The only way to tell if an infestation is present is to dig up roots to look for larvae or damage. A minor infestation will cause tree wilting and possibly yellowing of leaves due to lack of water and nutrient uptake. A heavy infestation will kill trees. The problem tends to be more severe in sandy soils. Prionus also feeds on other ornamentals, including gambel oak and maple.

The adult is a very large (1-2-inch), brown beetle that emerges from pupation in July. They were trapped in the Perry area July 5, and will continue emerging for the next month. Adults fly only at night during their short 10-20 day life span. They do not feed; their only objective is to mate.

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After mating, the female lays 150-200 eggs just below the soil surface and near the trunk of trees. Larvae seek out roots for feeding. They begin at the smallest diameter roots and eventually move to larger diameter roots toward the crown of the tree. This process can take 3-5 years. Mature larvae are up to 3 inches long.

There are very little control options except to keep trees healthy, completely remove infested trees, and avoid planting in infested sites.

Recently, the female sex pheromone was identified, and a lure is now available, made by ConTech. One option for small farms or backyard trees would be mass trapping over a period of several years. There is some evidence that this can reduce the population over time.

Entomologist Diane Alston and Box Elder County Ag Agent, Mike Pace, are testing the use of high loads of pheromone to disrupt the mating process (mating disruption). So far, results look good with traps at test sites catching very few beetles. A mating disruption product may be available within the next 1 to 2 years.

Greater Peachtree Borer



The first borer moths of the season were caught this week, so all growers in the Wasatch Front region should begin treatment now on peach, nectarine, and apricot. We don't expect to see moths in Cache or Carbon counties for at least 2-3 more weeks.

Greater peachtree borer (sometimes called trunk, root, or crown borer) is a day-flying moth that resembles wasps. You may see them (thin, metallic blue-black body with clear wings) resting on leaves. Adults lay eggs on the lower 12" of the tree trunk or on nearby soil, and larvae bore their way into the wood and remain there for the next 9-11 months.

Sprays only need to be applied to the lower 12-18" of the trunk and any exposed roots. The residual material on the bark will kill the eggs laid by the adults as well as newly hatching larvae. Materials that contain permethrin (that are labeled for fruit trees) will provide the best control. Sprays should be applied 14-21 days apart, through the end of September.

PRODUCTION INFORMATION

Preventing Injury from Birds

Robins, starlings, blackbirds, grackles, and even our beautiful orchard oriole can sometimes be a nuisance by stealing precious fruit crops such as sweet cherries and grapes. Crops growing near roosting or nesting areas, trees, or ponds, are the most vulnerable.

Because birds acclimate quickly to some bird control options such as uniform movements or noise patterns, it is important to use a variety of methods rather than relying on one option. The options available include using visual repellents, barriers, or chemical sprays. Larger farms may also incorporate noise or roosting sites to attract larger birds of prey.

Visual Repellents



Scaring tactics using visual objects are probably the least effective option, but when combined with other tactics, can be helpful. Options include "scare eye balloons" that depict eyes (or the gaping mouth) of a hawk. Research in Ontario has shown that the yellow colored balls are most effective on blackbirds, sparrows and finches, but that no color affects robins and waxwings. To be effective, they should be suspended above the crop and allowed to blow in the wind. Shiny streamers and mirrors reflect the sun, and when distributed over a wide area, confuse birds. Fake hawks, snakes, or other objects have no effect.

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Physical Barriers



Using netting provides the best control on smaller crops, but is expensive or impractical on large cherry trees. The netting may be draped over the crop or fastened to an overhead structure which completely encloses the crop.

Chemical Control

Many chemicals have been tested over the last several decades, but few have provided acceptable control without any health risks. Research that began out of Cornell in the late 1990s found that methyl anthranilate, a flavor component of Concord grapes, is repellent to most birds. This food-grade chemical is used in certain gum, candy, juice, and soft drink products. In research trials, however, it was found to lose effectiveness after about 3 days, is not rainfast, and must be consumed in high quantities to be effective. It is registered as FruitShield.

