

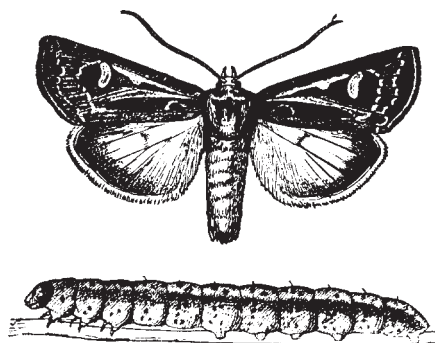
PLANT & PEST ADVISORY

FRUIT EDITION \$1.50

JUNE 2, 1998

IPM Basics: Degree Day Timing for Insect Control

Peter W. Shearer, Ph.D., Tree Fruit Entomology



Readers of this newsletter are frequently exposed to the terms **biofix**, **degree days (DD)**, and **DD after biofix** in relation to timing insecticide sprays. It is important to understand the meaning behind these terms. Briefly, we can use accumulated heat units (called degree days) from a particular point in time (biofix) to predict the life-stage of a target insect, then apply an insecticide when it will do the most good.

The basis for this concept of DD timing for insecticides is that insects grow in response to temperature. If the temperature is too low, the insect won't grow and develop; but once the temperature exceeds the insect's lower developmental threshold, the insect will start to grow and develop. The warmer it gets, the faster the insect develops until the upper developmental temperature is reached. If it gets too hot, the insect stops developing and can even die. Unfortunately, thermal death of insects we worry about rarely happens.

Each insect species develops in response to heat. For some insects, like Oriental fruit moth (OFM), tufted apple bud moth, and codling moth, we are able to determine how much heat the insects are exposed to and whether the insect has been exposed to enough heat to hatch from eggs, complete development to adult, etc.

When considering the amount of heat an insect has been exposed to, we work in terms of heat units or degree days. For the insects listed above, we know how many DD's it takes for them to develop through their various life stages. For instance, with OFM, the insect grows and develops between 45° (lower threshold) and 90°F (upper threshold). We also know that it takes approximately 200 DD from biofix (the first sustained pheromone trap catches of male OFM moths) for eggs to be laid and to start hatching. After approximately 960 DD have been accumulated from biofix, we know that OFM has completed a generation. We also know that the insecticides we apply are most effective against young larvae, thus, we can time our sprays as larvae start emerging from eggs.

We can measure the number of DD's that insects accumulate over time most simply by subtracting the insect's lower developmental temperature from the average daily temperature [DD = (daily maximum temperature - daily minimum temperature)/2 - base temperature]. Most often this process is initiated at biofix. Degree days are summed

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Nitrogen Stress Observed Following Heavy May Rains

Robert Belding, Ph.D., Pomology

Following the periods of heavy rain that visited our area in May, we observed several locations that have been stressed by a lack of nitrogen, particularly on some of the lighter soils. It has become obvious that the rains leached away early fertilizer applications.

The symptoms on peach trees are shorter new shoots with reduced leaf area, as well as a reddish color to the new growth. In a mild deficit the leaves will be a blotchy pale green with a reddish color. The more dramatic cases of nitrogen stress include shot holing with red edges and marginal necrosis of the leaves. The marginal necrosis that I have seen has occurred midway up the edge of the leaf rather than at the leaf tips and was always associated with the red color.

Additional applications of calcium nitrate should be made in many locations. However, caution should be used to avoid over-applying nitrogen to early-bearing varieties. Excess nitrogen can cause reduced red color and premature fruit softening. Spring fertilizer applications can be split, applying half in March and the other half following fruit set. Split applications allow greater flexibility in adjusting to crop load and weather conditions. □

Twilight Fruit, Vegetable & Flower Meeting

Tuesday, June 30, 1998

5:30 p.m.

