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Bud Phenological Stages

The slow pace of flower development over the last two weeks is sure to speed up with the warm weather predicted for the upcoming week.

Davis County, Box Elder County, Salt Lake County, Weber County:

Apples: Full bloom-Petal fall
Tart Cherries: Full bloom
Sweet Cherries: Petal fall
Peaches: In the shuck
Pears: Full bloom

Cache County:

Apples: First pink-Full pink
Sweet cherries: First bloom-Full bloom
Peaches: Full bloom
Pears: Full white-First bloom
Apricot: Petal fall

Utah County:

Apples: Bloom-Full bloom
Tart Cherries: Bloom
Sweet Cherries: Full bloom-Petal fall
Peaches: In the shuck
Pears: Full bloom

Upcoming Monitoring/Insect Activity

San Jose Scale	Male flight at 185-325 DD (base 51F)
Codling Moth	First flight at 190-260 DD (base 50F)
European red mite	Egg hatch ends: 180-280 DD (base 50F)
Campyloomma bug	Egg hatch begins at first pink (apples)
Oblique banded leafroller	Hang traps after petal-fall (apples)
White Apple Leafhopper	First adults 550 DD (base 50F)
Peach twig borer	Hang traps at 300 DD (base 50F)
Western Cherry Fruit Fly	Hang traps at 700 DD (base 41F)

Degree Day Accumulations, as of Wednesday, April 25

County	Location	Codling Moth, Peach Twig Borer (Base 50°F)		Western Cherry Fruit Fly (Base 41°F)
		DD since March 1	DD since biofix	DD since March 1
Box Elder	Perry	194	11	463
Cache	North Logan	113	-----	296
	Richmond	157	-----	370
	River Heights	148	-----	357
Carbon	Price	259	-----	517
Davis	Kaysville	188	-----	461
Salt Lake	SLCC	239	-----	552
	West Valley City	214	-----	513
Tooele	Erda	283	-----	577
	Grantsville	313	-----	621
Utah	Alpine	171	-----	433
	Genola	233	-----	506
	Lincoln Point	185	-----	438
	Orem	249	18	481
	Payson	188	-----	439
	Provo	293	-----	576
	Santaquin	178	-----	428
Weber	West Mountain	215	-----	479
	Pleasant View	206	38	476

Insect Activity

APPLES AND PEARS

Codling Moth:

Dates of confirmed biofixes (consistent moth flight):

Orem: April 14

Pleasant View: April 16

Perry: April 24

Knowing a biofix date will allow us to provide an estimate of spray timings for each location. These estimates are based on local weather data, short-term weather forecasts, and 30-year temperature averages. We will provide spray dates and insect product recommendations for three different stages of the insect:

pre-egg laying (50-75 days after biofix)

early egg-laying (100-200 days after biofix)

first larval emergence (200-250 days after biofix)

The projected timing dates of the spray period will be updated as current weather data become available.

In general, controls target larvae. The most critical time period for control will occur at 340-640 DD after biofix, where approximately 70% of the 1st generation larvae is hatching. Multiple applications may be necessary for the 1st generation, depending on the severity of the codling moth infestation.

Speckled Green Fruitworm:

This insect is still active, and found on tart cherries. Pesticides that are used for other insects such as codling moth will also treat the fruitworm. Examples include Bt, spinosad (Success, Entrust, Conserve), and other broad-spectrum insecticides.

PEACHES AND NECTARINES

Green Peach Aphid:

Numbers of green peach aphids have increased over the last week, and will continue to grow. These aphids are usually only a problem early in the season, but only when their populations become exceedingly high. If leaves are curling, young fruit looks distorted, and you're finding dozens of aphids per terminal, then there may be a damaging population. Monitor your peach and nectarines in the coming weeks.



Disease Activity

APPLES AND PEARS

Fire blight:

The fire blight model (Cougarblight) indicates MODERATE risk of infection for Sunday, April 29. However, knowing the epidemiology (spread and biology) of this bacteria will help you in determining if you should worry about applying a protective treatment. To get floral infection, these things need to happen simultaneously: open blossoms, a wetting event, 4 or more days of temperatures in the 60s, and the presence of the pathogen.

