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Update on Pest Management and Crop Development

FRUIT JOURNAL

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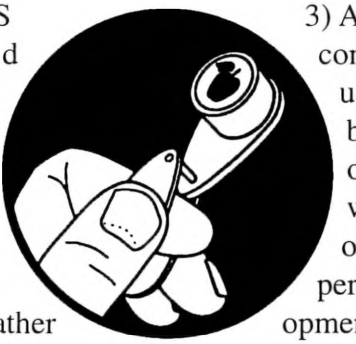
INSECTS

SO SOON?

PETAL PUSHERS (Art Agnello and Harvey Reissig, Entomology, Geneva, and Dick Straub,Entomology, Highland)



❖❖ Once again, the N.Y. weather has figured out yet another variation on the theme of getting to a given destination without traversing any known territory. We thought for sure that this spring would at last be one of those mythical "normal" ones that warmed slowly into a pleasant, if hesitant, calm period of bloom, perhaps to be followed by just a bit too much rain to suit everyone's preferences. However, the pre-summer heat wave that had all the weathermen clucking and the schoolkids sporting shorts and sandals, also generated an all too familiar turbo pink-to-fullblast bloom sequence that left even the honeybees breathless from exertion. Despite the predicted cool-front slowdown this week, many eastern N.Y. apple orchards have already entered the petal fall period, and the rest of us won't be far behind. As you're no doubt aware, petal fall is the pivotal time for establishing a foundation for the control of many of the most important arthropod pests. Here once again are some important points to keep in mind for the petal fall insecticide sprays:

1) To minimize the hazard to honey bees, apply pesticides only after ALL petals have fallen in the block and when no bees are actively foraging on blooming weeds (evening is better than early morning).

2) Do not use Lannate on early McIntosh, Wealthy, or Dutchess because of possible injury to fruit and foliage.

3) Although our research trials haven't consistently borne this out, postbloom use of pyrethroid insecticides has been known to encourage the buildup of certain pests such as mites and woolly apple aphid. Try to limit use of these materials to one application per season to delay resistance development and extend their useful field life.

4) When choosing an insecticide for this application, keep in mind its range of activity, both adverse and beneficial. For example,

- if Sevin is applied for thinning, it will also help to control plum curculio and white apple leafhopper (even at the 1 lb rate); however, it does have detrimental effects on *Amblyseius fallacis* predator mites.
- Carzol acts not only against European red mite, but will also control white apple leafhop-

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per; however, it is not kind to predatory mites. Recall that petal fall is now the latest that this material can be used because of a recent label change.

• Agri-Mek is recommended at petal fall for maximum efficacy against mites; this is also the timing at which it will have its greatest effect against white apple leafhopper nymphs and sapfeeding spotted tentiform leafminers. It is not likely to be too useful against rosy apple aphid.

5) Be aware of the destructive effects of any spray materials on beneficial mites and insects (refer to Tables 5 and 12 on pp. 45 and 52 in the 2001 Recommends.)

6) Do not use Vydate or Sevin during the first 30 days after bloom without taking into account their thinning effects.

Mites

Many growers may have been unable to do as good as job as they would have liked with their early season mite programs again this year. Conditions were fairly lousy for oil spraying in western N.Y., and the pink period didn't last nearly long enough for some of the other prebloom acaricide products. Although early reports indicate lower than normal levels of mites this year, even in historically problematic orchards, some European red mite management strategies will need to take into account the always unpredicatable (and always critical) early prebloom mite development conditions. Mite hatch has already been noted in western N.Y., and the relatively natural inclination to rely on a good rescue material such as Pyramite carries the implicit requirement of vigilant monitoring for threshold numbers and timely action when a treatment is needed. The predictions call for this summer to be drier and warmer than normal, which means that high numbers and significant leaf damage can develop very rapidly when the mites do show up.

