

News/What to Watch For:

Aphid, psylla eggs starting to hatch; speckled green fruitworm adults emerging soon to lay eggs; lygus bugs becoming active soon
Do not prune out old fire blight cankers if the bacteria has started to ooze
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Bud Stages

The next six days of warm weather are going to result in rapid bud and insect development.

Davis, Box Elder, Salt Lake, Weber counties:

Apples: green tip - 1/2" green
Apricots: bloom
Cherries: green tip
Peaches: pink - first bloom
Pears: bud burst

Cache County:

Apples: silver tip - green tip
Cherries: swollen bud
Peaches: swollen bud - 1/4" green
Pears: swollen bud

Utah County:

Apples: green tip - 1/2" green
Apricots: first bloom - bloom
Cherries: green tip
Peaches: pink
Pears: bud burst - green cluster

Grand County:

Apples: first pink - open cluster
Apricots: full bloom - petal fall
Cherries: first bloom
Peaches: bloom
Pears: full bloom

Insect and Disease Activity/Info

POME FRUITS

Codling moth

On approximately April 20-26 (first pink stage of apple), growers in northern Utah who are using codling moth traps should set traps in their orchard or backyard apple tree. One trap per 10 acres should suffice to determine biofix (the date that adult moths first start to fly). Traps should be hung as high as possible, in the direction of the prevailing wind. Make sure no debris is blocking the openings. Traps in Carbon and Cache counties will not need to go up until late April.

If you are not trapping, do not worry. The USU IPM program gets biofix dates in various locations across northern Utah so that we can provide exact starting spray dates for codling moth control.

Rosy Apple Aphid

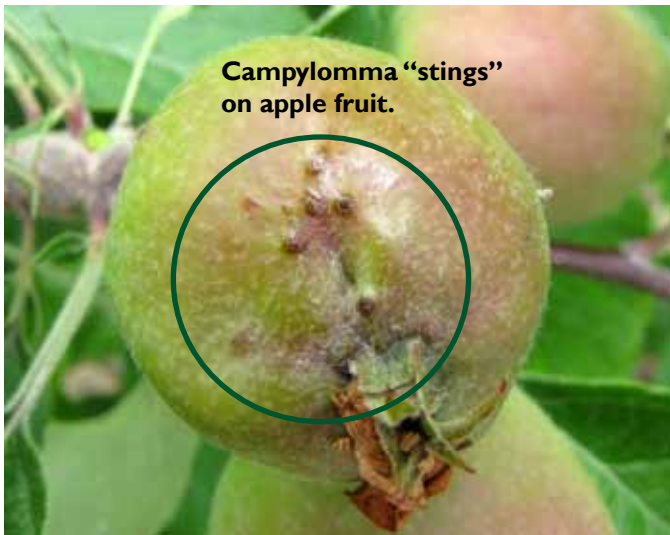
Rosy apple aphid eggs are hatching now in the warmer areas of northern Utah. Feeding curls leaves and can sometimes disfigure fruit. Usually control is not warranted; delayed dormant oil applications will take care of most of the overwintered eggs. Commercial growers that have not traditionally had success with dormant oil applications could consider a non-pyrethroid insecticide at pink stage of apple, including Actara, Assail, Beleaf, Calypso, or Esteem.



Campylomma

Also known as mullein bug, campylomma is actually a beneficial predator. Early in the season, however, young nymphs may feed on fruitlets when no prey is available, causing corky bumps. It overwinters as eggs in woody trees, including apple and pear. Egg hatch occurs pre-bloom, and adults are fully formed by mid May. Many adults migrate

Insect and Disease Information, continued from previous page



tight cluster and bloom periods of apple. They will actively feed throughout the summer on a wide range of hosts including fruits, vegetables, forage crops, and weeds. Orchards with a heavy weed groundcover or adjacent alfalfa fields are more prone to damage. Within the orchard, removing weeds such as common mustard can reduce fruit injury.

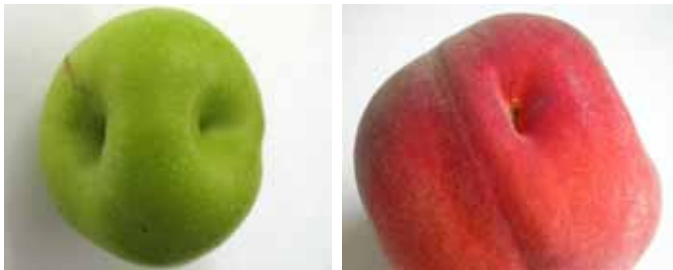
Lygus bug is difficult to manage, especially for orchards near range or forage land. Insecticides for control are usually broad-spectrum, and can harm beneficials. According to Cornell entomologists, the pyrethroids (Asana, Ambush, Baythroid, Danitol, Pounce, Warrior) are most effective, followed by the neonicotinoid group that includes Actara, Calypso, and Assail, plus Avaunt, which are moderately effective.

on to herbaceous hosts. Over the summer, they feed on thrips, aphids, mites, and psylla.

