scaffolds Update on Pest Management and Crop Development
FRUIT JOURNAL

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DISEASES

KABOOM!

PEAR BLOSSOM BLAST

(Dave Rosenberger, Plant Pathology, Highland)

❖❖ Pear blossom blast is a bacterial disease caused by *Pseudomonas syringae*. Infection is favored by cool wet weather (as compared with fire blight bacteria, which are favored by warm wet weather). *Pseudomonas syringae* survives and grows on the surface of many different plant species and is distributed by splashing rain and by insects. In Northeastern United States, severe outbreaks of blossom blast on pears may occur when cool wet weather prevails during bloom and is followed by a spring frost. Frost injury provides entry sites for infection.

Symptoms of pear blast include blackening of the calyx end of individual fruitlets, blackening of entire blossom clusters with cluster leaves remaining unaffected, or complete death of clusters including both the blossoms and the leaves. Young leaves near affected clusters may have small nondescript necrotic leaf spots. Unlike fire blight, blossom blast does not spread into larger limbs or cause extensive damage to pear trees. Infections can seriously reduce fruit set. Because the mildest symptoms (blackening of the calyx cup on small fruitlets) can easily be confused with other factors that cause poor fruit set, the economic importance of this disease is often underestimated.

Pear blast has been a significant problem in some orchards in eastern New York over the past three years, but no one can accurately predict whether or not pear blast is likely to cause problems in 1998. Infections are most likely to occur after blossoms open because various flower parts are more susceptible to infection than are leaves and other green tissue. Thus, the frosts that occurred over the past weekend are not likely to contribute to development of pear blast. However, as flowers open this week, frosts later in the week could contribute to infections if weather turns cool and damp. Pear blast is unlikely to develop if we continue to have sunny, warm, dry days because the bacteria need cool damp weather to build up on the plant surface before infections can occur.

If weather during pear bloom turns cool and damp for several consecutive days, pear growers should apply streptomycin as indicated for fire blight. This application is especially critical in orchards that suffered from pear blast last year because researchers have noted that orchards affected one year are likely to show the same problem in succeeding years if weather conditions are favorable for disease development. The streptomycin application should be made prior to any predicted bloom-time frosts. However, note that streptomycin as labeled for fire blight calls for applications beginning at 20–30% bloom. Applications prior to 20% bloom are not in compliance with the label and have not been shown to be of any value for either fire blight or pear blast. If cool wet conditions persist for more than a few days, a second bloom-time application may be needed 57 days *after the first* application.❖❖

METAL ILLNESS?

RUST DISEASES
(Dave Rosenberger,
Plant Pathology, Highland)

❖❖ Rust infections on apple fruit occur during wetting periods between tight cluster and petal fall. The tissue that will develop into the apple fruit is exposed just below the blossom and can become infected with rust as soon as the cluster leaves fold back from the flower clusters. Infections on leaves can occur after petal fall, but fruit are relatively resistant to infection after petal fall. With apple trees in the Hudson Valley at tight cluster, this is the critical time for protecting trees from rust infections.

Cedar trees are loaded with cedar apple rust galls this spring because the wet summer during 1996 favored infection of cedar trees. The rust infections that occurred in cedars during the fall of 1996 are now producing the teliospores that can infect apples. Potential for fruit infections is likely to be higher than usual this year both because of the abundance of cedar galls and because early bud development this year is resulting in a prolonged period of susceptibility. Cool weather last week slowed bud development. Whereas apple trees sometimes move from tight cluster to petal fall in as little as two weeks, these growth stages can be spread out over more than four weeks when a season starts early.

Three different rust diseases are commonly found on apple trees in eastern New York. Cedar apple rust causes yellow or orange lesions on both leaves and fruit of susceptible apple cultivars. Quince rust infects apple fruit, but not leaves. Hawthorne rust is less common and can infect apple leaves but not fruit. Hawthorne rust can cause typical yellow rust lesions leaves of cultivars such as McIntosh, Empire, and Liberty that are generally considered resistant to cedar rust.