Demarest Farm, Hillsdale, NJ

Speaker & Topic

Dr. Bob Belding, Spec/Tree Fruit Pomology, "Tree Fruit Culture & Management to avoid pest problems"

Dean Polk, IPM Agent - Fruit, "Fruit IPM Update"

Dr. Peter Shearer, Spec/Fruit Entomology, "Tree Fruit Pests & their Control"

Dr. George Wulster, Specialist in Floriculture, "Flower Crop Pests & their Control"

Dr. Steve Johnston, Spec/Plant Pathology, "Vegetable Diseases & Management"

Carmen Valentin, DEP Public Outreach Representative, "DEP Update"

Recertification credits will be offered in
CORE & PP2

Also...Hayride Tour of Demarest Farm
Rain or Shine!

Call Joel Flagler of Rutgers Cooperative Extension of Bergen County at (201) 599-6167 for information or directions, or call Demarest Farm at (201) 666-0472.

Considerations for Thinning Time '98, & Options for Better Return Bloom in '99

Dick Unrath, Ph.D., Horticultural Science Department - NCSU

Thinning 1998. This year has generally been a year of heavy snowball bloom after last year's light crop, but sometimes a snowball bloom takes so much energy from the tree that fruit set is not as heavy as expected. Also, I am beginning to see variable fruit set with distance from bee hive location indicating possible limited pollination activity in some blocks of Red Delicious, so check your crop load carefully.

On the flip side, if you have heavy fruit set, you must do an effective thinning job for fruit quality and to prevent poor return bloom next year. Also, if this "El Nino" summer turns out like the last strong El Nino year, we could be in for a substantial summer drought, which will demand even greater thinning response to adjust crop load and ensure adequate fruit size with limited soil moisture.

Planning for good return bloom in 1999 starts now. Obviously, good thinning is the first essential element in next year's bloom density, but there are some special situations. The first is young trees or overly vigorous varieties (such as Fuji, Mutsu, Jonagold, Ginger Gold, etc.) or trees on very vigorous rootstocks that would rather grow shoots and wood than slow down and start flowering. For these situations the application of Ethrel 45 to 60 days after normal petal fall date using 1/2 to 1 pint of Ethrel per 100 gallons and directing the spray especially to the more vigorous areas of the tree using true row volume, pesticide dilute water rates can be an effective growth reducer which encourages flavor initiation. With high vigor, a second application two to three weeks after the first application will increase the response.

The second special situation is a less than ideal thinning job which can result in overcropping and reduce return bloom the next year. If you find yourself with heavily overloaded trees after thinning season is over, the only option you have is to hand thin to reduce fruit load. An additional aid to improve return bloom on the hand-thinned trees or on trees that are just slightly overloaded (110 to 150% of an ideal crop load) and not hand-thinned is to add 5 ppm of NAA in the June and July cover sprays. Since NAA has a direct stimulation on return bloom, this "after-thinning use" will help tip the trees' hormonal balance in favor of next year's flower initiation.

Submitted by Bob Belding, Pomology Extension Specialist □

Pear Problems: Blast, Frost, and Fabraea

Dave Rosenberger, Ph.D., Plant Pathology,
Cornell University, Hudson Valley Lab

Reprinted from *Scaffolds Fruit Journal*, Cornell,
Volume 7, No. 11 <http://www.nyaes.cornell.edu/ent/scaffolds/1998/>

Pear growers in eastern N.Y. will remember '98 as a difficult year. Trees came into bloom about 15 days earlier than usual, and the crop was threatened by frost on numerous occasions. The cool, damp spring and associated light frosts created the potential for severe infections by *Pseudomonas syringae*, the bacterium that causes pear blast (See Scaffolds for 13 April 1998). Symptoms of pear blast did show up in many orchards during early May. Symptoms included characteristic leaf spotting, blackening of flowers that remained attached long after unpollinated flowers had abscised and fallen from the tree, developing fruitlets with blacked calyxes, and occasional wilting and death of entire spurs. Some observers reported that infections seemed less severe in orchards where streptomycin sprays had been applied prior to the onset of the cold damp weather.