Scout for nymphs during bloom by vigorously shaking flower clusters into a paper cup, or banging a branch over a cloth tray. In general, one nymph/tray or cluster for goldens, and 4 nymphs for other varieties warrants a treatment before, during, or after bloom when bees are not foraging.

ALL TREE FRUITS

Lygus Bug



Early feeding by lygus bugs on developing apples or stone fruits results in deeply pitted fruit, sometimes referred to as cat-facing injury. Adult lygus spend the winter in protected areas such as within plant debris or among alfalfa litter, or in cracks and crevices in tree bark. They start to feed actively when temperatures approach 70°F, between the



Predatory Spider Mites

You may hear us talking (or have read) about not using materials that contain a pyrethroid early in the season. One of the primary reasons for this is to conserve our native western predatory mite, *Typhlodromus*



Predatory mites are pear-shaped, and move much more quickly than pest mites.

occidentalis. Predatory mites feed on pest mites, including the twospotted spider mites, McDaniel spider mites, rust mites, and blister mites. The western predatory mite overwinters as mated females in protected sites on trees or in groundcover. They start activity early (much earlier than spider mites), at the green tip stage of apple, increasing in activity at the tight cluster stage. They immediately disperse, looking for prey.

Their primary prey at this time of year are the rust mites and blister mites that are also active early. Keeping these mites in the orchard will help to build up a good population of predatory mites.

Factors that may reduce predatory mite population include:

- **mortality in winter:** *Typhlodromus* are sensitive to very cold, dry winters.
- **amount of prey early in the season**
- **application of pyrethroids early in the season**

Degree Day Accumulations and Insect Development

Upcoming Monitoring/Insect Activity

Pear psylla	Adults active just before bud swell; egg-laying from bud swell to green cluster
Rosy apple aphid	First egg hatch around first pink
Codling moth	Hang traps at first pink
European red mite (rare)	First egg hatch around apple full bloom
Campylomma bug	Egg hatch begins at apple first pink
White apple leafhopper	Egg hatch begins at apple first pink

Degree Day Accumulations

March 1 - Tuesday, April 13

County	Location	GDD 50
Box Elder	Perry	46
	Tremonton	32
Cache	North Logan	27
	Providence	39
	Smithfield	23
Carbon	Price	45
Davis	Kaysville	54
Grand	Castle Valley	153
Juab	Tintic	34
Salt Lake	Holladay	73
	West Valley City	70
Tooele	Erda	59
	Tooele	50
Uintah	Vernal	46
Utah	Alpine	51
	American Fork	62
	Genola	77
	Lincoln Point	53
	Payson	65
	Provo	83
	Santaquin	56
Weber	Pleasant View	53

Production Information

Horticultural/Dormant Oil Demystified

At this time of year, we often discuss spraying “dormant oil” and in summer, we talk about “summer oil.” This dated terminology applied to pest control many years ago. Dormant oils were never used during the growing season because they were unsafe for plants, and summer oils were only used as a spreader-sticker. Today, those terms simply refer to the timing of the treatment. The product that is applied during the dormant period and summer is the same; the only difference is the concentration. Oils are unique in that they have been used for more than a century and no target pest has developed resistance to them.

Horticultural mineral oil is a term used to describe a class of high quality oils formulated for agricultural use. They are produced by distilling and refining crude oils. Other terms are mineral oil, petroleum oil, spray oil, insecticidal oil, horticultural oil, superior oil, paraffinic oil. Various other petroleum products are made from crude oils, including gasoline, kerosene, fuel oil, and lubricating oil.

Oil Characteristics

1. The newest horticultural oils are sometimes considered “narrow range oils” which means that the oil has been through two distillation stages to reduce the temperature range at which the oil boils. This results in an oil that has high insecticidal properties and low potential for plant injury. These oils are also sometimes referred to as “superior oil.”
2. Horticultural oils are made from crude oil that is high in paraffin. Paraffinic oil occurs in sources in the eastern U.S. and in Texas. (Oil dug from the western U.S. is high in naphthenes.) Studies have shown that paraffinic oils have greater insecticidal properties.
3. In newer oils, the unsaturated hydrocarbons have been removed. These compounds that were found in older oils were responsible for plant injury. The term for oils low in unsaturated hydrocarbons is “unsulfonated residue.” The safer oils usually have a UR value at 92% to 97%.
4. The label for oils will provide a variety of information:
 - a. percent oil content: the oil may be listed as “mineral,” “petroleum,” or “paraffinic.”
 - b. minimum UR value: Make sure it is more than 92% so that injury to plants is reduced.

How Oils Kill Pests

Oils kill pests primarily by smothering, and work best on soft-bodied insects. Insects require oxygen to live, and oil plugs the insect's air-exchange apparatus, causing slow suffocation. Oil works better on eggs just before they hatch because the oxygen requirement is greater. This is why we suggest spraying oil at the “delayed dormant” timing when fruit tree

buds have started to swell. Oils applied during dormancy or delayed dormancy are more effective at a higher concentration (usually 1.5-2%) and the plants will not be affected. Oil applied in the summer should be mixed at a lower concentration (1%) to reduce plant injury.