Wetting and temperature requirements for cedar apple rust infection are noted on page 44 in the *1998 Pest Management Recommendations for Commercial Tree-Fruit Production.* Wetting requirements for quince rust infection have not been clearly defined. However, severe quince rust infections usually occur only following extended wetting periods (at least 30 hours, usually >48 hrs) with moderate temperatures (50–75°F) between tight cluster and late bloom. Under these conditions, more than 50% of fruit on unprotected trees can develop quince rust. More commonly, 5–15% of fruit are affected in unprotected orchards.

The SI fungicides (Rubigan, Nova, Procure) have eradicant activity against cedar apple rust that is similar to their eradicant activity against apple scab. Bayleton is also effective against cedar apple rust and has eradicant activity for rust similar to that of the other SI fungicides even though it is not effective against apple scab. Eradicant activity of SI fungicides against quince rust has not been evaluated in detail, but it appears more limited for quince rust than for cedar apple rust. The difference may occur because quince rust invades deep into the fruit flesh whereas cedar apple rust is more superficial. Growers concerned about quince rust infec-

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Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@nysaes.cornell.edu

Editors: A. Agnello, D. Kain

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tions following lengthy wetting periods should apply SI fungicides as soon as possible. Eradicant activity against quince rust may become limited after 48 hours counting from the start of the infection period.

Unlike apple scab, none of the apple rust diseases have a secondary infection cycle. Primary lesions on apple fruit or leaves will never result in secondary spread to other apple leaves. All of the inoculum must come from cedar apple rust galls or quince rust cankers on cedar trees. After this primary inoculum is exhausted (usually about June 15 for cedar apple rust in the Hudson Valley), no further infections can occur on apple until the following season.

Cultivars vary considerably in their susceptibility to cedar apple rust. Golden Delicious, Rome Beauty, Jonathan, Lodi, Idared, and Mutsu are some of the common older cultivars that are very susceptible. Newer cultivars to add to this list include Fuji, Braeburn, Gala, Cameo, Ginger Gold, Goldrush, and Arlet. Honeycrisp is only moderately susceptible to cedar apple rust. McIntosh and Delicious are considered very resistant. ❖❖

INSECTS

INSECT BITES

PINK AND A PRAYER
(Art Agnello, Entomology, Geneva)

❖❖ We'll make this quick, because we don't want the magic moment to pass before bloom broadsides us. Assuming you're all set with your early season mite management strategy, the most crucial of the pest decisions to be made at pink has to do with rosy apple aphid (RAA), because this is the last chance to opt for an effective RAA management decision, if you need to do so. Control recommendations for RAA cover the period from 1/2-inch green to the pink bud stage, using any of a number of materials: Thiodan, Lorsban, Lannate, Vydate, Supracide or Asana, listed roughly in order of increasing harm to beneficial mites. A pink application of any of these products does a better job than a spray applied either earlier or later.

Because RAA populations are highly variable, it is important to assess their densities before making a treatment. In past surveys, approximately 50% of the orchards sampled have ended up requiring treatment. If you find ONE infested cluster (checking 10 fruit clusters in each of 10 trees), we would advise including an RAA material in your pink spray; this threshold may be a little conservative for people who are skilled at finding the aphids.

What else is happening at pink? STLM is laying eggs, but most orchards don't suffer too greatly from 1st brood leafminer, and even if so, a sequential sampling plan can be used to classify STLM egg density at pink or of sap-feeding mines immediately after petal fall (see pages 91, 95 or 97 in the Recommends). Treatment is recommended if eggs average 2 or more per leaf on leaves 2, 3, and 4 of a fruit cluster at pink, or if sap-feeding mines average 1 or more per leaf on these leaves at petal fall. Sampling can be completed in approximately 10 minutes. In recent years, only 1 out of 6 sampled orchards have required insecticide treatments to control first-generation STLM populations. Vydate at pink or Lannate at petal fall have been our standard recommendations for this pest; however, now we also have the petal fall options of Provado (which will add to the leafhopper control if you don't use enough Sevin at thinning to do an adequate job), as well as Agri-Mek, which should be applied at this time anyway for mite control.

