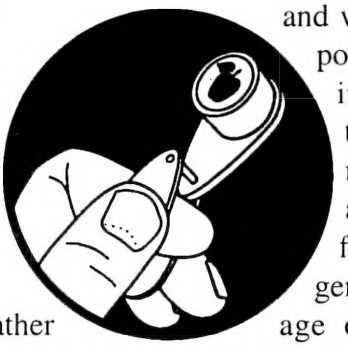
scaffolds FRUIT JOURNAL

Update on Pest Management and Crop Development

April 22, 2002 VOLUME 11, No. 6 Geneva, NY

INSECTS

BEE WISE



GETTING THE MOST POLLINATION FOR YOUR DOLLAR

(Nick Calderone, Entomology, Ithaca)

[**Editor's Note**: The unusual weather swings of the past week caught more than a few growers — and trees — off guard, so some of the information in this article reprinted from 2000 may no longer be timely; however, we felt that it contains enough good advice to still be useful.]

❖❖ Tree fruits, small fruits, and many vegetable crops, especially many of 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. 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. Move bees into apples, regardless of variety, right as the king blossoms begin to open. Also, modern cultivars with high blossom densities, such as trellised apples, require more pollinators.

continued...

IN THIS ISSUE...

INSECTS
- ❖ Pollination management

CHEM NEWS
- ❖ Confirm labeled, Lorsban REI

FIELD NOTES
- ❖ Hudson Valley apple scab

DISEASES
- ❖ Early-season disease update

PHENOLOGIES

PEST FOCUS

UPCOMING PEST EVENTS

Special requirements

Most other crops are also adequately served by a single strong colony per acre. Some crops, however, 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. Consequently, the bees do not contact the flower's sexual parts and pollination does not take place. Since it takes time for bees to learn to obtain nectar in this way, you can counteract this problem by using more colonies per acre to increase the number of inexperienced bees present. Up to two colonies per acre may be needed in large stands of Red Delicious apples.

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.

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 and sweet cherries.

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 recently in NY. 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, still labeled on several crops in NY) 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 pesti-

continued...

scaffolds

is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 3 pm Monday to:

scaffolds FRUIT JOURNAL
Dept. of Entomology
NYSAES, Barton Laboratory
P.O. Box 462
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX 315-787-2326
E-mail: ama4@cornell.edu

Editors: A. Agnello, D. Kain

This newsletter available on CENET at: news://newsstand.cce.cornell.edu/cce.ag.tree-fruit
and on the World Wide Web at:
http://www.nysaes.cornell.edu/ent/scaffolds/

cides 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 by the hives. A small tub with a few wooden floats will work well. A lathe-strip top from a bushel basket is ideal. If you don't provide floats, many bees will drown.

You can eliminate most pesticide damage to bees, both managed and wild, by not spraying when flowers, including weeds, are open and attractive to bees. Also, do not spray 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 and dandelions are 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 that you have 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 always have ready access to an adequate supply of colonies.

Pollination fees

Beekeepers are just learning what many farmers have been aware of for many years — pesticide resistance. Many beekeepers are finding heavier than normal winter die-off due to pesticide resistant parasitic mites. Look for rental fees in the $35–$60 range, depending on strength. Remember! The best deal may not always be the cheapest deal.

Expectations

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.

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 compatible 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.❖❖

CHEM NEWS

FINAL APPROVAL

CONFIRM LABELED IN NY

❖❖ On April 16, the N.Y.S. DEC granted a final state label for the use of Confirm 2F (EPA Reg. No. 62719-420) against specific lepidopterous pests of apples and pears in N.Y., with the exception of Nassau and Suffolk Counties. This selective product, which mimics the action of an insect hormone that induces molting, has been available to N.Y. growers for several years under various special local need and emergency exemption registrations; however, the full state label has been delayed pending the approval of state-specific label language addressing groundwater buffer zones. In N.Y., Confirm may not be applied by ground within 25 feet, or by air within 150 feet, of lakes, reservoirs, rivers, permanent streams, marshes, or natural ponds, estuaries and commercial fish farm ponds.

Confirm, originally developed by Rohm and Haas and now owned by Dow AgroSciences, has been effective in the control of OBLR when used in rotation with other active ingredients during the season, and is often recommended during the petal fall period against the overwintered generation of OBLR larvae. It is a restricted-use pesticide with a 4-hr REI and a preharvest interval on pome fruits of 14 days. Confirm has a low bee-poisoning hazard.

