

News/What to Watch For:

Insect activity (codling moth, fruitworm, aphids, leafhopper, and beneficials) continues to be at a low due to cold weather.

- Codling moth spray timings updated in table below
- If any infections have occurred due to fire blight, they will be showing up soon, as wilted shoots. Prune these out as you see them, about the same distance into healthy wood as the length of the shoot.
- Watch peach fruits for powdery mildew lesions as the fruit starts maturing.
- Brown mite (a cool season mite related to spider mites) has started showing up in some orchards.
- Western cherry fruit fly will not be an issue until fruit has developed a salmon blush color (several weeks away).

Insect and Disease Activity/Info

APPLES/PEARS

Codling Moth

Because of the cool, wet spring, codling moth emergence has been very sporadic. Biofix (first trap catch) is about 2 weeks later than last year in most locations. Adults only fly at night, looking for mates and egg-laying sites, when temperatures are above 50 and when there is not a pouring rain. The weather has surely prevented mating, and thus egg-laying from happening so far. Eggs within females are only viable for about 3-4 days, so if they cannot mate with males, eggs do not get laid. We are hoping that this means a "light" population for the first generation flight. Updated spray timings are posted below.

STONE FRUITS

Peach Twig Borer

Peach twig borers spend the winter as small larvae in galleries within the tree cambium. Larvae have emerged and moved to newly expanding shoots where they bore into the tip to feed, causing the typical "shoot strikes." They will pupate within the shoots and emerge soon as adult moths, to lay eggs on shoots. Later generations feed on the fruit. We have not caught any moths, and when we do, we will be able to provide dates for starting sprays.

Aphids

Aphid eggs that survived your dormant oil sprays have hatched and are multiplying now, including green peach aphid, leaf curl plum aphid, and black cherry aphid. Be sure to examine the aphid colonies closely for beneficial insects, as they are also increasing in population.



Green peach aphid is the most damaging, especially to nectarines, in that feeding can result in deformed fruit. All three species leave their tree fruit hosts for the summer to vacation on alternate plant hosts, returning at the end of the season to mate and lay eggs.

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Oil (1%) or insecticidal soap are the best options for residential growers. Once leaves are tightly curled, aphids are more difficult to treat, so thorough coverage is important.

Gummosis

With the warming temperatures comes the flow of sap, especially noticeable in stone fruit trees (cherry, apricot, peach, and plum). The oozing is sometimes generically referred to as gummosis (although back East, "gummosis" refers to a disease caused by a fungal pathogen). The sticky, oozing gum can be clear or amber in color, and by the end of the summer, it will have become almost rock-hard.



oozing gum on stone fruit trees can be caused by a variety of factors



ooze from cytospora canker is amber in color, and often occurs in association with wounds, like improper pruning cuts



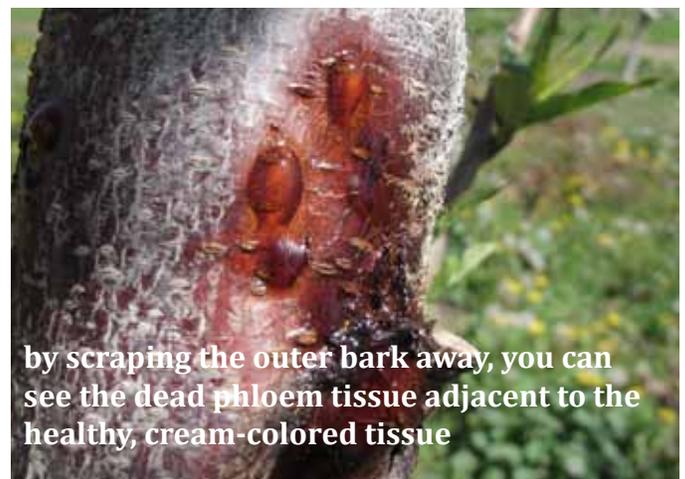
oozing from shothole borers is a response to push out the insect

I. A plant pathogen

- a) Cytospora canker, caused by *Leucostoma cincta*, invades and kills bark and cambial tissue through wounds such as pruning cuts, sunscald, hail, etc. Gumming from cytospora is dark amber in color, and if you scrape the outer bark, the dead phloem will appear cinnamon brown in color. Cytospora canker is an opportunistic pathogen, meaning that it invades trees through wounds. It can be found almost everywhere, so prevention is the key to management.



ooze from bacterial canker (apricot) is milky in color



by scraping the outer bark away, you can see the dead phloem tissue adjacent to the healthy, cream-colored tissue



flatheaded borers attack trees under stress that often do not have the reserves to exude sap

