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News/What to Watch For:

Pear psylla eggs; identify San Jose scale-infested branches for later monitoring; first hatch of rosy apple aphids
Prune out fire blight in apple, pear; prune out shothole cankers in peach, nectarine
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Bud Stages

Although Mother Nature granted us a few warm days this past week, we are still behind on development and degree days by about 1-2 weeks.

Davis, Box Elder, Salt Lake, and Weber Counties:

Apples: Green tip - 1/2" green
Apricots: First bloom - Full bloom
Cherries (tart): Swollen bud
Peaches: 1/4" green - Pink
Pears: Bud burst

Cache County:

Apples: Silver tip
Cherries (tart): Swollen bud
Peaches: Swollen bud
Pears: Swollen bud

Grand County (Castle Valley):

Apples: Open cluster
Apricot: Petal fall
Cherries (tart): Tight cluster
Peaches: First bloom
Pears: First bloom

Utah County:

Apples: Green tip
Cherries (tart): Swollen bud
Peaches: 1/4" green
Pears: Swollen bud - Bud burst

Insect and Disease Activity/Info

Specific spray information found on last two pages.

Speckled Green Fruitworm:



The speckled green fruitworm is the most common of the green fruitworms that occur in Utah and adult moths are emerging now. They are stout, and reddish-brown in color. It overwintered as a pupa in the soil and typically emerges in March to April to mate and lay eggs on both pome and stone fruit trees, as well as several ornamental species. It can lay up to 300 eggs in one large cluster. The eggs begin hatching during apple bloom or cherry petal fall.

The young larvae feed on flowers and leaves while the older larvae can also feed on fruit (see above). Damaged fruit can drop early or show deep sunken areas. Injury looks similar to leafroller feeding, but is deeper. There is just one generation per year.

Treatment: Treatments used for other pests (codling moth, peach twig borer, etc.) will also take care of fruitworms. Otherwise, use Bt (Foray, Dipel, etc.) or spinosad (Entrust, Success) at bloom during dawn or dusk.

[Speckled green fruitworm fact sheet](#)

Insect and Disease Activity/Info, continued

Rosy and Green Apple aphids:



Both of these aphids are beginning egg hatch now, but the green apple aphid (the most common aphid of apples) won't increase significantly until the warmer summer months. The rosy apple aphid is more of a problem in spring. They inject a toxic saliva during feeding, causing curled leaves and stunted and deformed fruits (as shown above). They migrate out of the apple orchard to weed hosts in late June and July. Green apple aphids remain in the orchard for the entire season.

Treatment: Delayed dormant (up to 1/2" green) oil (or oil plus Lorsban) will kill most overwintering eggs and emerging nymphs.

[Apple aphid Fact Sheet](#)

Peach Twig Borer

Peach twig borers spend the winter as a small larvae in galleries (hibernacula, shown below) within the tree cambium. They emerge as leaves begin expanding to seek the first flush of new growth. There they bore into the tip of shoots, causing the typical "shoot strikes." Later generations feed on the fruit.



Treatment: A pre-bloom application has been an effective means of controlling the overwintering larvae as they begin to stir. This is a good time for control as it is made before bees and other pollinators are active. Materials: oil plus esfenvalerate (Asana for commercial; Ortho Bug-B-Gon or Ortho Max for residential), spinosad, malathion, sevin.

If twig borer was not a significant problem last year, then a pair of bloom-time applications of Bt at dusk (early bloom, and again at post bloom) are very selective, highly effective, and harmless to pollinators.

Some commercial growers also use mating disruption to help suppress peach twig borer, and is often used in conjunction with the delayed dormant and bloom-time applications. It is most effective in orchards with low pest pressure, and in sites that are not adjacent to uncontrolled peaches. Dispensers are hung at or just before biofix, or at 400-450 degree days (base 50) after March 1.