Noise

Loud blasts of noise at irregular intervals can scare birds away (as well as neighbors). Bird-bangers (cannons) can fire shots at a random times and locations. Ideally, sounds should be spaced no more than 3 minutes apart. Birds get used to sounds that never change and are regularly spaced. Cannons are not practical on smaller farms where the loud noise will disturb neighbors. Other options are a warbling alarm-type signal or distress calls. The alarm calls prevent birds from communicating with each other so that they eventually leave the area, and the distress calls prevent nesting and also attract birds of prey. An effective noise device for larger farms is a pistol-fired, whistling, or banging cartridge that is shot into the air to prevent flocks from entering the area.

For effective bird control, it is important to use a variety of options and start early before birds become habituated to the site.

Rainfastness of Pesticides

Dr. John Wise at the Michigan State University Trevor Nichols Research Center, began testing many pesticides for rainfastness starting in 2006. They have been using a rainfall simulation chamber to conduct trials on fruit crops.

What he found was:

- The organophosphate insecticides (Imidan, Guthion) are the least rainfast. On the other hand, they are highly toxic, which may overcome the need for an immediate re-application after a rain event.
- Neonicotinoid insecticides (Provado and generics, Assail) are slightly more rainfast, but can be washed off. Keep in mind that these products are systemic, and can move into the plant tissue. Material that has had time to enter tissue is completely rainfast (about 4 hours).
- Pyrethroid, carbamate and IGR insecticides (Warrior, Pounce, Sevin, Esteem, etc.) are moderately susceptible to wash-off, and vary in their toxicity to the range of relevant fruit pests.
- Diamide and spinosyn insecticides (Delegate, Altacor, Success) are highly rainfast.

He has developed the following rainfastness charts:

General Rainfastness for Various Chemical Classes Under Different Rain Amounts

Insecticide Class	Rainfall <0.5 inch		Rainfall <1 inch		Rainfall <2 inch	
	Fruit	Leaves	Fruit	Leaves	Fruit	Leaves
Organophosphates	L	M	L	M	L	L
Pyrethroids	M	M	L	M	L	L
Carbamates	M	M	L	M	L	L
IGRs	M	H	L	M	L	L
*Neonicotinoids	M	H	L	L	L	L
Spinosyns	H	H	H	M	M	L
Diamides	H	H	H	M	M	L
*Avermectins	M	H	L	M	L	L

*Systemic residues remain within plant tissues

H=highly rainfast (less than 30% removed), M=moderately rainfast, L=low rainfast (more than 70% wash-off)

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Apple Insecticide Precipitation Wash-off Re-application Decision Chart: Expected codling moth control in apples, based on each compound's inherent toxicity to CM larvae, maximum residual, and wash-off potential from rainfall.

Insecticide	Rainfall=0.5 inch		Rainfall=1.0 inch		Rainfall=2.0 inch	
	*1 day	*7 days	1 day	7 days	1 day	7 days
Guthion				X		X
Imidan				X		X
Asana	X		X	X	X	X
Calypso				X	X	X
Assail	X		X	X	X	X
Proclaim	X			X	X	X
Delegate						X
Altacor						X
Belt						X

*Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus re-application is recommended.

- An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

Degree Day Accumulations and Insect Development

Upcoming Monitoring/Insect Activity

Pest	Host(s)	DD/Monitoring Action
Codling moth	apple fruit	Second generation begins late July
San Jose scale	apple mostly	Treat crawlers in early July
Pear psylla	pear	Second generation egg hatch begins early July
Peach twig borer	peach, nectarine, apricot	Egg hatch begins late June
Peach powdery mildew	peach	Look for powdery lesions (peach powdery mildew) or rust-colored lesions (apple powdery mildew) in July
Cherry powdery mildew	cherry	Look for small white lesions on new foliage near the base and interior of the tree

Degree Day Accumulations and Pest Phenology, through July 6.

Click [here](#) for information about degree days.