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Management for cytospora includes:

- i. in normal pruning operations, make proper cuts (i.e., do not leave stubs or do not make "flat cuts" that remove the branch collar where healing would normally occur) and do not prune in wet weather;
- ii. use white tree wrap or 50/50 latex paint/water to prevent sunscald injury
- iii. prune affected limbs back to healthy wood and sterilize tools with 10% bleach between cuts;
- iv. remove severely affected trees;
- v. keep trees healthy with optimal watering, mulching, nutrition, etc.

b) Bacterial canker, caused by *Pseudomonas syringae*, is more common on cherry, but has been identified from peach in Utah. Gumming from bacterial canker can also be amber in color, but may appear milky. Exposed phloem will have a slight fermented smell. *Pseudomonas* is also opportunistic, entering the plant tissue through tiny wounds. The bacteria can survive as a non-pathogenic epiphyte on leaf and bark surfaces of peaches, cherries, and many other plants including weeds.

Infections occur in late fall just prior to winter, and symptoms appear the following spring. Late season rainfall spreads the bacteria from leaf surfaces to buds where the infections take place. Infections are inconspicuous in the fall and winter but become more obvious in the spring, with dead buds that often exhibit signs of gummosis. Flowers and foliage may be infected under rainy conditions, resulting in wilting of shoots and oozing. Once within the branches, the bacteria invades the phloem, causing cankers

Management is the same as for cytospora canker, with the addition of copper sprays in the fall (2-3 applications beginning at 10% leaf drop to just after full leaf drop) and early spring prior to bud break.

2. Greater peachtree borer.

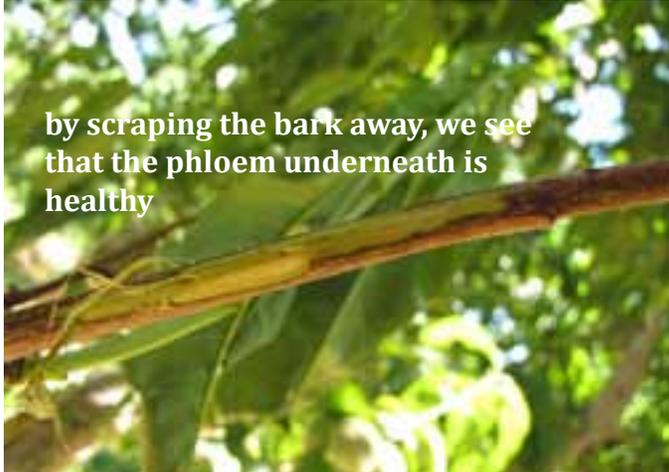
If you see gumming at the base of the tree (no higher than 8-12"), the gumming may be caused by this borer, and is not a canker. Peachtree borers attack the crown of the tree, and healthy trees can withstand attack. Tree can be protected with a properly timed insecticide (more information in future advisories).

3. Flatheaded or shothole borers.

These types of beetles will only attack weakened trees or wounds such as where sunscald has occurred. Attacks on healthy trees are usually unsuccessful because the tree will exude enough sap/ooze to flush out the insects. Ooze is



clear oozing may be a result of a wound



by scraping the bark away, we see that the phloem underneath is healthy

often clear in color, and limited to beetle entry holes. Weakened trees that are attacked may actually not ooze as much because they do not have enough reserves to waste on this response. Management of these pests is difficult, and may include bark sprays of permethrin May through August.

4. Wounds

Wounds from frost crack, bark injury, cat scratching, hail, etc. may exude gum in spring. Gummosis not caused by a pathogen will run somewhat clear in color (but will dry to amber).

5. Other climatic or physiological problems

Factors such as planting too deep, excessive irrigation, severe pruning from April - August, or over-bearing have all been cited as possible causes of abiotic gummosis.

If you are not sure that a pathogen is causing the gummosis, scrape the outer bark away. If the inner bark is still cream-colored (healthy), the oozing is caused by a non-living factor, and there is nothing you should do. If the wood is tan to brown, it is dead, and was most likely killed by a pathogen.

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Coryneum Blight



Coryneum blight (also known as shot hole) infections on fruit are showing up now, especially on apricots. The cool wet weather has been ideal for spread of this disease. As mentioned in earlier advisories, the optimal timing for coryneum is at the shuck split stage of fruit development.