Despite localized frost damage and varying levels of pear blast, most pear orchards in the lower Hudson Valley appeared to have a good crop as of mid-May. As the small fruitlets began developing, however, severe injury became apparent on many Bosc fruitlets. (Bosc is the primary pear variety in eastern N.Y.). Injured Bosc fruitlets showed severe russetting that subsequently caused longitudinal cracking of the fruit. In some cases, longitudinal cracking along with horizontal cracking produced a cross-hatched appearance on the affected face of the fruit. The proportion of affected varies from block to block but exceeds 75% in some blocks. Bartlett fruit have not developed the cracking problem although some Bartlett pears are showing typical frost rings.

Even where the pear crop may have been annihilated, Bosc pear trees should be protected from Fabraea leaf spot during June. Fabraea leaf spot is a perennial threat to Bosc pears, but it can be especially severe following mild winters and wet springs (e.g., years like 1998). Fabraea leaf spot is one of the most "explosive" diseases of tree fruits. It often seems to appear almost overnight during June or early July. The actual chain of events that leads to a Fabraea epidemic is more complex. Epidemics usually occur when a few primary infections are not prevented during the three to four weeks after petal fall. These primary infections appear as nondescript, round leaf spots that usually escape notice. If fungicides are then omitted or inadequate during June or early July, a few primary infections can provide enough inoculum for a very rapidly developing epidemic. Foliar symptoms can appear almost simultaneously on many

leaves throughout much of the tree canopy during late June or early July. The disease causes premature defoliation of trees where infection is severe.

Fabraea can build up more quickly than diseases like apple scab because older apple leaves gradually become resistant to infection by the apple scab fungus, whereas leaf age does not affect susceptibility to Fabraea. All leaves and fruit on Bosc pear trees remain susceptible to Fabraea leaf spot right up until harvest. Thus, when Fabraea leaf spot epidemics develop in early summer, all of the existing leaves can become infected over a short period of time if inoculum is present and trees are left unprotected.

To avoid Fabraea epidemics, Bosc pears should be protected with fungicide from petal fall through July 4. These sprays will prevent the primary infections that subsequently produce the abundant conidia that cause the epidemics. If trees are protected with fungicides applied on a 14-21-day interval through July 4, then the chances for late season development of Fabraea are minimized.

The mancozeb fungicides are the most effective for controlling Fabraea, but their use is restricted by the 77-day-to-harvest interval. Benlate has not provided consistent control of Fabraea, so the only effective fungicides for summer sprays are ziram and sulfur. Ziram alone is only moderately effective, especially if early season control has not been 100% effective. The combination of ziram plus sulfur (one pound of each per 100 gallons of dilute spray) has proven more effective for controlling flyspeck on apples than either product used alone. A ziram/sulfur combination might also prove effective for controlling Fabraea, but this combination has not been evaluated on pears.

Pears should be protected from Fabraea even in orchards where the pear crop has been lost to frost. If Fabraea causes premature defoliation, trees may fail to set fruit buds for next year and the high inoculum levels that result may cause problems in controlling Fabraea next year.

Submitted by Win Cowgill, Agricultural Agent □

IPM BASICS FROM PAGE 1

daily and accumulated DD's are compared with established values. When we accumulate a certain number of DD's (say 200 for OFM), then it is time to spray. An easier way to determine if enough DD's have accumulated for a target insect is to read Dean Polk's IPM notes elsewhere in this newsletter. He provides this information for the various insect pests and production regions in the state.

Calendar-based sprays are no longer in vogue because now we can time a lot of our insecticide sprays based upon insect development. In a cool year, properly timed sprays are delayed compared with traditional calendar sprays and put on earlier during warmer years. Ultimately, applying sprays based upon degree days is good IPM because spray timings are linked to the insect's life cycle and rate of development. □

Fruit IPM

Dean Polk, Agricultural Agent

Peach

Tarnished Plant Bug (TPB) and Other Catfacing

Insects: Sweep samples are finding many adults of these insects. Some samples have shown as many as 17 TPB per sample. Many of these counts are present in orchards which have not yet been mowed, or where herbicides have not yet been applied. While very little new catfacing injury is present, insecticides should still be applied if mowing is anticipated, and catfacing insects are present in high numbers. A number of fruit can also be found with bleeding spots, particularly on the suture and/or at the end of the fruit. This is often accompanied by a slight 'groove' near the bleeding. Upon cutting the fruit, large amounts of internal gumming is found. These are physiologically injured fruit, and are not the result of catfacing insects. One farm in North Jersey was reported with 9.5% catfacing damage (total of old and new feeding).