County	Location	Codling Moth (1st Generation)			Peach Twig Borer (1st Generation)		
		DD (post biofix)	% Moth Flight	% Egg Hatch	DD (post biofix)	% Moth Flight	% Egg Hatch
Box Elder	Perry	460	85	45	228	51	1
	Tremonton	449	84	42	---	---	---
Cache	River Heights	532	92	64	196	38	0
	Smithfield	502	90	54	174	30	0
Carbon	Price	644	98	80	338	85	11
Davis	Kaysville	664	98	83	443	97	43
Grand	Castle Valley	1348	51	15	948	3	0
Iron	Cedar City	644	98	80	495	99	62
Salt Lake	Holladay	729	99	90	540	100	75
	West Valley City	748	100	91	558	100	79
	West Jordan	689	99	85	---	---	---
Tooele	Erda	581	99	70	485	98	50
	Tooele	643	95	80	573	100	82
Uintah	Vernal	689	99	86	445	97	43
Utah	Alpine	525	92	59	150	23	0
	American Fork	615	96	73	453	97	45
	Genola	749	100	91	392	93	24
	Goshen	462	85	45	215	45	0
	Lincoln Point	647	98	80	315	78	7
	Lindon	518	91	58	262	64	2
	Provo	---	---	---	517	99	68
	Payson	637	98	80	---	---	---
	Santaquin-West	636	98	80	203	38	0
	West Mountain	634	97	89	---	---	---
Weber	Pleasant View	671	98	83	464	98	51
Wasatch	Heber City	421	80	32	---	---	---
Wayne	Capitol Reef	687	99	86	---	---	---

Spray Timing

Codling Moth - Continue to apply your chosen material(s) at the interval provided on the label. Make sure fruit is well protected during the period of greatest egg hatch. You do not need to spray between generations.

County	Location	Period of Greatest Egg Hatch (340-640 DD)	Keep Fruit Protected up To: (1020 DD)	Second Generation (1120)	Period of Greatest Egg Hatch: 2nd Generation (1320-1720)
Box Elder	Perry	past	July 23	July 27	Aug 3 - Aug 21
	Tremonton	July 1 - July 14	July 28	July 30	Aug 10 - Aug 29
Cache	River Heights	June 26 - July 12	July 27	Aug 2	Aug 10 - Aug 31
	Smithfield	June 29 - July 12	July 27	Aug 1	Aug 9 - Aug 28
Carbon	Price	June 25 - July 12	July 31	Aug 2	Aug 9 - Sept 3
Davis	Kaysville	past	July 18	July 25	Aug 1 - Aug 18
Grand	Castle Valley	past	past	past	July 5 - July 19
Iron	Cedar City	past	July 22	July 26	Aug 3 - Aug 21
Salt Lake	Holladay	past	July 13	July 19	July 27 - Aug 9
	West Valley City	past	July 15	July 20	July 27 - Aug 11
	West Jordan	past	July 21	July 22	July 29 - Aug 13
Tooele	Erda	past	July 21	July 27	Aug 2 - Aug 18
	Tooele	past	July 20	July 25	July 31 - Aug 16
Uintah	Vernal	past	July 23	July 27	Aug 4 - Aug 24
Utah	Alpine	June 20 - July 10	July 26	July 31	Aug 9 - Aug 27
	American Fork	past	July 23	July 27	Aug 3 - Aug 20
	Genola	past	July 19	July 21	July 29 - Aug 14
	Goshen	past	July 22	July 30	Aug 10 - Aug 27
	Lincoln Point	past	July 21	July 25	Aug 2 - Aug 18
	Lindon	past	July 17	July 21	July 29 - Aug 13
	Payson	past	July 19	July 25	Aug 2 - Aug 18
	Santaquin-West	past	July 21	July 25	Aug 2 - Aug 19
West Mountain	past	July 19	July 24	Aug 2 - Aug 18	
Weber	Pleasant View	past	July 18	July 23	July 30 - Aug 14
Wasatch	Heber City	July 1 - July 18	August 8	Aug 15	Aug 25 - Sept 29
Wayne	Capitol Reef	past	July 13	July 20	July 29 - Aug 13

Spray Timing

Peach Twig Borer - If you had moderate to severe PTB damage last year, use the earlier spray date; if you had very little PTB damage last year, use the later date to start sprays. These two dates correspond to 300 and 360 degree days after biofix, or 5% and 16% egg hatch. End of egg hatch, where you should "keep fruit protected up to" is at 800 degree days. The second generation egg hatch (5%) starts at 1200 DD.

