scaffolds

Update on Pest Management and Crop Development

FRUIT JOURNAL

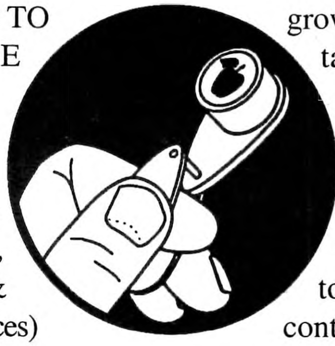
May 7, 2001 VOLUME 10, No. 8 Geneva, NY

DISEASES

FIRE WALL

USING APOGEE TO HELP MANAGE FIRE BLIGHT

(Bill Turechek, Dave Rosenberger, & Herb Aldwinckle, Plant Pathology, and Jim Schupp & Terence Robinson, Horticultural Sciences)



❖❖ Fire blight remains one of the most destructive and difficult-to-control diseases of apples and pears. Young, high-density apple plantings are especially at risk because they often contain vigorously growing, blight-susceptible cultivars that were propagated on highly susceptible rootstocks. Under high risk conditions, the recommended applications of copper at green tip and streptomycin during bloom may not provide complete protection against fire blight. When blight becomes established in young orchards, large numbers of trees can be killed within a single season. This article contains suggestions for optimizing use of Apogee for controlling fire blight in orchards that are at high risk.

Apogee (Prohexadione Calcium) is a growth regulator that has demonstrated potential for managing *shoot blight* infection in experimental trials conducted in New York, Michigan, and Virginia. *Apogee is ineffective for control of the blossom blight phase of the disease and is registered only for apples, not for pears*. Apogee works by "shutting down" the growth of a tree and, therefore, is used primarily to control overly vigorous trees and reduce the need for seasonal pruning. Apogee has value in fire blight management because when trees stop growing, they become relatively resistant to new blight infections and further expansion of established infections is arrested. Thus, Apogee can significantly reduce secondary spread of fire blight (i.e., shoot blight infections) in orchards where streptomycin sprays failed to provide 100% control of blossom blight. (Shoot blight is rarely a serious problem in orchards that do not have any blossom blight unless secondary inoculum is coming from adjacent blocks that had blossom blight.) In trials conducted in New York, the best control of shoot blight was obtained when Apogee was applied during late bloom or early petal fall (when shoots were 1 inch long) at 12 oz/100 gal, with a second application 3 weeks later.

continued...

IN THIS ISSUE...

The problem with using Apogee to control shoot blight is that the first application of Apogee must be made before the effectiveness of streptomycin blossom sprays can be evaluated. Research trials in both the Hudson Valley and Geneva have shown that if the first Apogee application is delayed until blossom blight symptoms appear, then Apogee will have almost no benefit for controlling fire blight. Apogee has no effect on shoot growth or fire blight for at least 10 days after application, so it acts too slowly to be of value as a rescue treatment for orchards with blight symptoms.

In mature orchards where trees have already filled their spaces, the decision on whether or not to use Apogee can be based on a combination of its potential value as a vegetative growth inhibitor and as a supplement to fire blight control. In young orchards where trees have not yet filled their spaces, the decision is much more complex. Using Apogee for fire blight control in young orchards will cause reduced vegetative growth (see Table 1 for an example).

Table 1. Calculated estimates of tree size and yield in years three through six of 'Gala'/M.26 apple trees treated with Apogee in the third year of planting. Calculations on Apogee-treated trees are shown in ( ) and were calculated based on the assumption that Apogee application would reduce tree canopy (volume) by 40% compared with unsprayed trees.