European Red Mite (ERM): Mite populations have been present at up to 30 mites per leaf, particularly where repeated applications of Lannate were used for green peach aphids. The mite predator, *Stethorus punctum*, is starting to appear in some blocks.

Lesser Peachtree Borer: Adult moths have been captured in pheromone traps for several weeks. Egg laying and larval emergence is well underway. This is the first of 2 generations. Growers who can treat this generation with a handgun may wish to do so at this time. Past experience has shown that treating with an airblast sprayer gives only marginal control. If airblast spraying is the only method available at this time, growers may be better off waiting to treat the second generation in September with a handgun when more time is available.

Rusty Spot: New rusty spot lesions continue to be visible. New spots are about 1/8 to 1/4" in dia. While some growers feel that they can market fruit that have rusty spot lesions, growers who do not tolerate this disease will probably continue treatments over the next couple of weeks. Highest infection rates are running about 10% of fruit infected.

Oriental Fruit Moth: Trap captures are starting to increase in southern counties as first brood larvae pupate and emerge as adults. Trap captures should continue to increase over the next couple of weeks.

Spray Compatibility: A number of growers are applying various forms of calcium with their normal cover sprays. We know from other states and our own experience that certain forms of calcium when combined with copper sprays will burn foliage. Several blocks were recently observed that exhibited classic phytotoxic burning. Both a chelated form of calcium and a copper compound were applied on these blocks.

Apple

Apple/Spirea Aphid Complex: Apple/spirea aphid populations have increased over the past 2 weeks. Colonies are small, but are present on up to 80% of tree terminals. These insects should be tolerated to some degree, particularly if natural predation and parasitism is high, as is the case in many orchards. Lady beetles and Syrphid flies are easily found. Aphid 'mummies' are also present as a result from being parasitized by small wasps. A number of growers have asked about spray programs for blocks which have little to no fruit. Here is an example of NOT having to apply a spray, especially if the crop cannot justify it. Under normal crop loads, and heavier aphid colonies, insecticides can be justified.

Codling Moth (CM): The second spray for codling moth is due in southern counties, and in northern counties by next week. After these treatments are applied, growers can use a 5 moth per trap per week treatment level.

Tufted Apple Budmoth (TABM): Treatments for TABM continue to be needed, particularly in Gloucester and other southern counties where this pest continues to be a problem. See last week's newsletter and the degree day chart above for timing and treatment options.

European Red Mite (ERM): Mite populations have reached 15 mites per leaf in some locations. On 1 farm, Pyramite applied on 1 middle decreased the population by 50%. Predators (both *Stethorus punctum* and predatory mites) are also present on the same farm. Predators are starting to show up over a wide area.

Fire Blight: Growers should be aware of potential fire blight problems. Orchards that had just a few fire

SEE IPM ON PAGE 5

Degree Day Accumulations Since Biofix and Spray Targets								
June 1								
Insect	Hammonton	Bridgeton	Hardingville	CreamRidge	Princeton	Oldwick	Pittstown	Hackettstown
OFM	Done	Done	Done	Done	Done	Done	Done	Done
TABM	696	664	708	613	613	606	438	383
CM	479	495	522	470	456	449	176	343
Spray Targets:								
OFM	200 & 400 DD ₄₅ after biofix (1 st generation).							
TABM	490, 625, 763, 898 DD ₄₅ after biofix (1 st generation). 2228, 2415, 2605, 2795 DD ₄₅ after biofix (2 nd generation).							
CM	250 DD ₅₀ after biofix plus 14 days later (1 st generation). 1250-1300 DD ₅₀ after biofix plus 14 days later (2 nd generation).							

blight strikes last week, now have a moderate number of strikes. Thunderstorms can increase blight infections.