County	Location	Start Sprays (300 DD: large population/heavy damage)	Start Sprays (360 DD: small population/little to no damage)	Keep Fruit Protected Up To: (800DD)	Start sprays, 2nd Generation (1200 DD)
Box Elder	Perry	past	past	July 25	Aug 8
Cache	River Heights	July 12	July 15	Aug 3	Aug 21
	Smithfield	July 12	July 14	Aug 1	Aug 18
Davis	Kaysville	past	past	July 20	Aug 4
Grand	Castle Valley	past	past	past	July 15
Iron	Cedar City	past	past	July 20	Aug 4
Salt Lake	Holladay	past	past	July 15	July 29
	West Valley City	past	past	July 16	July 29
Tooele	Erda	past	past	July 18	Aug 1
	Tooele	past	past	July 16	July 29
Uintah	Vernal	past	past	July 24	Aug 10
Utah	Alpine	July 12	July 15	Aug 3	Aug 20
	American Fork	past	past	July 21	Aug 5
	Genola	past	past	July 22	Aug 7
	Goshen	July 7	July 10	July 27	Aug 15
	Lincoln Point	past	past	July 18	Aug 2
	Lindon	past	past	July 18	Aug 3
	Provo	past	past	July 17	Aug 1
Santaquin	July 9	July 13	July 29	Aug 14	
Weber	Pleasant View	past	past	July 19	Aug 2

Spray Materials - Commercial Applicators

The options provided below are not all-inclusive and are not endorsements of USU. Please check the label before mixing.

Target Pest	Host	Example Brands	Chemical	Amount per acre	REI	Comments
Codling Moth	apple	Altacor 35WDG	chlorantraniliprole	3.0-4.5 oz	4 h	re-apply based on product interval through each generation until harvest on Sept. 15
		Assail	acetamiprid	1.7-3.4 oz	12 h	
		Belt SC	flubendiamide	5 oz	12 h	
		Delegate 25WG	spinetoram	6-7 oz	4 h	
		Imidan 70W	phosmet	3.5-5.3 lbs	3 d	
		Voliam Flexi	thiamethoxam + chlorantraniliprole	4-7 oz	12 h	
San Jose scale	apple	acetamiprid	Assail	3.4 oz	12 h	Talus: one application/season Esteem: 45-day PHI; excellent control
		buprofezin	Talus	see label	12 h	
		pyriproxifen	Esteem	4-5 oz	12 h	
Woolly apple aphid	apple	Assail	acetamiprid	1.7 oz	12 h	apply post bloom only if scouting shows that this pest is present
		Beleaf	flonicamid	2-2.8 oz	12 h	
		Calypso	thiacloprid	2-4 oz	12 h	
		Clutch	clothianidin	2-3 oz	12 h	
		Admire Pro; generics	imidacloprid	see label	12 h	
Peach twig borer	peach, nectarine	Belt	flubendiamide	3-4 oz	12 h	reapply based on protection interval until harvest
		Altacor	chlorantraniliprole	3.0-4.5 oz	12 h	
		Delegate	imidacloprid	4.5-7.0 oz	12 h	
		Imidan	phosmet	4.25 lbs	12 h	
		Voliam Flexi	thiamethoxam+ chlorantraniliprole	4-7 oz	12 h	
Greater peachtree borer	peach, nectarine, apricot	chlorpyrifos	Lorsban	see label	4 d	Lorsban: max once/season; do not allow spray to touch foliage/fruit Thionex: max twice/season
		endosulfan	Thionex	see label	4 d	
		esfenvalerate	Asana	see label	12 h	
		pemethrin	Pounce	4-8 oz	12 h	
Powdery mildew	peach	Adament	tebuconazole+ trifloxystrobin	4-8 oz	4 h	monitor fruit and leaves for powdery mildew and only apply if necessary; chance of fruit infection decreases after pit hardening
		Abound	azoxystrobin	11-15 oz	12 h	
		Orbit, Tilt	propiconazole	4 oz	4 h	
		Pristine	boscalid+ pyraclostrobin	2-2.4 oz	12 h	
Western Cherry Fruit fly	cherry	Altacor	chlorantraniliprole	3.0-4.5 oz	4 h	start applications when fruit develops salmon blush color on top of yellow and continue until harvest
		Assail	acetamiprid	5.3-8 oz	12 h	
		Delegate	spinetoram	4.5-7 oz	4 h	
		GF-120	spinosad+bait	10-20 oz	4 h	
		Admire Pro; generics	imidacloprid	see label	12 h	
Powdery mildew	cherry	Abound	azoxystrobin	11-13 oz	4 h	
		Pristine	boscalid+ pyraclostrobin	10.5-14.5 oz	12 h	
		Quintec	quinoxifen	7 oz	12 h	
		Rally	myclobutanil	2.5-6 oz	24 h	
		Rubigan	fenarimol	6-12 oz	12 h	