Yr	Ht	W	Vol	(bu/A)	Yield Reduction with Apogee (bu/A)
3	7.0	6.3	1164	309	None
	(7.0)	**(6.3)**	**(1164)**	**(309)**	
4	8.5	7.7	2111	560	118
	(7.9)	**(7.1)**	**(1668)**	**(442)**	
5	10	9.0	3393	900	145
	(9.4)	**(8.5)**	**(2845)**	**(755)**	
6	10	9.0	3393	900	None
	(10)	**(9.0)**	**(3393)**	**(900)**	

That, in turn, will decrease profitability of the orchard in succeeding years because it will increase the number of years required for trees to fill their spaces and for the orchard to reach the break-even point. Because of this, one needs to seriously consider whether the delay to reaching full production and/or the reduction in fruiting capacity outweighs the potential loss due to fire blight plus the cost of an application, and that decision must be made at petal fall.

The cost-benefit analysis for deciding whether or not to apply Apogee in young orchards will hinge on several factors. These include the number of fire blight infection periods that occurred during bloom, the severity of fire blight the previous season, the susceptibility of the scion variety and rootstock, and the age and vigor of a planting. After extended discussions among the fire blight researchers and horticulturists at Geneva and Highland, we developed the following model for determining when Apogee applications might be justified as a blight-prevention strategy in a young apple orchard. This point system was derived from our "best guesses", so this model will undoubtedly change as more data become available. The model

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
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@nysaes.*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/
For fruit information on the web see:
http://www.cornellfruit.com

assumes that growers are making every attempt to control blossom blight using streptomycin or streptomycin plus Messenger in young orchards. Apogee use is therefore viewed as an additional measure to be employed only in the most severe situations.

At petal fall, circle the appropriate response for the orchard in question:

1. *Was fire blight found in or around your orchard in the past 2 years?* YES=1, NO=0

2. *Is the cultivar susceptible?* VERY=100, MODERATELY=50, OR SLIGHTLY=0

3. *Tree vigor status?* BELOW AVERAGE=0, AVERAGE=50, OR ABOVE AVERAGE=100

4. *Did MARYBLYT predict a high risk or an infection event prior to petal fall?* NO=0, YES AND TOTAL EIP IS LESS THAN *200*=50, OR YES AND TOTAL EIP IS GREATER THAN *200*=100

5. *Did you omit any streptomycin sprays that would have been required to cover MARYBLYT infection periods?* NO=0, YES=100

6. *Have there been any trauma events during bloom (hail or wind storms)?* NO=0, YES=100

Now apply the formula: $y = 1 - (2+3+4+5+6)$, where you replace the numbers in the formula with the points from the corresponding question above. If y is 250 or greater, then an Apogee application is probably warranted. For Apogee treatment of trees less than 5 years old, the rate of application should be reduced to 6 oz/100 gal, and the grower must balance the benefit of shoot blight control against the drawback of reduced shoot growth.

Several questions come up as one considers each of these conditions. Again, we stress that this model was written specifically for plantings between the ages of 2–6 year old, the orchard ages that frequently suffer the most severe tree losses to fire blight. Fire blight in or around your orchard means exactly that. In this model, we make the assumption that disease pressure is insignificant in orchard blocks where fire blight has been absent for two or more years. We also assume that the orchard blocks in question are regularly scouted and that good sanitation practices, such as pruning, are followed. If any of your blocks (or any of your neighbor's blocks) have had fire blight in them in the last two years, consider that the potential for fire blight infection exists in your orchard should conditions be favorable during bloom. Favorable conditions means those conditions which pose a high risk for infection as determined by the fire blight forecaster *MARYBLYT*.

Apple cultivars differ considerably in their susceptibility to fire blight, but cultivars may be grouped differently, depending on how susceptibility is evaluated. Table 2 ranks the susceptibility of several cultivars based on field observations. Although a particular cultivar's susceptibility to fire blight is largely a function of its genetic make-up, other factors, particularly nutrition, contribute to a tree's susceptibility. In general, vigorously growing trees are more susceptible to fire blight than slow-growing trees. Orchards with high nitrogen levels where young trees are being pushed to fill their allotted space should be considered high risk for fire blight and thus good candidates for Apogee to slow tree growth.