Tarnished plant bug is a final possibility, but you'll need to decide for yourself whether it's a major concern. In our experience, TPB control has been warranted in few western N.Y. orchards (and only slightly more in the Hudson Valley), simply because the most effective treatment to use is a pyrethroid, which a) wipes out predator mites, and

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b) still rarely lowers TPB damage enough to be economically justified. If you elect an Asana spray at pink for plant bug, you'll take care of rosy apple aphid (and STLM) at the same time; if RAA is your primary concern, scout for them first, and if necessary, use Lorsban or Thiodan.❖❖

BEE FRUITFUL

GETTING THE MOST POLLINATION FOR YOUR DOLLAR

(Nick Calderone, Entomology, Ithaca)

❖❖ Tree fruits, small fruits, and many vegetable crops, especially the vine crops, all require pollinating insects for a successful harvest. Remember! Not only is pollination important for a high yield, it is just as important to fruit size, shape and sweetness! A number of insects pollinate crops, but, for several reasons, the honey bee is the most versatile, all-around pollinator. Honey bees are available in large numbers throughout the growing season, they pollinate over 90 commercial crops, they are easily transported by truck, and they can be easily distributed throughout large plantings. Compared with other pollinators, honey bees are very cost effective. A single strong, two-story colony provides 15–25 thousand foragers.

HOW MANY COLONIES?

Growers are usually concerned about the number of colonies they need to rent. New York growers have traditionally used about one colony of bees per three acres for apple pollination. This number may have been adequate in small orchards visited by feral honey bees and by solitary bees and bumble bees from adjacent hedgerows and woods. However, feral honey bee populations have been greatly reduced in recent years, and modern agricultural practices have eliminated many natural nesting sites for solitary bees and bumble bees. In addition, the flight range of solitary bees is not generally sufficient to ensure coverage of the center portions of large plantings. Growers with large blocks of apples and other tree fruits may wish to increase the number of hives to one per acre. Most other crops are also adequately served by a single strong colony per acre. If your fruit set has been lower than expected in the past, or your fruits are lopsided or misshapen, you probably need to use more bees. Remember, if your fruit set is too high, you can always thin, but if it is too low, you are just out of luck.

SPECIAL REQUIREMENTS

Some crops have special requirements. Red Delicious apples have flower structures that are different from most other common varieties such as McIntosh. Their anthers are widespread, and bees learn to insert their mouthparts between the anthers to obtain nectar. In this way, the bees do not contact the flower's sexual parts and no pollination occurs. It takes time for bees to learn to obtain nectar in this way. To counteract this problem, the number of colonies in the orchard must be increased so there are more inexperienced bees present. Up to two colonies per acre may be needed in large stands of red delicious apples. Move bees into apples, regardless of variety, right as the king blossoms open.

Pollination of pears will probably always be a problem because pear nectar contains only about 15% sugar versus 40% for apples, dandelions, and yellow rocket. The answer is to move the bees into the center of the pear block when the pears are at 50% bloom. It will take some time for the bees to discover better sources farther away, and in that time, the pears may be adequately pollinated. An alternative is to use more colonies per acre, which will increase the number of bees foraging within the orchard. Sweet cherries should be pollinated soon after they open. Therefore, bees should be moved in the day before bloom. Since sweet cherries require a high fruit set for a commercially viable crop, and since they bloom early in the season when the weather is often unfavorable for foraging, two colonies per acre may be required. There is growing evidence that strawberries can benefit substantially from having hives of bees in the field during bloom.