ERRATUM ON LORSBAN REI

Sometime during last year's Lorsban label modifications, a more restrictive Re-Entry Interval (REI) was instituted that we failed to take notice of. Although the base REI as stated in the label's Agricultural Use Requirements section remains at 24 hrs, a period of 96 hrs (4 days) is now mandated for all uses of both the 4EC and 50WS formulations on all tree fruits. Please make a notation to this effect in your printed copies of the Recommends, and we'll do our best to correct the online version.❖❖

HUDSON VALLEY

HUDSON VALLEY APPLE SCAB

This work was supported by the New York State Integrated Pest Management Program.

Apple Scab Ascospore Maturity Counts:

Date	% ascospores that were Imm.	Mature	Empty	No. spores in tower shoot
Appleton, Niagara Co.				
April 8	96	4	0	15
Appleton, Niagara Co.				
April 15	54	45	1	225
Peru, NY				
April 15	65	34	1	358

❖❖ A week of unusually hot weather throughout the state contributed to extremely rapid progression of both tree phenology and apple scab spore maturity. (Note the change in spore maturity for Appleton over just seven days!) High temperatures recorded at the Hudson Valley Lab for Monday through Friday (April 15-19) were 81, 88, 94, 91, and 85°F. Daily lows were 59-63°F.

In the lower Hudson Valley, McIntosh trees were in full bloom on Friday, April 19, thereby setting a record for the earliest bloom date in over 40 years. Dr. Chick Forshey recorded full bloom dates for McIntosh in the Hudson Valley starting in 1960. The mean date for full bloom on McIntosh in the lower Hudson Valley over the past 42 years is May 7. The earliest full-bloom dates since 1960 were 20 April 1976, 22 April 1977 and 24 April 1998.

Bartlett pear trees at the Hudson Valley Lab started blooming on Wednesday, April 17, and a few flowers on early-blooming apple cultivars opened the same day. By Friday evening when

continued...

FIELD NOTES

it rained and the temperature finally dropped back toward normal, we had accumulated about 750 degree hours (Base 65°F.). That is about 3.7 times the minimum number of degree hours required for a fire blight infection period according to the MARYBLYT model. Heavy dews on Thursday and Friday mornings might have provided enough moisture for blight infections in orchards with high inoculum levels. Some orchards were sprayed with streptomycin on Thursday, but growers were advised that all at-risk orchards needed a streptomycin spray prior to the rains on Friday afternoon. Effectiveness of the streptomycin sprays should be evident in several weeks.❖❖

DISEASES

APRIL MALADIES

EARLY SEASON DISEASE UPDATE
(Bill Turecheck, Plant Pathology, Geneva)

Powdery Mildew

❖❖ A number of events have come together to make this season particularly favorable for powdery mildew. An abundance of disease last year, followed by a mild winter, has assured us an ample supply of inoculum, and record warm temperatures this spring have pushed out plenty of susceptible tissue. The expected losses from the disease are hard to predict and will vary depending upon the inherent level of susceptibility of the cultivar, environmental conditions, and, of course, management practices. Highly susceptible cultivars such as 'Ginger Gold', 'Idared', 'Cortland', and 'Jonagold' will be most affected. Wet weather will typically slow the development of powdery mildew, but will increase the pressure for nearly every other serious disease of apple. Immature tissues (e.g., young expanding leaves) are particularly susceptible to pathogen attack so management tactics need to begin at tight cluster.

Seasonal losses due to powdery mildew can be severe; however, losses from the cumulative or chronic effects of the disease over several seasons can be equally or more severe. The rewards that growers receive from increased management in any given season can often go unnoticed. Keith Yoder at West Virginia University recently showed the economic benefits of managing mildew under various fungicides programs for a three-year period on 'Ginger Gold' in Virginia. Even the least effective fungicide treatment (i.e., six applications of sulfur) yielded twice that of the check, and several other programs, primarily those incorporating sterol inhibiting (SI) fungicides, yielded twice that of the sulfur over the course of three years. However, managing disease reaches a point of diminishing returns where the cost of increased management is not compensated by an equal increase in yield. This was dependent upon many factors, including which other diseases were managed.

Several fungicides are effective against powdery mildew. One of the most economical of these is sulfur. Wettable sulfur (including micronized and liquid formulations) is very effective at reducing the development of powdery mildew; however, it serves primarily as a protective spray so it must be applied frequently, as its residual activity is approximately 5 days under the best of conditions. Liquid lime sulfur can also be used and it may also serve to "burn out" established lesions. The use of liquid lime sulfur should be kept to a minimum because it can reduce both fruit size and yield.