The primary source of inoculum (disease-causing "spores") for all new floral infections is from bacteria on the surface of overwintered cankers. These cankers can occur on branches or on twigs as small as 6 mm in diameter. If you have pruned out last season's cankers, you are in good shape, but keep in mind that all it takes is one canker with live bacteria to infect several trees.

Rain and rain splash spread the bacteria to open flowers. When a flower becomes infected, bacteria will multiply rapidly in warm weather, and as bees pollinate flowers, they spread the bacteria from flower to flower. When the bacteria become established on the flower parts, another wetting event is necessary to wash the bacteria down to the floral cup, which will result in an infection.

New shoots can also be infected with fire blight through tiny wounds caused by hail, strong winds, or thunderstorms. The resulting twigs will die and curl downward, forming a "shepherd's crook."

Control of fire blight in a large orchard can be difficult. There are currently two antibiotics available in Utah (with a third available in the near future, we hope): streptomycin (Agriamycin) and oxytetracycline (Mycoshield), for use on apples and pears during the bloom period. Extension Plant Pathologist, Kent Evans, surveyed several sites in 2006 and found that 25% of the bacterial population in Utah County is resistant to streptomycin. He did not find resistance elsewhere. He will continue surveying the fire blight population in northern Utah even more intensively this season.

Home orchardists can watch their trees carefully for new infections (rapid wilt and shepherds crooking at the end of affected shoots) and promptly remove them by pruning the disease out before it spreads within the tree, to neighbors' trees, or to commercial orchards nearby. Foliar treatments are available if necessary.

Treatment recommendations, to be applied by Saturday, April 28, are shown in the next section.

Current Spray Timings

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

Commercial Growers:

Apple powdery mildew every 2 weeks until July: Bayleton, Flint, Procure, Rally, Rubigan, Sovran, and sulfur formulations, among many other materials

Fire blight: Apply before a wetting event or heavy dew, for April 28 or 29

Utah County: because of the high resistance of fire blight to streptomycin, we recommend **ONLY** using oxytetracycline until a new antibiotic is available.

All other locations: streptomycin (Agriamycin)

Codling moth:

Location	Spray Dates to Target Pre-Egg Laying	Spray Dates to Target Eggs	Spray Dates to Target First Larvae Hatch	Spray Dates to Target Max. Larvae Hatch
Perry	May 2 - May 6	May 9 - May 18	May 21 - May 24	May 31 - June 18
North Logan	----	----	----	----
Richmond	----	----	----	----
River Heights	----	----	----	----
Price	----	----	----	----
Kaysville	----	----	----	----
SLCC	----	----	----	----
West Valley City	----	----	----	----
Erda	----	----	----	----
Grantsville	----	----	----	----
Alpine	----	----	----	----
Genola	----	----	----	----
Lincoln Point	----	----	----	----
Orem	April 24 - April 27	May 1 - May 13	May 14 - May 17	May 24 - June 12
Payson	----	----	----	----
Provo	----	----	----	----
Santaquin	----	----	----	----
West Mountain	----	----	----	----
Pleasant View	April 28 - May 2	May 5 - May 16	May 16 - May 19	May 27 - June 16

Materials for codling moth control:

pre-egg-laying: Rimon	first larvae hatch: Assail, Asana, Calypso, Carbaryl, Clutch, Diazanone, Guthion, Codling Moth Granulosis Virus, Imidan, Warrior, <i>Sevin</i> , <i>Malathion</i>
early egg-laying: Horticultural oil, Esteem, Confirm, Intrepid, Azatin	maximum larvae hatch: same as above

*Reapply insecticides based on the residual period (i.e., protection interval) of the product used, and be sure to rotate among pesticide classes.