Potato Leafhopper (PLH): The first adults were seen in the Blue Anchor area (Camden Co.) this past week-end. Therefore, it is likely that we will see more of this pest in apple orchards in the near future. PLH has been implicated as a pest that can spread fire blight. PLH can be distinguished from white apple and rose leafhoppers in that PLH are yellowish-green, are more active, tend to run sideways when disturbed, and feed more on younger leaves and on the leaf margins. The other 2 principle leafhoppers are more white in color, move in a forward motion, and cause a random stippling of the leaf.

Apple Scab: Spore tower counts done on 5/1 yielded 238 spores, 5/8 – 142 spores, 5/16 – 95, 5/21 – 60, and 5/29 – 18 spores per 30 minutes. The primary infection period is just about over.

Pear

Pear Psylla: Hatch began in most blocks in southern counties late last week. We now have mostly softshells and an occasional hardshell nymph. Treatments for this pest should go on immediately if not already done so, and populations justify treatment.

Blueberry

Leafrollers and Leps. (Redbanded leafrollers - RBLR, Obliquebanded Leafroller - OBLR, Green Fruitworm -

Trap Captures

Tree Fruit – South Jersey

WEEK END:	RBLR	STLM	TABM-A	CM	AM	OFM	TABM-PLPTB	PTB
1-May	0.75	1057	1.38	2.23		15.43	7.08	
8-May	0.33	953	19.58	5.31		14.54	23.58	
15-May	0.20	108	23.44	6.59		8.05	23.58	
22-May	0.80	119	41.20	5.39		8.57	59.55	52.83
29-May	0.00	315	65.25	8.51	0.00	13.33	78.76	63.74

Tree Fruit – North Jersey

WEEK END:	RBLR	STLM	TABM-A	CM	AM	OFM	TABM-PLPTB	PTB
1-May	23.53	803	0.11	0.11		11.27	0.04	0.00
8-May	14.02	346	0.91	1.56		7.04	0.63	2.00
15-May	3.20	79	2.66	1.69		2.46	1.98	5.72
22-May	1.64	71	11.87	7.52		11.94	11.07	46.47
29-May	0.41	203	24.67	10.11		9.64	26.25	51.39

Blueberry - Atlantic Co.

WEEK END:	RBLR	OBLR	CBFW	SNLH	BBM HIGH	BBM LOW
5/1	6.4	0.08				
5/8	2.2	0	0.2			
5/15	0.04	0.05	0.57			
5/22	0	4.05	0.61			
5/29	0.29	11.15	1.28			

Blueberry - Burlington Co.

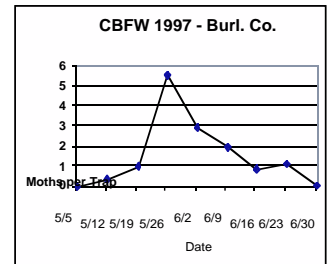
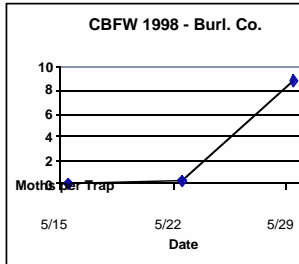
WEEK END:	RBLR	OBLR	CBFW	SNLH	BBM HIGH	BBM LOW
5/1	2.5	0				
5/8	1.1	0.05	0			
5/15	1.06	0.06	0.00			
5/22	0	0.5	0.22			
5/29	0.1	13.3	8.8	0.08		

GFW): A few remaining green fruitworms are still present. A small number of fields were seen where this insect was present above treatment levels.

Aphids: Aphid populations are for the most part unchanged since last week. Aphids are present, but at low levels. The highest infestation was about 20% of terminals infested on 1 farm.

Cranberry Weevil (CBW) or Blueberry Blossom

Weevil: Since this is not a pest at this time, this is purely observational. Several fields were noted this past week where adult weevils were present on foliage; somewhat unusual for this time of year.



Cranberry Fruitworm (CBFW): CBFW adult catches increased sharply this past week and into this week. Even though the season started off early, the current timing is a pretty close match to last year's catches and timing. See graphs below. Treatments are applied several days after the flight peak.