For those who run *MARYBLYT* on their farm, the answers to question numbers 4 through 6 are straightforward. Referring to question 4, consider the highest EIP (**E**piphytic **I**noculum **P**otential) value attained during bloom. Remember that *MARYBLYT* resets EIP values to zero after a streptomycin application, so be careful to look over the entire range of EIP values during bloom. Referring to question 5, a missed application is an application that was not applied within 24 hours after a *MARYBLYT* 'high risk' warning (i.e., 3 out of the 4 infection criteria have been met). We assume that you check and update *MARYBLYT* once every 24 hours (i.e., daily,

continued...

preferably at the same time each day). And lastly, we consider a trauma event has occurred if hail has opened wounds on trees or winds have been high enough to noticeably damage the foliage prior to petal fall. Under the most severe conditions (e.g., those that occurred in Southwestern Michigan in 2000), virtually all apple cultivars can develop fire blight. This is a judgement call and should vary depending upon the varieties affected and the extent of damage.

Apogee is used in situations where fire blight was not well managed (for whatever reason). It is important to note that Apogee **will not** and **cannot** act as a substitute to standard management practices. Thus, an effective program for management mandates that Apogee be used in conjunction with a delayed dormant copper spray, timely blossom blight sprays, and good sanitary practices as part of an integrated pest management strategy to control fire blight.❖❖

Table 2. Relative susceptibility of commonly grown cultivars to fire blight.[1]

Very susceptible		Moderately susceptible		Slightly susceptible
Braeburn	Jonamac	Baldwin	Gravenstein	Delicious
Fuji	Jonathan	Cameo	Macoun	Liberty
Fuji 2	Mutsu	Cortland	McIntosh	Northern Spy
Gala	Paula Red	Empire	Monroe	Stayman
GingerGold	R.I. Greening	Enterprise	NY674	
Honeycrisp	Rome Beauty	Fortune	Pioneer Mac	
Idared	Spigold	Gold Rush	Spartan	
Jerseymac	Twenty Ounce	Golden Delicious	Starkspur	
Jonagold	Tydeman	Golden Supreme	Wealthy	

[1] Modified from: Breth, D.I., Reddy, M.V.B., Norelli, J., and Aldwinckle, H. 2000. Successful fire blight control is in the details. New York Fruit Quarterly 8(1):10-16.

IT'S THE PITS

DISEASES OF CHERRY

(Bill Turechek, Plant Pathology, Geneva)

❖❖ In New York, there are two economically important diseases of cherry that require attention at petal fall.

Cherry leaf spot is one of the most serious diseases of cherry. The disease affects primarily the foliage of both sweet and tart cherry. In general, tart cherries are much more susceptible to the disease than sweet cherries. Severe infections can result in total defoliation by midsummer, which weakens the trees and makes them more susceptible to cold injury. If heavy infection occurs early in the season, the fruit will fail to develop. Infections can occur anywhere from petal fall to harvest when conditions are suitable.

The disease is caused by the fungus *Blumeriella jaapi*. The fungus survives the winter in infected leaf tissue that falls to the ground. In early spring, a fruiting structure is produced that contains the primary spores that initiate disease. These spores begin to mature around bloom and, for several weeks afterwards, are released during periods of rain or any significant wetting event such as heavy dew. The spores invade the plant through stomata, which are found primarily on the underside of the leaf, on leaf and fruit stems, and for a short period, on fruits. Immature leaves are resistant to infection because

continued...

they have yet to unfold and expose their stomata. In fact, infection in early spring is somewhat limited because the availability of susceptible tissue is at a minimum during the primary period of spore release.

Once infection has occurred, symptoms appear in approximately 10–14 days. The symptoms begin as small, circular red to purplish spots on the upper leaf surface. Spots enlarge as they grow older, typically coalescing and turning brown, and may eventually drop out of the leaf to give the leaf a "shot-hole" appearance. The most striking symptom of cherry leaf spot, especially on tart cherry, is the yellowing of older leaves prior to their falling from the tree. When infection is severe, the entire tree may be defoliated by midsummer. Numerous spores are produced on the underside of leaf lesions and appear as a white to pinkish mass in the center of the lesion. These spores are moved throughout the orchard by wind and rain and are responsible for driving the epidemic.