Various mineral and plant oils are known to be effective against powdery mildew. Oils traditionally have been used to combat insect and mite pests as well as to serve as a carrier or adjuvant for copper fungicides. Oils have limited kickback activity, about 24 hours, and their protective activity is very much dependent upon the type of oil used and, not surprisingly, the amount of rainfall. Oils, though, have very little activity against apple scab and most of the other major pathogens of apple, and captan cannot be used in combination with oil sprays.

continued...

Potassium bicarbonate (e.g., Armicarb 100, Kaligreen) can be effective if applied regularly and as a protectant. Mono-potassium phosphate (MKP) has been shown to provide good levels of control, particularly when used in alternation with SI fungicides. Serenade biofungicide, a wettable formulation of the bacterium *Bacillus subtilis*, has provided good activity against powdery mildew in various trials conducted across the US. All of these "softer" products have little activity against apple scab, are easily washed off in rains, and should not be relied upon to control a "running" epidemic. These products are much more suited for use at the beginning of a season when disease pressure is low or when extended dry periods are predicted.

The SI fungicides Rubigan, Nova, and Procure are very effective at controlling powdery mildew. The SI's have suitable kickback activity and, when applied on a regular schedule, are very effective at controlling the disease. Applications should begin at tight cluster and continue until terminal growth stops in midsummer. The spray interval is generally 10 days from tight cluster through petal fall, when leaf tissue is developing rapidly, and is lengthened to 14 days after petal fall. To prevent the development of resistance, it is recommended that all SI fungicides be applied at the full labeled rates. Reduced rates will encourage a more rapid buildup of pathogen strains with moderate levels of resistance. The strobilurin fungicides, Sovran and Flint, provide good control of powdery mildew but are slightly less effective than the SI fungicides. Deciding how to configure sprays of SI's and strobilurin should depend upon other disease concerns. Refer to Dave Rosenberger's article in Scaffolds Vol. 11, No. 3 for some strategies here (http://www.nysaes.cornell.edu/ent/scafolds/2002/4.1.html).

Fire Blight in Western New York

Fire blight continues to be the most threatening disease in NY. Last week's record warm temperatures pushed many varieties into pink in western NY, and with the threat of severe weather, left many growers worrying whether an application of streptomycin was necessary. Why? It is likely that the 80°F+ temperatures last week activated overwintering cankers. If the temperature stayed warm enough over the weekend to push a variety into bloom, a rain event would have likely moved the bacteria from an oozing canker to the blossom. However, our record warm temperatures are being followed by very cool weather (maybe even snow!). Cool weather has a negative effect on the pathogen. According to the MARYBLYT model, a three-day cool period with no temperatures above 64°F will reduce the risk of infection to near zero. The bottom line is that any infection that may have occurred this weekend in western NY should have very little impact on the crop.

With trees beginning to enter bloom, the threat of blossom blight is not over and should be on every grower's mind. Effectively managing fire blight requires a combination of disease management practices. Dormant and seasonal pruning (i.e., removing infected limbs as soon as symptoms are detected and before extensive damage develops) plays an integral role in reducing the amount of disease pressure in an orchard and should be practiced with diligence. Managing blossom blight during bloom is achieved through well-timed chemical sprays. Chemical control will be far less effective in orchards where fire blight cankers have not been pruned out. The level of control is critically dependent upon which product you choose to use and the timing of your sprays. The number of applications is typically far less important, per se, than when sprays are applied.

Streptomycin: Streptomycin applications during bloom are highly effective against the blossom blight phase of the disease. These sprays are critical because effective early season control often prevents the disease from becoming established in an orchard. Predictive models, particularly MARYBLYT and Cougar Blight, help to identify potential infection periods and improve the timing of streptomycin, as well as avoid unnecessary treatments, particularly during the blossom blight phase of the epidemic.

continued...

Streptomycin applications are best used in a preventive mode, just prior to an infection event. In younger orchards, removing blossoms by hand will reduce the risk of blossom infection. This practice can be especially effective in minimizing losses due to rootstock blight as well, particularly when highly susceptible varieties such as 'Gala' or 'Ginger Gold' are grafted onto M.9 or M.26. Although somewhat time consuming, blossom removal is a much less expensive alternative than replanting an entire block.