[Peach twig borer Fact Sheet](#)

Degree Day Accumulations and Insect Development

Upcoming Monitoring/Insect Activity

By Insect (in order of appearance)	
Pear psylla (PP)	Egg-laying at 40-126 DD (base 41)
Pearleaf blister mite (PBM)	Adults begin feeding at bud swell
San Jose scale (SJS)	Overwintering nymphs begin feeding when sap flows
Rosy apple aphid (RAA)	First egg hatch around 90 DD (base 50)
Campylomma bug (CB)	Egg hatch begins at first pink (apples)
White apple leafhopper (WALH)	Egg hatch begins at first pink (apples)
European red mite (ERM) (rare)	First egg hatch around 135 DD (base 50)
Codling moth (CM)	Hang traps at 100 degree days (base 50) First flight at 190-260 DD

By Host (see abbrev. at left)	
Apple	RAA, CM, ERM, CB, WALH, SJS
Apricot	SJS
Cherry	SJS
Peach	
Pear	CM, ERM PP, PBM

Degree Day Accumulations

March 1 - Tuesday, April 15

County	Location	Codling Moth, Peach Twig Borer (base 50)	Western Cherry Fruit Fly (base 41)
Box Elder	Perry	50	165
Cache	North Logan	30	105
	Providence	35	115
	Smithfield	30	105
Carbon	Price	48	158
Davis	Kaysville	62	202
Grand	Castle Valley	171	380
Salt Lake	SLC	32	115
	West Valley City	64	202
Tooele	Erda	64	202
	Grantsville	64	202
	Tooele	64	202
Utah	Alpine	49	185
	Genola	72	228
	Lincoln Point	---	---
	Orem	58	190
	Payson	80	231
	Provo	58	190
	Santaquin	61	198
	West Mountain	62	210
Weber	Pleasant View	54	173

“Base 41” and “base 50” refer to the lower temperature threshold at which certain insects develop. For example, no codling moth development occurs below 50 degrees.

Production Information

Using Mating Disruption to Control Codling Moth

The use of insect pheromones in orchards allows us not only to monitor for insect pests, but to manage them, as well. Pheromones are chemicals that insects use to communicate with one another, and our interest is in the pheromones (of mostly moth species) that are released by females to attract males for mating. These species-specific chemicals are synthesized and imbedded in a rubber lure to use on sticky traps to determine the presence and abundance of certain moth pests. But when dispersed in large quantities over great distances, pheromones can also be useful in suppressing pest damage by preventing mating. For the last 10 years, mating disruption (MD) has been a valuable tool for commercial apple and pear growers in suppressing codling moth damage.

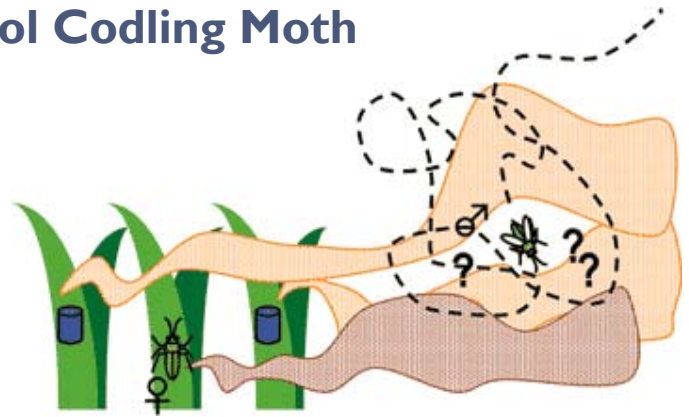
Notice that “commercial growers” is written above. That is because the use of mating disruption only works in orchards 10 acres in size or more, and the typical residential orchard is much smaller. Mating disruption will not work on smaller orchards because it does not prevent mated females from neighboring locations from flying into the orchard.

How it Works

In a non-treated environment, the plume of “scent” that a female releases can be detected hundreds of yards away by males, and “hangs” in the air in such a way that the male can follow the scent through the plume, almost always zeroing in on the female. When enough artificial sources of pheromones saturate the air, the probability of males finding females is significantly reduced. They are unable to follow one specific plume, and wander for days. When no mating occurs, injury to fruits is also reduced.