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
Codling moth	apple, pear	<i>Conventional</i>		acetamiprid: every 14 days carbaryl: every 14 - 21 days malathion: every 7 days gamma-cyhalothrin: every 14 days bifenthrin: every 14 days hort. oil: lasts 5-7 days for killing eggs; use at beginning of each generation; apply at 1% rate only when temperatures are below 80; follow up with a different product spinosad: every 7 days
		carbaryl	Sevin, Bonide Fruit Tree Spray, etc.	
		acetamiprid	Ortho Max Flower, Fruit, and Veg.,	
		malathion	Malathion	
		gamma-cyhalothrin	Spectracide Triazicide	
		bifenthrin	Ortho Max Garden Insect Killer	
		<i>Soft/organic</i>		
		hort. oil (1%)	Many products	
		spinosad	Green Light, Gardens Alive Bull's Eye	
San Jose scale	apple	<i>Conventional</i>		two applications spaced 7-14 days apart should be enough
		bifenthrin	Ortho Bug-b-Gone	
		carbaryl	Sevin	
		<i>Soft/organic</i>		
		hort. oil	many options	
		neem oil	Concern, Garden Safe, others	
Peach twig borer	peach, nectarine	<i>Conventional</i>		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
		acetamiprid	Ortho Max Flower, Fruit & Veg	
		carbaryl	Sevin, Bonide Fruit Tree Spray, etc.	
		malathion	Malathion	
		permethrin	Basic Solutions Yard & Garden	
		<i>Soft/organic</i>		
		spinosad	see 'codling moth' above	
		kaolin clay	Surround	
Greater peachtree borer	peach, nectarine, apricot	permethrin, bifenthrin	variety	permethrin: apply every 14-21 days until mid-September carbaryl: must be applied every 7 days
		carbaryl	Sevin, Bonide Fruit Tree Spray	
Aphids	all fruit trees	carbaryl	Bayer Advanced	start with a single application
		bifenthrin	Ortho Bug-B-Gone	
		malathion	Bonide, Malathion	
		permethrin	Lilly Miller	
Powdery mildew	all fruit trees	bayleton	Bonide	do not apply lime sulfur when temperature is over 75 degrees F. Neem oil and Kaligreen are organic options
		lime sulfur	Lilly Miller	
		propiconazole	Ferti-Lome	
		neem oil	Garden Safe	
Western cherry fruit fly	cherry	potassium bicarbonate	Kaligreen	start applications when fruit in sunniest locations develop a salmon blush spinosad: every 7 days
		malathion	Malathion	
		pyrethrin	Concern Multi-Purpose	
		spinosad	see above	

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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