Our message, as ever, is that it is always wise to keep an eye on the foliage throughout June and July to detect unreasonable mite buildup, because it doesn't take much to boost numbers into the problem category. Until June 30, we recommend a threshold of 2.5 motile stages (anything except eggs) per leaf. Explicit yet simple instructions on assessing mite densities can be found on the mite sampling charts in the Recommends (starting on p. 60).

Among rescue-type products, Pyramite applied in a timely manner should generally do the best job, and is most likely to give you control for the remainder of the season, but don't stop examining the foliage altogether. It's advisable not to use this product more than once per season, even though 2 applications are allowable. This is not only out of consideration for potential resistance development, but also because Pyramite has some toxicity to predator mites, and hitting them twice won't do much to allow their establishment.

Kelthane can be used if you have no reason to suspect resistance in your populations, or if none has been applied in a given block for at least 5 years. Vendex is still available, and has been shown in some of Dick Straub's trials to be one of the more effective treatments for twospotted spider mites. Keep in mind that TSSM populations can increase faster than red mites.

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Plum Curculio

Plum curculio (PC) adults move into orchards from overwintering sites in hedgerows or the edges of woods and are present in the trees from late pink to early bloom before the fruit is susceptible to damage. Adults are active in the spring when temperatures exceed 60°F, which means that more than likely they've already started arriving. Adult females oviposit in fruit during both day and night but feed mostly at night. Depending on temperature, overwintering adults remain active for two to six weeks after petal fall. Although adults may feed on blossoms, apples are not susceptible to damage until petal fall, at which time adults damage fruit by both feeding and ovipositing. Unlike fruit injured by other pests, many apples damaged by plum curculio will remain on the tree until harvest. Because adults are not highly mobile, orchards near overwintering sites, woodlands, and hedgerows are most susceptible to attack. Fruit damage is usually most common in border rows next to sites where adults overwinter.

Monitoring for plum curculio is not currently recommended in New York because of the amount of time and labor involved and because plum curculio is generally assumed to be present in every orchard. Although growers realize that initial post-bloom sprays for plum curculio control should begin at petal fall, they are often unsure how many additional sprays will be necessary to maintain protective chemical residues to prevent subsequent damage throughout the PC oviposition cycle, which varies according to temperatures and weather patterns after petal fall.

Following from the fact that PC activity and oviposition are greatly affected by temperature, an oviposition model has been developed to determine when control sprays after petal fall are no longer necessary to protect fruit from PC damage. This model is based on the assumption that residues from control sprays after petal fall only need be maintained on fruit and foliage until about 40% of the oviposition cycle is complete, which is predicted by the model to occur at 340 DD (base 50°F) after petal fall. Probably, this strategy works because, after 40% of PC oviposition is complete, adults usually are not moving into the orchard from outside sources, or moving around within orchards from tree to tree. Therefore, by this time, adults residing in treated trees have already been killed by insecticide residues and are unable to complete the remainder of their normal oviposition cycle.

In order to use this strategy: (1) Treat the entire orchard at petal fall with a broad spectrum insecticide. (2) Start calculating the accumulation of DD after petal fall (base 50°F). (3) No additional sprays are necessary whenever the date of accumulation of 340 DD falls within 10–14 days after a previous spray.

This conventional strategy is probably only necessary for commercial apple orchards in which PC fruit damage has been observed frequently, or for orchards thought to be particularly vulnerable to infestation from codling moth or the European apple sawfly. Usually, orchards that chronically suffer fruit damage from PC are relatively small blocks located next to abandoned orchards or surrounded by woods or woodlots, which are favorable sites for overwintering of PC adults. Some larger orchards bordered by woods on one or more sides may also be at risk for chronic infestations of PC.

In moderate problem orchards, a petal fall application followed by a second spray 10–14 days later will provide adequate control. In orchards with more severe chronic problems, or in seasons when adult activity is prolonged by unusually cool and wet weather, two cover sprays applied 10–14 days apart after petal fall may be necessary to prevent late damage. Guthion, Imidan, and all pyrethroid insecticides are effective at controlling plum curculio. These materials will also control codling moth later on.