There are four theories presented by Michigan State University researchers of how males are prevented from finding females:

1. **Desensitization.** Imagine sitting in a room filled with cologne. At first, you're overwhelmed, but after several minutes, you grow “numb” to the smell and don't notice it anymore. This theory surmises that the moth's brain is overloaded with information and can no longer process what to do about the pheromones.
2. **Sensory Imbalance.** The male moths cannot distinguish between the authentic and artificial pheromones.
3. **Camouflage.** The females' pheromone is mixed with the artificial, and males are in essence “driving blind” to try and find the females. They still sense pheromone, but cannot orient themselves to any particular direction.



4. **Competitive Attraction or False-Plume Following.** The males are able to sense and follow various pheromone plumes for the duration of their lives. But because there are so many plumes in a mating disruption treated orchard, they almost always are following the plume of an artificial dispenser.

The competition theory holds the most weight in explaining how MD works. The mating of males and females may not be completely disrupted, but is significantly delayed. Eventually, some males will find females. But by the time they meet (a delay of 2-3 days) the fecundity of the females is reduced by more than 50%.

Using Mating Disruption

Mating disruption programs should be considered as one tactic within the toolbox of pest management options. In any orchard where there was codling moth injury in the past, supplemental cover sprays will be necessary. You may wonder, “if I have to spray anyway, why pay for the mating disruption?” It is a proven-effective component of an IPM program because, over time, it significantly reduces the overall target insect population. (Getting all neighboring orchards of suitable size will speed this process along.) Eventually, the number of sprays will be significantly reduced. It is highly selective, and there are virtually no mammalian or environmental health risks.

The commercially available MD dispensers that are most commonly in use are placed in the orchard in a high number of points (200-400) per acre. To prevent all mating, they should be hung in the orchard before biofix. (Although it is imperative that growers get a biofix from a comparable, non-MD location to time supplemental sprays.) These hand-applied dispensers should be placed as high as possible in each tree. The standard brands (Isomate, Checkmate) utilize wires, clips, or circular twin tubes and are twist-tied or clipped directly onto branches. These products last approximately 120 days, allowing for pest suppression for most of the growing season.

continued on next page

Mating Disruption, continued from previous page

Isomate CTT (Pacific Biocontrol) is a more concentrated formulation and is applied at 200 points/acres.



Pacific Biocontrol Isomate C-plus

Results of Mating Disruption Studies at Washington State University

- New products that are in the form of pheromone-impregnated flakes or fibers, (Suterra Checkmate CM-F, Sentry NoMate CM Fiber, Hercon Disrupt Micro Flakes CM) that are applied at high densities (20,000-40,000/acre) with specialized equipment do not perform as well as hand-applied dispensers. More modifications are needed on these products.
- As the density of hand-applied dispensers is reduced, the risk of crop injury increases. Caution should be taken when reducing rates of hand-applied dispensers below the recommended rate per acre, especially under moderate to high pressure situations.
- A new product (Trece Cidetrak) is the first hand-applied dispenser that is comparable to, or slightly better than, the industry standard (Isomate C-plus). This may be a promising new product for Utah. The pheromone in any mating disruption product breaks down in UV light, occurring more quickly in our high altitudes. This product claims to break down more slowly than others.



Trece Cidetrak

Other Methods

- “Attract and Kill” involves applying droplets of pheromone to foliage by hand (Last Call CM, Aptiv, Inc.) and also contain pyrethroids to kill attracted males. Research in Utah showed poor results of this product, with close to 20% injury.
- High-emission dispensers such as aerosol “puffers” (i.e., Puffer CM and Puffer OFM from Suterra LLC.) or polymer

bags loaded with large doses of pheromone (i.e., MSTRS OFM from AgBio Inc., Ames, IA). Not enough is known about these products in Utah.

- A new wax product called SPLAT (ISCA Technologies) that is sprayed with specialized equipment at the rate of about 5 acres/hour, 100 drops/tree. Not tested in Utah.