The severity of infection is dependent upon the length of the wetting period as well as the temperature during the wetting event. Table 11 in Cornell's Pest Management Guide for Commercial Tree Fruit Production shows the predicted degree of infection relative to the average temperature and the number of hours of leaf wetness. Under the optimum conditions, light infection can occur with as little as 5 hours of leaf wetness when the average temperature is at the optimum of 65°F, but nearly 20 hours of leaf wetness are needed when the average temperature is less than 50°F when conditions are less than optimal.

The only practical way to manage this disease is through the use of fungicides. Fungicide applications should begin at petal fall and continue on a 7–10-day schedule until harvest. Calendar sprays can be avoided by timing applications prior to infection events (see Table 11). Elite, Indar, and Rubigan have approximately 3 days of kickback activity and can be used in this mode if necessary. Bravo has the longest residual activity and also has activity against black knot.

Powdery mildew of cherry is caused by the fungus *Podosphaera clandestina.* The fungus attacks young leaves and shoots and, like leaf spot, is a bigger problem on tart cherry than sweet cherry. The symptoms of the disease appear as a white powdery growth on either side of the leaf or on the terminal ends of the shoots. Severely infected leaves curl upward and eventually drop as they age. Temperatures between 65–75°F, with little rain, but with sufficient humidity, such as those caused from heavy dew or fog, are the most conducive conditions for rapid disease development. Powdery mildew is one of the most severe diseases of cherry in the Pacific Northwest. However, the disease is typically not of economic significance in New York orchards. Where the disease is a problem, Nova is the most effective fungicide, and applications should begin shortly after petal fall. ❖❖

HORTICULTURE

ARREST WARRANT

SUGGESTIONS FOR GETTING MAXIMUM GROWTH SUPPRESSION FROM APOGEE

(Jim Schupp, Horticultural Sciences, Highland)

❖❖ Water from sources with high concentrations of calcium carbonates, known as hard water, will inactivate Apogee. Most surface water sources, such as ponds, have soft water, while many wells have hard water. Water hardness can be tested, either by a water quality lab, or with test strips available at pool and spa suppliers.

Use of a water conditioner is advisable if the calcium concentration is 200 ppm or more. Spray grade ammonium sulfate (AMS) is effective, as are a number of proprietary water conditioners, available from chemical distributors.

continued...

The best way to determine how much conditioner is needed is to test a full spray tank of plain water before adding any spray material. If the hardness is 200 ppm or more, then start by adding 1 pound of AMS for every pound of Apogee you intend to put in the tank. Follow the label instructions if you are using a proprietary product. Retest after the conditioner is thoroughly mixed, adding more product as necessary to bring the level of hardness down below 200 ppm. Once the amount of conditioning for a water source has been established, any additional tanks of Apogee using that source can be mixed with the same amount of conditioner.

Use of a surfactant is recommended. A number of different non-ionic and organosilicone spray adjuvants have been used in Apogee research plots with good success.

Apogee is compatible with most commonly used pesticides. Do not apply Apogee with calcium sprays, as the calcium will inactivate Apogee.

One of the "gray areas" in our knowledge on Apogee is whether there is a problem with applying products containing gibberellic acid (GA), such as ProVide and Promalin or their generic equivalents, and Apogee to the same trees. A 2000 study of Apogee +/- ProVide, conducted on Golden Delicious in the Hudson Valley, suggests that there is no problem; however, until we can confirm these results with additional research, it is best to avoid using GA products on Apogee-treated trees.

Another "gray area" is the potential effect of Apogee on fruit set. Some studies have shown that 12–16 ounces Apogee per 100 gallons increases fruit set. Other studies have documented no effect of Apogee on fruit set. Our 2000 study on Golden Delicious was one of the latter. While the results of research are as yet inconclusive, the Apogee label contains a section recommending its use to increase fruit set on young trees.