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HIVE PLACEMENT

Always select good locations for the bees you rent to obtain maximum benefit for your pollination dollar. It's a lot like real estate — location-location-location. A good location slopes slightly to the east or south, is protected from the wind, and has as much exposure to sunlight as possible. It is important that colonies of honey bees be kept in full sunlight in order to warm the hives rapidly in the morning and entice the workers out of the hives on chilly spring mornings. Entrances should face south to east, whenever possible. Keep colonies on pallets or cinder blocks to keep the bottom boards 3–6 inches above the ground. Hives with wet bottom boards will be cooler and have less foraging activity than dry colonies. A hive stand will also keep colonies above tall grass, which may shade or block the entrance. Place colonies in groups of 4–6 to take advantage of good locations. In large orchards and fields, groups of 10–20 hives can be used to take advantage of prime locations. It is best to locate hives near pollinizer rows where that consideration applies, such as with apples.

PESTICIDES

Overall, pesticides are less of a problem to bees and beekeepers today than they were 10 and 20 years ago. Nevertheless, serious poisoning incidents still occur, and several reports of bee poisoning from methyl parathion were confirmed last year in New York. It is important to read the pesticide label and to avoid using materials that are especially toxic to bees whenever there is a safer alternative available. Sevin (carbaryl), Guthion (azinphosmethyl) and Penncap-M (micro-encapsulated methyl parathion) are especially toxic to bees.

Honey bees are most often killed by pesticides when they ingest contaminated pollen. However, bees can also be poisoned by pesticides that have contaminated small pools from which foragers collect water to dilute the honey they feed their young. Bees will collect water from the closest available source, including standing water in wheel ruts and old tires in or near your fields. A problem exists if more than 10 dead bees are found in front of a hive in the morning. If too many bees die, your crops will not be adequately pollinated and it may be necessary to rent more bees. You can help the bees by providing them with a source of clean water nearby. A small tub with a few wooden floats or a ridged piece of hardware cloth placed diagonally in the tub will work well. If you don't provide floats or screens, the bees may drown.

You can eliminate almost all damage to bees, both managed and wild, by not spraying when flowers, including weeds, are open and attractive to bees, and by not spraying when there is any risk of drift to non-target crops or flowers. Evening, about an hour before sunset, is usually a good time to spray because there is generally little wind at that time. Always use the largest droplet size possible when spraying, and check out the use of spray stickers to help minimize drift. Keep flowering ground-cover plants mowed if you are going to spray in an orchard during the summer. Clover is a common problem for bees on orchard floors; keep it mowed or use an herbicide.

GENERAL RECOMMENDATIONS

Bees should be moved onto location at night, and once the hives have been set down for pollination, you should leave them at that spot until the job is done! Moving bees in the daytime and moving them short distances (less than 3 miles as the crow flies) will cause a serious loss of foragers and seriously damage the colony. Always contact the beekeepers if the need arises to move the bees. If you live in an area with known bear problems, use an electric fence to protect the bees. Keep nearby flowering plants mowed to reduce competition for the bees' attention.

THE BEEKEEPER

I recommend establishing good working relations with several beekeepers to ensure yourself a ready supply of bees for pollination. Any individual beekeeper's situation may change over time, but if you work with several beekeepers, you should al-

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ways have ready access to an adequate supply of colonies. Remember! Bees are an essential part of your crop production system, but they are only one part. In many ways, they are like the fertilizers and chemicals that you buy. Each is essential, but none of them, by themselves, can guarantee a crop. Many things influence the quantity and quality of your crop. One is the weather. Bees will visit flowers and pollinate only if they can fly. Cool, rainy, and windy weather will delay, slow, or stop flight, and the beekeeper cannot do anything about the weather. Excessive heat during the summer can cause problems with fruit set in certain crops, like pumpkins. Again, this is beyond the beekeeper's control. Be clear up front about your expectation concerning the strength of the colonies you rent and satisfy yourself that you have received what you expected. This will eliminate misunderstandings down the road.