Homeowners:

Apple powdery mildew every 2 weeks until July: Bayleton, Bonide and sulfur formulations

Fire blight: Ferti-lome fire blight spray (streptomycin) is available; apply only if necessary

Codling moth: see table above. Products that are italicized may be used by homeowners. In addition, *Bacillus thuringiensis* (Dipel), and spinosad (Success, Entrust)** can also be used, but must be applied every 3 - 10 days to be effective.

More Information for Backyard Orchardists

CODLING MOTH BIOLOGY

Codling moth is the most serious pest of apple and pear worldwide. Without question, fruit in Utah must be protected to harvest a crop. In northern Utah, there are typically two full generations and a partial third generation. In southern Utah, most or all of a third generation will occur.

The only external damage you'll see are the entry and exit holes, which are filled with frass (excrement). Fruit attacked during the first generation



Codling moth exit or entry holes

often drops prematurely. You may also notice stings, which are healed shallow or aborted entries that occur due to larval death or when larvae exit the feeding area and tunnel into fruit elsewhere.

Codling moth overwinters as a pupa under bark, in fruit bins, in orchard trash piles, or other protected sites as a larva in a protected cocoon. In spring, codling moth adults begin to emerge, fly, and look for mates when evening temperatures exceed 55-60° F. The adult is a gray and brown mottled moth with bands of alternating gray and white on wings with a bronze to copper spot on the tip of each forewing. It flies primarily at night, and stays hidden during the day on the bark.

A mated female moth lays her eggs singly on fruit or on upper surface of leaves near fruit. She lays between 30 - 70 eggs, and they hatch in 6-20 days, depending on temperature.

The codling moth larvae are 1/2 - 3/4 inch long when full grown, with a tan to pink with a brown head.

Larvae bore into fruit within 24 hours after hatching, then tunnel to the core where they feed on pulp and developing seeds. They



Codling moth larva

complete their growth within the fruit (3-5 weeks) and then exit by their entry hole or by a new exit hole. Larvae may crawl to a protected site to pupate and emerge as second or third generation adults in 10 - 20 days, or enter diapause and remain larvae until the following spring.

Insecticides are a main control tactic. There are new insecticide compounds available, many of which are less toxic to humans and beneficial insects and mites than earlier insecticides. For commercial orchards with more than 10 acres of contiguous apple and pear plantings, pheromone-based mating disruption can greatly reduce codling moth populations to allow reduced insecticide use. Effective biological control has not been possible because fruit is attacked by newly hatched larvae, which are protected from natural enemies once inside the fruit. Sanitation methods can help reduce codling moth densities within an orchard but alone cannot provide satisfactory control.

For homeowners, the best control for codling moth is insecticidal application timed at egg hatch for each generation. Therefore, it is important to know when the larvae is emerging. How would you know? By monitoring for moth flight.

Delta or wing style traps can be used to monitor adult male flight using a pheromone that attract only the codling moths adults. The traps are hung in an apple tree by first bloom or around 100 DD. Servicing the trap is easy:



Delta trap used for monitoring moths

check traps once/day and look for moths trapped on the sticky surface. When you see more than two moths on two successive nights, biofix has occurred. Knowing the codling moth biology on your own site will help you to time sprays specifically to your trees.

Besides spraying, homeowners can try other methods to aid in control. Thinning fruit is important. Newly hatched larvae often seek out protected sites for entry, and thinning fruit to just one apple/cluster can limit successful entries. Fruit thinning also allows for improved insecticide coverage on the entire fruits.

Also, keep your site clean. Strip remaining fruit at the end of the season and remove or destroy piles of unwanted fruit. Remove or destroy dropped fruit to reduce second generation densities.

Place corrugated cardboard bands (2 - 3 inches wide) around trunks of trees in May to collect first generation larvae or in August to collect overwintering larvae that are moving to the trunks to pupate. Remove and destroy bands before moths emerge in mid- to late June (for first generation) or in late October to November (for overwintering generation). This method is most effective on smooth-barked varieties and in smaller, isolated orchards without nearby sources of moths.

Bud Phenological Stages

Apple



Pear



Peach



Apricot



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.

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