Coryneum blight is caused by a fungus that overwinters in buds, causing small gummy cankers. From there, it spreads to leaves and later, to developing fruit. Infections on the leaves cause small round holes, with the center of the lesion sometimes barely attached. On fruit, lesions vary from dark colored warts to sunken lesions (depending on time of infection). Look for developing lesions (holes in the leaves and purplish spots on fruit) and treat if necessary to protect fruit for later in the season.

Keep in mind that future infections will occur whenever there is a 4-hour window of moisture.

Management for residential growers: If your peaches are at the shuck-split stage (currently only cooler areas such as Cache County, northern Box Elder County), you can use chlorothalonil (Fertilome, Bonide Fungonil). If your fruit is beyond this stage, you cannot use chlorothalonil. The only other easily available option is captan (Bonide). If you can find it, Ziram is very effective, and if you can afford it, so is Pristine.

Management for commercial growers: Ziram and Pristine are most effective, Abound is somewhat effective.

For all growers: an application of copper at 50% leaf drop in the fall is an excellent option for control of coryneum blight.

Peach Leaf Curl



Peach leaf curl is showing up in many places this spring due to the cool wet weather. Peach leaf curl is a fungal-caused disease that affects peach and nectarine. Infection occurs just as the leaves are opening, and causes puckering and distortion of the leaves. The affected area is pink at first, and then turns green, then brown. Leaves will eventually drop. Infections only occur when temperatures are below 79 F in the presence of moisture. Once the temperatures rise, further infections of leaves and fruit will end.

If you see these symptoms, note that there are no fungicides that can be applied at this time. The best treatment is a single application of a fixed copper applied at leaf fall.

For now, maintain tree vigor of infested trees by thinning more fruit than normal, reducing drought stress with irrigation (if soils ever dry up), and apply extra nitrogen fertilizer.

Degree Day Accumulations and Insect Development

Upcoming Monitoring/Insect Activity

Pest	Host(s)	DD/Monitoring Action
Apple powdery mildew	apple	Look for small white lesions on new foliage
Cherry powdery mildew	cherry	Look for small white lesions on new foliage near the base and interior of the tree
White apple leafhopper	apple	Look for nymph and adult activity on undersides of leaves
Codling moth	apple, pear	Egg-hatch continues through late June/early July
Black cherry aphid	cherry	Watch terminals for leaf-curling and feeding
Peach twig borer	peach, nectarine	First flight early to mid June
Green peach aphid	peach, nectarine	Look for colonies on peach and nectarine
San Jose scale	apple mostly	Treat crawlers in late June/early July

Degree Day Accumulations and Pest Phenology, through May 31

County	Location	Codling Moth		
		DD (post biofix)	% Moth Flight	% Egg Hatch
Box Elder	Perry	42	4	0
Cache	River Heights	16	2	0
	Smithfield	13	1	0
Davis	Kaysville	59	7	0
Grand	Castle Valley	376	73	25
Iron	Cedar City	60	7	0
Salt Lake	Holladay	109	17	0
	West Valley City	106	16	0
	West Jordan	67	8	0
Tooele	Tooele	130	17	0
Uintah	Vernal	91	13	0
Utah	American Fork	17	2	0
	Genola	106	15	0
	Goshen	36	4	0
	Lincoln Point	40	4	0
	Lindon	82	10	0
	Payson	59	7	0
	Santaquin-West	58	7	0
	West Mountain	66	8	0
Weber	Pleasant View	52	6	0
Wasatch	Heber City	20	2	0
Wayne	Capitol Reef	112	17	0

Spray Timing

The table below shows two options for the first spray of the first generation. Option A may provide a slight cost savings, and can be repeated at the beginning of the second generation. It uses horticultural oil (1%) to target eggs before they have started to hatch. The second spray will then be about 7-12 days later, and will coincide with the period when eggs would normally be rapidly hatching. Option B is the traditional date to start sprays--when the eggs start hatching.

Good residue (insecticide) coverage is important at this timing. After the first insecticide spray has been applied, continue to apply your chosen material(s) at the interval provided on the label.