Apogee has no direct effect on fruit size or quality; however, if Apogee increases fruit set and the grower does not respond by thinning off excess fruit, the increased crop load will result in smaller fruit. Use lower rates of Apogee where the level of vigor permits, and be prepared to adjust thinning strategies to remove more fruit if initial set is too high. If the amount of additional thinning required is not great, a 20–30% increase in chemical thinner concentration may be adequate to get the desired result.

Increasing the concentration of thinner may not be an adequate solution in situations where fruit set is excessive. The amount of additional thinning achieved by increasing the thinner concentration often doesn't result in a proportionate reduction in fruit set. Besides the diminishing thinning activity, high concentrations of chemical thinners sometimes have undesirable side effects, most notably foliar damage and reduced fruit size. An alternative solution is to add another thinner or to apply the usual dose of thinner with spray oil to increase its activity.❖❖

CHEM NEWS

RE-CONFIRMED

CONFIRM LABEL & OBLR CONTROL CONSIDERATIONS
(Art Agnello, Entomology, Geneva)

❖❖ We received word last Friday that the N.Y.S. DEC has again granted Rohm & Haas a 24c Special Local Need label for Confirm 2F for use in apples and pears in N.Y.; the DEC is still reviewing the total package, which includes all crops. As was the case last season, use of this product in N.Y. is restricted to three applications per season at a rate of 20 fl. oz. per acre per application. Growers who would like to apply this product at petal fall against overwintered brood OBLR should now have this option available to them. The SLN labeling must be in the possession of the user at the time of application. Note that use of this product is prohibited in Nassau and Suffolk Counties.

continued...

Although our initial surveys have turned up lower than normal populations of OBLR in many commercial sites this year, a number of growers may elect a treatment to control the overwintered generation of larvae at this time of the season. Other recommended options available at this time are a B.t. product such as Dipel at bloom to petal fall, or SpinTor at petal fall. Bear in mind that rotating active ingredients will help forestall the development of resistance in local populations.❖❖

PEST FOCUS

Geneva:
1st **oriental fruit moth** and **lesser appleworm** caught in Geneva.

Highland:
Pear psylla nymphs observed.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/7):	347	202
(Geneva 1/1-5/7/2000):	383	185
(Geneva 1/1–5/7 "Normal"):	323	152
(Highland 1/1–5/7):	450	262

Coming Events:	Ranges:	
Obliquebanded leafroller larvae active	149–388	54–201
Pear psylla 1st egg hatch	111–402	55–208
Rose leafhopper nymphs on multiflora rose	188–402	68–208
Green fruitworm flight subsides	170–544	69–280
American plum borer 1st catch	194–567	55–294
Comstock mealybug crawlers in pear buds	220–425	82–242
Codling moth 1st catch	273–805	141–491
Mirid bugs first hatch	322–432	156–231
European red mite egg hatch complete	361–484	183–298
McIntosh at petal fall	418–563	210–317

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	4/30	5/3	5/7
Green fruitworm	0.4	0	0
Redbanded leafroller	9.3	24.0	5.9
Spotted tentiform leafminer	312	627	584

Highland, NY

	5/2	5/7
Green fruitworm	0.1	0
Redbanded leafroller	33.0	36.4
Spotted tentiform leafminer	149.5	38.6

* first catch

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

PHENOLOGIES

Geneva:
Apple (McIntosh): full bloom
Apple (Red Delicious): king bloom
Peach: 50% petal fall
Pear: 75% petal fall
Sweet cherry: 50% petal fall
Tart cherry: bloom
Plum: 90% petal fall

Highland:
Apple (McIntosh): petal fall
Apple (Golden Delicious): full bloom
Apricot: fruit 10 mm
Pear (Bartlett): fruit set
Peach: petal fall
Plum (Stanley): petal fall

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.