Oil may also act as a repellent, delaying egg laying (of pear psylla, for example) or preventing scale crawlers from settling.

Oils are targeted at: aphids, soft scales, pear psylla, immature leafhoppers, whiteflies, mites, and eggs of most insects.

How to Prevent Plant Injury

Oils that are properly applied rarely damage plant tissue. Oils may injure plants if applied at too high a rate or on hot days. Trees most susceptible to damage are those suffering from drought stress. They have a lower tolerance for interruptions in air-exchange supply through stomates or lenticels

Oil should not be applied:

- on days where temperatures exceed 90 or are below 30 degrees F
- on dry, windy days

Symptoms of plant damage:

- dark green to purple discoloration on leaf margins
- water-soaking around stomates or lenticels
- swelling or corking of lenticels
- delay in budbreak
- leaf drop and death of buds

Other Oils

Vegetable oils are sometimes sold as insecticides, where cottonseed and soybean oils are the most effective. Neem oil (from seeds of the neem tree, *Azadirachta indica*) has some insecticidal and fungicidal properties.

Essential oils (rosemary, lavender, thyme, clove, garlic, coriander, peppermint, citronella), are said to include some fumigant and topical toxicity as well as repellent effects. They are considered minimum-risk pesticides and are exempt from Environmental Protection Agency registration. As a result, many of the products labeled for control of insect pests have not been subjected to evaluation of efficacy or plant toxicity. A recent study of several products on greenhouse plants showed that essential oils vary in their effectiveness against certain arthropod pests stated on the label, and are phytotoxic. The oils controlled spider mites and mealybug but caused significant plant injury, while green peach aphid and thrips were not affected by the oils (Cloyd, et al 2009).

Cloyd, Raymond, et al. 2009. Effect of Commercially Available Plant-Derived Essential Oil Products on Arthropod Pests. *Journal of Economic Entomology* 102(4):1567-1579.

Bud Phenological Stages

Apple



Pear



Peach



Cherry



Apricot



Spray Materials - Commercial Applicators

For delayed dormant timing:

Target Pest	Host	Chemical	Example Brands	Amount per acre	REI	Comments
San Jose scale	pome and stone fruits	2% oil alone or with: pyriproxyfen	Esteem	4-5 oz	varies 12 h	good coverage essential
Aphids, including woolly apple aphid	apple, cherry, peach	1.5% oil alone or with: chlorpyrifos	Lorsban	4 pints	4 d	good coverage essential; addition of Lorsban necessary for woolly apple aphid
Pear psylla	pear	1.5-2% oil with: esfenvalerate lime sulfur kaolin clay permethrin lamda-cyhalothrin pyriproxyfen	Asana Surround Ambush, Pounce Warrior Esteem	3 qts 1 pint 1 gal see label 2.5-5 oz 5 oz	12 h 48 h 4 hr 12 hr 1 day 12 h	good coverage essential Surround (organic) must be applied up to 3 times before first bloom.
Pearleaf blister mite	pear	1.5-2% oil with: carbaryl	Sevin	4 pints	12 h	
Peach twig borer	peach, nectarine	Bt chlorantraniliprole spinetoram spinosad	Biobit, Dipel Altacor Delegate Entrust, Success	see label 3-4.5 oz 3-7 oz 4.5 oz	4 h 4 h 4 h 4 h	apply before bloom to target larvae as they leave hibernacula to feed on foliage and before they enter shoots
Coryneum blight (shot-hole)	stone fruits	fixed copper chlorothalonil	COCS, Kocide, etc. Bravo, Echo	varies 3-4 pints	1 d 12 h	use only fixed copper products. Do not use after green tip stages. Be sure tank is always agitated during sprays.
Fire blight	apple, pear	fixed copper	many	varies	1 d	do not apply copper after green tip stage because fruit russetting may result; there are mixed opinions on whether copper has an effect on managing fire blight

Spray Materials - Residential Applicators

Note that these treatments are only recommended if you know you have the particular pest in your trees.

Delayed-dormant timing:

Target Pest	Host	Chemical	Example Brands	Comments
San Jose scale, aphids	pome and stone fruits	1.5-2% horticultural oil	Volk oil, Bonide all seasons spray oil, HiYield Dormant Spray, etc.	smothers aphid eggs
Pear psylla	pear	1.5-2% horticultural oil	Volk oil, Bonide all seasons spray oil, HiYield Dormant Spray, etc.	Best to treat before egg-laying and when adults are detected.
Blister mites	apple, pear	1.5-2% oil with: carbaryl	Sevin	Only a single application is needed
Peach twig borer	peach, nectarine	Bacillus thuringiensis spinosad	Ferti-lome Dipel, Green Light Ferti-lome, Green Light lawn and garden, Monterey	apply before bloom to target larvae as they leave hibernacula to feed on foliage and before they enter shoots
Coryneum blight (shot-hole)	stone fruits	fixed copper	Basic Copper, Microcop COCS, Kocide, etc.	copper can be injurious to plant tissues; fixed copper less so. Do not use after green tip stages.
Fire blight	apple, pear	fixed copper	many	do not apply copper after green tip stage because fruit russetting may result

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.

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