Using predictive models (e.g., MARYBLYT), it is possible to use local weather forecasts to predict (i.e., guess) whether an infection event is likely to occur in the next day or two. This can be extremely helpful in identifying unusually high-risk situations. You can also access blossom blight predictions based on the Cougar Blight model at http://www.nysaes.cornell.edu/pp/extension/tfabp/forecast.shtml. This site provides a 5-day forecast for 5 sites within NY.

Messenger (Harpin) was recently labeled for use in NY. The active ingredient in Messenger is a protein (harpin) derived from the bacterium *Erwinia amylovora* (the causal agent of fire blight). Messenger has no direct effect on the viability of the pathogen. Instead, Messenger activates natural defenses within plants to make them more resistant to diseases and physiological stresses. Plants require 5–7 days for full induction of resistance, so Messenger must be applied several days prior to fire blight infection periods. This is a problem with using this compound because it means that the product must be applied before anyone can tell whether or not weather conditions during bloom will actually allow blight infections to occur. The blight suppression provided by Messenger will last for approximately 14 days. In experimental orchards, Messenger applied 10 days before pink and at pink significantly reduced blossom blight in 3 trials prior to 2001. In 2001, the level of fire blight control in Messenger treated plots was no better than the untreated check. To this date, we do not know why this occurred; it will be tested again in 2002.

The bottom line: Properly timed applications of streptomycin during bloom should still be used as the primary defense against fire blight. Messenger may prove useful as a supplement to streptomycin for situations where blight is expected to be unusually severe, either because of high carry-over inoculum in young highly susceptible orchards, or when severe blossom blight conditions can be expected based on long-term weather forecasts. When mixing Messenger, do not use chlorinated water, or water below pH 5.0 or above pH 10.0. Follow label instructions regarding tank mixing.❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

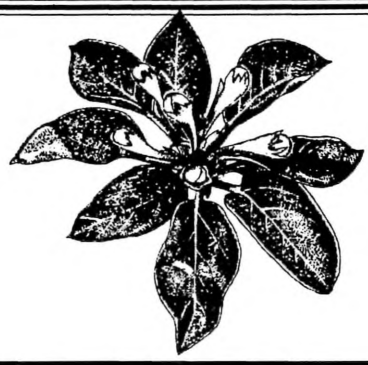
	4/15	4/18	4/22
Green fruitworm	0.4	0	0
Redbanded leafroller	3.0*	18.8	6.4
Spotted tentiform leafminer	5.6*	325	192
Oriental fruit moth	–	–	1.1*
Lesser appleworm	–	–	1.1*
Codling moth	–	–	0

Highland, NY

	4/15	4/22
Green fruitworm	0.2	0.1
Redbanded leafroller	1.9	2.6
Spotted tentiform leafminer	4.8	111
Oriental fruit moth	0.9	29.5

* first catch

scaffolds
Dept. of Entomology
NYS Agricultural Exp. Sta.
P.O. Box 462
Geneva, NY 14456-0462



PHENOLOGIES

Geneva:
Apple (McIntosh): Pink
Apple (Red Delicious): Tight cluster
Apple (Empire): Pink
Pear: 50% bloom
Peach: Bloom
Tart cherry: White bud
Sweet cherry: Bloom
Plum: 50% petal fall

Highland:
Apple (McIntosh): Full bloom
Apple (Golden Delicious): King bloom
Peach: Petal fall
Apricot: Shuck split
Plum (Stanley): Petal fall

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–4/22):	309	168
(Geneva 1/1-4/22/2001):	118	51
(Geneva "Normal"):	166	68
(Highland 1/1–4/22):	470	259
Coming Events:	**Ranges:**	
Green fruitworm flight subsiding	170–544	69–280
Rose leafhopper nymphs on multiflora rose	188–402	68–208
San Jose scale 1st catch	189–704	69–385
Spotted tentiform leafminer 1st flight peak	180–544	65–275
European red mite egg hatch	157–358	74–208
Obliquebanded leafroller larvae active	149–388	54–201
Pear psylla egg hatch	111–402	55–235
Tarnished plant bug adults active	71–536	34–299
Comstock mealybug 1st gen. crawlers in pear	220–425	82–242
McIntosh at bloom	310–448	152–251
Peach at petal fall	257–466	131–277
Pear at petal fall	343–544	144–275
Plum at petal fall	277–466	113–252
Sweet cherry at petal fall	257–448	131–251
Tart cherry at bloom	257–448	122–251

PEST FOCUS

Geneva:
Oriental fruit moth and **lesser appleworm** 1st catch.

Highland:
Pear psylla eggs and nymphs observed on leaves.

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.

This material is based upon work supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.