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Obliquebanded Leafroller

Rather high numbers of overwintered OBLR are being found in some blocks in the Hudson Valley, particularly in those 'hail' blocks that received minimal management last season. The obvious larvae are in 'shelters' or rolled terminal leaves, and will be difficult to impact with insecticides. A significant number, however, are now exposed in blossom clusters and quite accessible to sprays. Any degree of control now will lessen pressure from the summer brood. Control options are:

1. CONFIRM — N.Y.S. registration is now complete under a SLN 24(c) provision.
2. *Bacillus thuringiensis* — One could wait until petal fall, but because all formulations are labeled for bloom applications, this timing would be the optimum tactic. Because these larvae are still small, and are exposed, the lower to mid range of rates should suffice (see the Recommends, p.108).
3. ASANA or DANITOL — Although effective, Asana is a tough choice because of a propensity to cause mite flaring. Danitol, however, does not flare mites in a similar fashion and may, in fact, provide early season suppression of mites. Unlike the federal label, the N.Y.S. label (received too late to be included in the Recommends) allows a maximum application rate of 10 2/3 oz/acre per application. Research results from western N.Y. have shown good control of OBLR at this rate.

White Apple Leafhopper

WALH nymphs can be numerous in some blocks, especially in the eastern part of the state. Provado has proven itself effective against this pest, and a petal fall application also gives leafminer control. Furthermore, it will have an added effect on green aphid populations, which might otherwise be more problematic this spring, owing to the advanced tree development and sustained availability of succulent green tissue. Rosy apple aphids can similarly be cleaned up with this strategy, although petal fall is often too late to prevent fruit damage that their feeding may have caused. Growers using Sevin in their thinning sprays will get some WALH control at the 1 lb rate. Alternative choices include Thiodan and Lannate; Agri-Mek or Carzol used for mites now will also do the job, but Carzol will be harmful to predator mites. The damage potential of this first generation should be evaluated carefully before deciding on the need for a specific control of this pest.

Oriental Fruit Moth

OFM has been receiving more attention recently, as we have been made increasingly aware of its tenacious ability to overcome some of the older "safe" OP-based control programs, particularly in peaches. We are in the midst of extensive research to nail down some of its developmental secrets and susceptibility gaps, but for the time being, field efficacy trials conducted last season showed that problematic populations were best controlled starting at *petal fall* (not shuck split) of peaches, using a pyrethroid such as Asana, and backed up 10-14 days later. The second brood requires a similar approach, beginning about 6 days after its peak flight, which is expected during the second half of June, but we'll keep you posted on the timing for this one. Pheromone mating disruption seemed to work very well last year, but we're testing it for a second season to better understand its strengths and weaknesses, so we're not recommending it too strongly just yet.❖❖

APO(LO)GEES

WHAT'S YOUR SIGN?

ERRATUM

❖❖ Mike Fargione pointed out an error in the article entitled "Using Apogee to Help Manage Fire Blight" that appeared in last week's issue. In the first sentence after the numbered paragraphs that represent the decision model for using Apogee, the article as printed says:
"Now apply the formula: $y = 1 - (2+3+4+5+6)$".
In fact, the formula should be:
"$y = 1 * (2+3+4+5+6)$" (i.e. times instead of minus).
❖❖

GENERAL INFO

NOZZLE TIPS

FINE TUNE YOUR BOOM SPRAYER FOR THE COMING SEASON
(Andrew Landers, Agricultural & Biological Engineering, Ithaca)

❖❖ Maximum economic return will be obtained with a finely tuned sprayer as it provides better disease control and is more cost-effective.

There are three factors that affect application rate:

1. Forward speed
2. Nozzle size
3. System pressure.

Forward speed affects both dose rate and volume rate — double the speed and you halve both. Remember to drive at a speed that provides a stable boom. Too fast will result in boom bounce, leading to incorrect nozzle height above the target. Too slow will result in not applying pesticides in a timely manner, failing to cover the ground and keeping on top of disease outbreaks.