POLLINATION FEES

Look for rental fees in the $35–$60 range, depending on strength. Remember, the best deal may not always be the cheapest deal! What is one major consumer of pollination services doing to ensure a steady supply of the highest grade colonies? Look for the answer in an upcoming issue.

TIP — Planning a new orchard? Be sure to determine if your main cultivars are self-sterile — like McIntosh and Red Delicious apples — or, worse yet, self-sterile and inter-incompatible like many popular cultivars of sweet cherries. If so, be sure to plant an adequate proportion of pollinizer cultivars. Be sure you select pollinizers that bloom at the same time as your main variety. If you do not have pollinizers in your self-sterile stands, you can often purchase compatible pollen and use hive inserts to distribute it to the blossoms.❖❖

ANNUAL TUNE-UP

MAKE NO MISTAKE
(Art Agnello, Entomology, Geneva)

❖❖ Now that people have had a chance to start reading parts of the 1998 Tree-Fruit Recommendations, we've begun hearing of things that need fixing:

- p. 38, in the footnotes to Table 8. Activity Spectrum of Apple Fungicides. Footnote [h], which pertains to the effect of mancozeb and ziram products on predator mites, is backwards. It should read: "Low to moderate impact from several early season (through 1C) applications; moderate to high impact from summer applications."

- p. 61, the rate of Agri-Mek for European red mite in apples as given (2.5–5.0 oz/100 gal) is a re-statement of the labeled rates, which corresponds to 10–20 oz/A. However, we've never needed to go to the higher rate in field trials, and have obtained very adequate results in apples at the 10 oz/A rate, provided the applications were made at or immediately after petal fall. Conversely, in pears (p. 128), the 20 oz/A rate has been needed more commonly to achieve the best success with this material against pear psylla.❖❖

PHENOLOGIES

Geneva:
Apple(Mac) - early tight cluster
Red Delicious) - half-inch green
Pear (Bartlett) - early green cluster
Sweet cherry (Darrow) - early white bud
Tart cherry (Montmorency) - bud burst
Peach - pink bud
Apricot - bloom
Plum - green cluster

Highland:
Apple (Mac) - open cluster
Pear (Bartlett) - white bud
Peach - full bloom
Apricot - 75% petal fall
Plum (Stanley) - 25% bloom

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1- 4/13):	199	107
(Geneva 1997 1/1-4/13):	127	51
(Geneva "Normal" 1/1-4/13):	107	47

Coming Events(Geneva):	**Ranges:**	
Green fruitworm flight peak	64-255	19-108
Green apple aphid present	127-297	54-156
Rosy apple aphid nymphs present	91-291	45-148
Tarnished plant bug adults active	71-536	34-299
Pear thrips in pear buds	137-221	54-101
Pear psylla nymphs present	111-402	55-208
STLM 1st flight peak	180-544	65-275
Redbanded leafroller 1st flight peak	180-455	65-221
European red mite egg hatch	157-358	74-208
Obliquebanded leafroller larvae active	149-388	54-201
STLM 1st oviposition	141-319	48-154
McIntosh at tight cluster	188-279	68-138

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	4/2	4/6	4/13
Green fruitworm	0.7*	0.6	0
Spotted tentiform leafminer	0.2*	0	10.5
Redbanded leafroller	0.2*	0	1.5
Oriental fruit moth (apple)	-	0	0.1*
Oriental fruit moth (peach)	-	0	0

* 1st catch

HVL, Highland, NY

	3/30	4/6	4/13
Pear psylla eggs/leaf	-	5.5	9.3
Pear psylla nymphs/leaf	-	-	0.5*
Green fruitworm	3.0*	0.1	1.0
Spotted tentiform leafminer	0.1*	0.1	0.1

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NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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Dept. of Entomology
NYS Agricultural Exp. Sta.
Barton Laboratory
Geneva, NY 14456-0462