Fruit Meeting Calendar

June 3, 1998 - SE PA Twilight Small Fruit Growers Meeting 6:30 p.m., Rodichok Farm, Tower City, PA. Call Joe Fiola at Rutgers Fruit Research & Extension Center, Cream Ridge, NJ, (609) 758-7311.

June 3, 1998 - South Jersey Christmas Tree Growers Meeting, Dean's Evergreens Christmas Tree Plantation, Route 609 Elmer-Richwood Road, Monroeville, NJ. Call RCE of Gloucester County, 609-863-0110 for details and information.

June 11, 1998 - Cider Labeling & HACCP Discussion Workshop at the Rutgers Fruit Research and Extension Center, Cream Ridge, NJ. Contact Ron Good, of the New Jersey Apple Industry Council at 609-292-8853 for information. More details to follow later.

June 16, 1998, 6:30 p.m. - Direct Marketing Twilight Meeting, Passaic County, Farms View Roadstand, 945 Black Oak Ridge Road (Rt. 202), Wayne, NJ

This third-generation farm, located in the middle of suburbia, has steadily grown over the years and has recently undergone a major expansion. They have also diversified the business by developing a successful leaf recycling business, thereby creating a source of organic matter for use in their fields. For further information, please contact Ramu Govindasamy at (732) 932-9171 ext. 25.

June 29-30, 1998 - International Dwarf Fruit Tree Association Summer (Peach & Apple Tour of Virginia). Pre-registration is required. Contact Charles Ax at 717-837-1551 before May 15 to register. Details are available from Jerry Frecon at 609-863-0110.

June 30, 1998 - Twilight Fruit, Vegetable and Flower Meeting, Demarest Farms, Hillsdale, NJ. Call Joel Flagler of Rutgers Cooperative Extension of Bergen County at (201) 599-6167 for information or directions, or call Demarest Farm at (201) 666-0472.

July 23 through July 26, 1998 - New Jersey Peach Festival at the Gloucester County 4-H Fair, 4-H Fairgrounds, Mullica Hill, NJ. Contact Chris Smith at 609-881-1411 or Marsha Gaventa at 609-467-8028.

August 18, 1998, 6:30 p.m. - Direct Marketing Twilight Meeting, Monmouth County, Atlantic Farms, 1506 Atlantic Avenue, Wall Township (Rt. 524), NJ 08736

Located in suburbia, John Tobia and family have carved out a wonderful market, serving consumers with Jersey produce, plants, farm entertainment and agriculture education tours. A steadily growing wholesale produce business serving restaurants and other marketers has been established, further diversifying the operation. For further information, please contact Ramu Govindasamy at (732) 932-9171 ext. 25.

Hazard Analysis and Critical Control Point (HACCP) Information Meeting

Jerome L. Frecon, Agricultural Agent

The Food & Drug Administration has proposed new labeling requirements for raw (non-pasteurized) apple cider. Part of the proposal includes implementing a HACCP Plan for each raw cider processing operation.

The New Jersey Apple Industry Council, at their last Board of Directors Meeting, discussed this new program and felt it would be beneficial to have an informational meeting to learn what HACCP is, if it can be implemented, and also how to understand and respond to the entire program.

The following is the agenda for this meeting:

Date: June 11, 1998

Time: 3 p.m. until ?

Place: Rutgers Fruit Research and Extension Center
Route 539

Cream Ridge, Monmouth County

3:00 Welcome and Introductory Remarks

3:05 "HACCP for Cider Producers - Panacea or Problem?"

Dr. Don Schaffner, Extension Specialist in Food Science

Rutgers Cooperative Extension

5:00 "Making your Voices Heard by the FDA"

Alicia Rosamilia, Law Student

5:10 Discussion and Comments

ATTENTION: To attend this meeting you must call and let us know if you are coming!

Respond to Ron Good at (609) 292-8853

Sponsored by the NJ Apple Council, in cooperation with Rutgers Cooperative Extension, NJ State Horticultural Society, NJ Department of Agriculture, NJ Department of Health & Senior Services.

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PLANT & PEST ADVISORY

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