Nozzle selection is so important. Droplets are measured in microns; 100 microns is about the thickness of a human hair. Remember that large drops bounce; such droplets are over 300 microns and are created by using low pressures, too large a nozzle orifice and/or worn nozzles. Too fine a droplet (less than 150 microns) will drift, resulting in damage to neighboring properties, nuisance complaints and equally important, reduced application to the target.

Select the correct nozzle for the target. Use a nozzle that creates a fine spray for fungicides and insecticides. A medium quality spray is ideal for herbicides. Coarse spray is ideal for applying liquid fertilizers and pre-emergent herbicides to bare soil.

The rate of nozzle wear will depend upon the pressure used, type of pesticide being used and nozzle material. Note that ceramic nozzle tips, while expensive, do last much, much longer than cheap plastic nozzles. Nozzles made from modern polymers are also superior to cheap plastics. Brass is the worst nozzle tip to use, as it wears out so rapidly.

Nozzle abuse is a problem caused by operators using a piece of wire to clean out a blocked tip. Rodding out a ceramic tip with a piece of wire is the kiss of death, it will damage it, thus affecting flow rate and spray pattern. Remember, good filtration and agitation will prevent nozzle blockage. If a nozzle does block, replace it with a spare and blow out the blockage with an airline or use a bristle brush; NEVER kiss nozzles!

System pressure affects flow rate, nozzle life, droplet size, fan shape and penetration into the target. Too low a pressure will result in large droplets dripping off the target. Too high a pressure results in off-target drift and poor application. Beware that some automatic electronic controllers will alter flow rate by using a butterfly valve to change system pressure. Always work within the boundaries recommended in the sprayer manual.

Table 1. The inter-relationship between the factors affecting application rate

	Sprayer speed	Nozzle size	System pressure
Application rate	X	X	X
Spray volume	X	X	X
Droplet size		X	X

Good pre-season maintenance and calibration is so important. Articles have been published by the author on this subject. They are also obtainable at: http://aben.cals.cornell.edu/extension/pestapp/boom.html

Remember, good pesticide application is a wonderful blend of technology and common sense.

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So you think you are a good sprayer operator? (Answers may be found on page 8)

1. A radar type speed indicator obtains signals from
   a) a wheel mounted induction coil.
   b) the tractor transmission.
   c) the field surface.
   d) the sprayer pump drive.

2. Increasing the operating pressure of a sprayer results in
   a) narrowing the nozzle jet angle.
   b) decreasing droplet size.
   c) increasing droplet size.
   d) increasing output and droplet size.

3. Drift from a sprayer is most likely to be increased by
   a) high operating pressures.
   b) boom too near ground.
   c) high application rates.
   d) high forward speed.

4. With an automatic rate control system in operation on a sprayer, increasing forward speed causes increased output by
   a) producing larger droplets.
   b) increasing system pressure.
   c) increasing droplet size and pressure.
   d) reducing system pressure.

5. The use of 110° nozzles on a sprayer enables
   a) the boom to be raised higher above the target.
   b) nozzles to be placed closed together.
   c) boom to be set closer to the target.
   d) smaller nozzle orifices to be used.

6. The correct procedure when turning on headlands during spraying is
   a) turn off power take-off.
   b) continue to spray.
   c) turn sprayer main control valve to off.
   d) turn sprayer boom valves to off.

7. When calibrating a sprayer to apply 20gallons/acre results show 18 gallons/acre is being applied. To rectify this error, changes should be made to
   a) pressure.
   b) nozzles.
   c) speed.
   d) speed and pressure.

8. Sprayer calibration should be carried out
   a) by the dealer before delivering the sprayer.
   b) when poor spraying results can be seen.
   c) at the beginning of each spraying period.
   d) after at least 500 acres of spraying.