County	Location	Option A		Option B	
		Apply Oil (200 DD)	Apply delayed 1st cover (350 DD)	Traditional Start Date (1% egg hatch)	Period of Greatest Egg Hatch (340-640 DD)
Box Elder	Perry	June 11	June 20	June 13	June 20 - July 5
Cache	River Heights	June 15	June 25	June 17	June 24 - July 10
	Smithfield	June 15	June 24	June 16	June 23 - July 8
Davis	Kaysville	June 9	June 17	June 10	June 17 - July 1
Grand	Castle Valley	past	past	past	May 28 - June 13
Iron	Cedar City	June 10	June 19	June 11	June 19 - July 3
Salt Lake	Holladay	June 5	June 13	June 6	June 13 - June 26
	West Valley City	June 6	June 15	June 6	June 14 - June 28
	West Jordan	June 8	June 17	June 10	June 16 - June 30
Tooele	Tooele	June 5	June 13	June 6	June 13 - June 27
Uintah	Vernal	June 8	June 18	June 9	June 17 - July 4
Utah	American Fork	June 12	June 21	June 13	June 20 - July 4
	Genola	June 7	June 16	June 8	June 16 - July 1
	Goshen	June 11	June 19	June 12	June 17 - July 1
	Lincoln Point	June 11	June 20	June 13	June 20 - July 4
	Lindon	June 7	June 15	June 8	June 14 - June 28
	Payson	June 10	June 18	June 11	June 18 - July 2
	Santaquin-West	June 10	June 19	June 11	June 19 - July 3
	West Mountain	June 8	June 17	June 10	June 16 - June 31
Weber	Pleasant View	June 9	June 18	June 11	June 17 - July 1
Wasatch	Heber City	June 16	June 27	June 18	June 26 - July 14
Wayne	Capitol Reef	June 5	June 12	June 6	June 12 - June 25

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	
		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	
Rosy apple aphid	apple	Assail	acetamiprid	1.7 oz	12 h	apply post bloom only if scouting shows that this pest is present
		Clutch	clothianidin	2-3 oz	12 h	
		Beleaf	flonicamid	2-2.8 oz	12 h	
		Provado	imidacloprid	4-8 oz	12 h	
		Calypso	thiacloprid	2-4 oz	12 h	
Pear psylla	pear	Assail	acetamiprid	1.7-3.4 oz	12 h	oil alone is also effective, or add oil to one of these products
		Centaur WDG	buprofezin	34.5-45 oz	12 h	
		Delegate	spinetoram	4-7 oz	4 h	
Powdery mildew	apple	Kaligreen	potassium bicarbonate	2.5-3 lb	4 h	apply starting at open cluster stage and repeat every 7-14 days if necessary
		Flint	trifloxystrobin	2-2.5 oz	12 h	
		Rally	myclobutanil	5 oz	24 h	
		Procure	triflumizole	8-16 oz	12 h	
		Pristine	pyraclostrobin + boscalid	14.5-18 oz	12 h	
		Rubigan	fenarimol	12 oz	12 h	
Green peach aphid	peach, nectarine	Assail	acetamiprid	8 oz	12 h	apply to nectarines if >1 colony/tree and peaches, >2 colonies/tree
		Provado	imidacloprid	4-8 oz	12 h	
Lygus bug	peachers	Aza-Direct	azadirachtin	1-2 pints	4 h	OMRI certified organic
		Baythroid	beta-cyfluthrin	2-2.4 oz	12 h	restricted use product
		Tombstone	cyfluthrin	2-2.4 oz	12 h	restricted use product
		Pyganic	pyrethrin	4.5-18 oz	4 h	OMRI certified organic
Coryneum blight	peachers, nectarine, apricot	Captan	captan	see label	24 h	
		Pristine	boscalid+ pyraclostrobin	10.5-14.5 oz	12 h	
		Ziram/Thiram	ziram	6-8 lbs	48 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> carbaryl acetamiprid malathion gamma-cyhalothrin bifenthrin <i>Soft/organic</i> hort. oil (1%) spinosad codling moth virus	Sevin, Bonide Fruit Tree Spray, etc. Ortho Max Flower, Fruit, and Veg., Malathion Spectracide Triazicide Ortho Max Lawn and Garden Insect Killer Many products Green Light, Gardens Alive Bull's Eye Virosoft, Cyd-X	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 codling moth virus can only be purchased online
Aphids	all fruit trees	carbaryl bifenthrin malathion neem oil permethrin	Bayer Advanced Ortho Bug-B-Gone Bonide, Malathion Green Light Lilly Miller	start with a single application
Powdery mildew	apple	bayleton lime sulfur propiconazole neem oil potassium bicarbonate	Bonide Lilly Miller Ferti-Lome Garden Safe Kaligreen	do not apply lime sulfur when temperature is over 75 degrees F. Neem oil and Kaligreen are organic options
Coryneum blight	peach, nectarine	captan neem oil	Captan Various brands	do not use antibiotics on trees after bloom; they are ineffective. Management for fire blight through the summer entails pruning out new infections only.

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