ISCA SPLAT (Specialized Pheromone & Lure Application Technology)

Monitoring in a MD Orchard

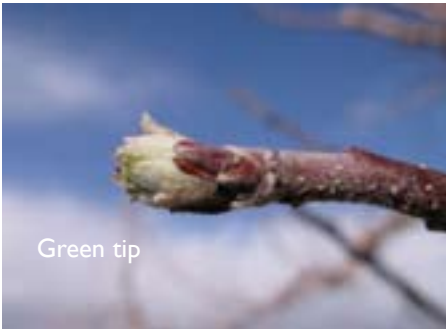
Growers should continue to monitor for codling moth during the season to evaluate

the effectiveness of the mating disruption, and to determine if supplemental sprays are needed. Two types of lures, a “megalure” (also called 10x) releases more pheromone than the typical lure so that it is still attractive to males. Another lure called the DA-combo is a combination of the megalure and a synthetic pear ester. The pear ester is easily distinguished from the pheromone by males and females, and both sexes are attracted to this lure. Although research on action thresholds in Utah is ongoing, we currently recommend treatment when 5 moths have been caught with either type of lure.

In tree fruits, mating disruption pheromone materials are also available for other insects besides codling moth: oriental fruit moth, peachtree borer, peach twig borer, and some leafroller species.

Bud Phenological Stages

Apple



Cherry



Peach



Pear



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	hort. oil alone or with: lime sulfur pyriproxyfen methidathion	Esteem Supracide	6-12 gallons	varies 12 h 2-14 d	good coverage essential; re-search has shown good results with Esteem and oil
Aphids	apple, cherry, peach	hort. oil alone or with: chlorpyrifos	Lorsban	6 gal 4 pints	varies 4 d	good coverage essential
Peach twig borer	peach, nectarine, apricot	hort. oil plus: esfenvalerate spinosad spinetoram	Asana Success Delegate	6-8 oz 4-8 oz 3-7 oz	12 h 4 h 4 h	
Pear psylla	pear	hort. oil with: esfenvalerate lime sulfur kaolin clay permethrin lamda-cyhalothrin	Asana Surround Ambush, Pounce Warrior	4-6 gallons 3 qts 1 pint 11 gal see label 2.5-5 oz	varies 12 h 4 hr 12 hr 1 day	good coverage essential Surround (organic) must be applied up to 3 times before first bloom.
Pearleaf blister mite	pear	hort. oil with: carbaryl	Sevin	4 gal 4 pints	4 h 12 h	
Coryneum blight (shot-hole)	stone fruits	copper sulfate fixed copper chlorothalonil ziram	COCS, Kocide, etc. Bravo, Echo Ziram	varies varies 3-4 pints 6-8 lbs	1 d 1 d 12 h 48 h	copper can be injurious to plant tissues; fixed copper less so. 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

Spray Materials - Residential Applicators

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

For delayed-dormant timing

Target Pest	Host	Chemical	Example Brands	Comments
San Jose scale, aphids	pome and stone fruits	hort. oil alone or with: esfenvalerate malathion permethrin	Ortho bug-b-gone, Ortho Max, etc. Malathion Bug Stop, Spectracide, etc.	
Pear psylla	pear	hort. oil with: esfenvalerate kaolin clay malathion permethrin	Ortho bug-b-gone, Ortho Max, etc. Surround Malathion Bug Stop, Spectracide, etc.	Best to treat before egg-laying and when adults are detected. Surround (organic) must be applied up to 3 times before first bloom.
Peach twig borer	peach, nectarine, apricot	hort. oil plus: esfenvalerate carbaryl malathion spinosad	Ortho bug-b-gone, Ortho Max, etc. Sevin Malathion Green Light	
Pearleaf blister mite	pear	hort. oil with: carbaryl lime sulfur	Sevin variety	Only a single application is needed
Coryneum blight (shot-hole)	stone fruits	copper sulfate 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: All pesticides have benefits and risks, however following the label will maximize the benefits and reduce risks. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use. Any mention of a pesticide brand in this document is not an endorsement by USU, and brand lists are not all-inclusive.

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