URGENT MESSAGE

CHEM NEWS:
OFF-LABEL
DI-SYSTON
USE ALERT

CHEM NEWS

❖❖ We have been informed of some instances of people in the field recommending Di-Syston as a deer repellent in their orchards. Although the 15% granular formulation does have a registration on non-bearing fruit trees, this is restricted to aphids, lace bug, leafhoppers, mites, thrips and whiteflies, and the material must be worked into the ground and watered in afterwards. Besides the fact that use of this material for deer management would be off-label (i.e., illegal), this is a highly toxic pesticide that, if misused, could pose a severe poisoning risk to dogs, birds, small children, etc.❖❖

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PEST FOCUS

Geneva:
1st **American plum borer** trap catch 5/10. **Pear psylla** nymphs present. **Mullein plant bug** and **apple brown bug** (mirid bugs) nymphs present.

Highland: **Pear psylla** hardshell nymphs present and 1st gen. egg hatch complete. 1st **oriental fruit moth** trap catch 5/8 and 1st **codling moth** trap catch 5/14. Very high **obliquebanded leafroller** numbers in blocks left untreated following hail damage last year.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/14):	464	277
(Geneva 1/1-5/14/2000):	540	294
(Geneva 1/1–5/14 "Normal"):	422	209
(Highland 1/1–5/14):	581	352

Coming Events:	**Ranges:**	
Lesser appleworm 1st flight peak	372–851	181–483
Oriental fruit moth 1st flight peak	259–606	96–298
Lesser peachtree borer 1st catch	224–946	110–553
San Jose scale 1st catch	189–704	69–385
Spotted tentiform leafminer sap-feeders present	295–628	130–325
American plum borer 1st flight peak	360–962	134–601
Codling moth 1st catch	273–805	141–491
Mirid bugs hatch complete	532–720	252–390
European red mite egg hatch complete	361–484	183–298
McIntosh at fruit set	467–648	242–339

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	5/7	5/10	5/14
Green fruitworm	0	0	–
Redbanded leafroller	5.9	2.2	3.1
Spotted tentiform leafminer	584	428	242
Oriental fruit moth	72.5*	107	55
Lesser appleworm	57.5*	83.3	19.4
American plum borer	0	1.0*	1.1

Highland, NY

	5/7	5/14
Green fruitworm	0	0
Redbanded leafroller	36.4	15.5
Spotted tentiform leafminer	38.6	17.2
Oriental fruit moth	0.1*	0.1
Codling moth	0	0.8*

* first catch

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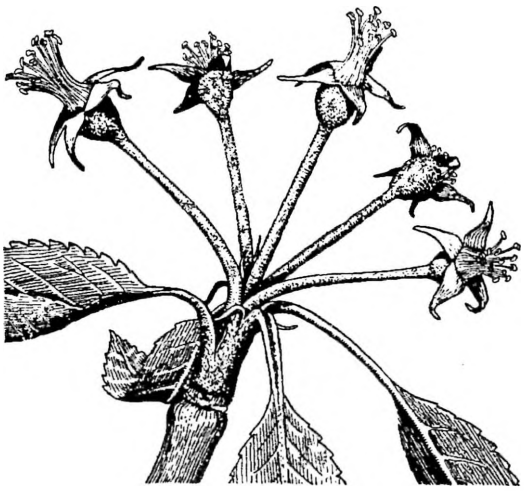
ANSWERS (To questions on page 6)
Q.1 = c, Q.2 = b, Q.3 = a, Q.4.= b, Q.5 = c, Q.6 = c, Q.7 = b, Q.8 = c&d

PHENOLOGIES

Geneva:
Apple (McIntosh): petal fall
Apple (Red Delicious): 90% petal fall
Peach: petal fall
Pear: fruit set
Sweet cherry: fruit 1/4 inch
Tart cherry: fruit 1/4 inch
Plum: fruit set

Highland:
Apple (McIntosh): king fruit 5mm



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