scaffolds

Update on Pest Management and Crop Development

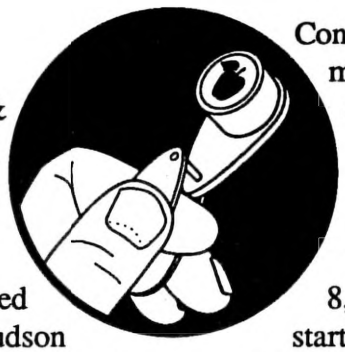
F R U I T J O U R N A L

June 7, 1999 VOLUME 8, No.12 Geneva, NY

INSECTS

TAKING WING

NOBLESSE OBLIQUE (Art Agnello & Harvey Reissig, Entomology, Geneva)



❖❖ Moths of the obliquebanded leafroller have been flying in the Hudson Valley and in western N.Y. since 6/2, which pretty much goes along with the trend of the current stretch of this season to be a bit ahead of normal. First hatch is generally assumed to occur about 360 DD (base 43°F) after the flight starts, and as of today our values stand at 129 for Highland and 115 for Geneva. This brings us quite naturally to the perennial question of how best to approach management of OBLR populations this year, so a brief synopsis of last year's research efficacy trials might be in order.

Pesticide control programs for the first summer brood of OBLR were conducted in two Orleans Co. orchards in 1998, one of them Idared trees and the other Romes. All sprays were applied using three or more of the following timings: Peak Flight (6/18), First Hatch (6/22), and "cover sprays" at various timings: 7/1, 7/8, 7/14, 7/21, 7/27–8

- Confirm was tested in six treatments — 1: 3 sprays (6/18, 7/1, 7/14); 2: 3 sprays (6/22, 7/8, 7/27); 3: 3 sprays with DiPel (same timing as #1); 4: 3 sprays with the synergist Butacide, which contains piperonyl butoxide (same timing as #2); 5: 3 sprays with DEM, another synergist (same timing as #2); and 6: 6 sprays at 6 oz/A, which is 1/3 the recommended rate (weekly starting on 6/22 until 7/28).
- Intrepid, a "second generation" MAC (molting accelerating compound, the class to which Confirm belongs), was tested in two treatments: low (4 oz/A) and high (6 oz/A) rates in 3 sprays (6/22, 7/8, 7/27).
- SpinTor was compared in three treatments: low (5 oz/A) and high (7.5 oz/A) rates combined with the adjuvant LI-700 in 3 sprays (6/22, 7/8, 7/27); and 6 sprays at 4 oz/A (weekly starting on 6/22 until 7/28).
- Proclaim, an emamectin compound (related to abamectin/Agri-Mek) was tested in one treatment: 4.8 oz/A in 3 sprays (6/22, 7/8, 7/27).
- Rimon, a chitinase inhibitor (Dimilin was in this class), was tested in one treatment: 12 oz/A in 3 sprays (6/22, 7/8, 7/27).
- Lorsban 50W, Asana, and DiPel were applied as standard treatments using a 3-spray program (6/22, 7/8, 7/27).

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IN THIS ISSUE...

OBLR infestations were considerably lighter in the Rome orchard than in the Idareds. None of the newer materials tested were any more effective in protecting fruit than were the standard materials, Lorsban, DiPel and Asana. The effectiveness of all schedules of Confirm in preventing fruit damage was fairly similar. The addition of DiPel, Butacide, or DEM did not increase the effectiveness of Confirm. The 3-spray program of Spintor at the highest rate (7.5 oz/A), and the weekly sprays of a low rate (4.0 oz/A) of this product were slightly more effective than was the 3-spray program using the 5.0 oz/A. The higher rate (6.0 oz/A) of Intrepid provided better control of fruit damage than did the lower rate. Treatments of Rimon significantly reduced fruit damage below that in the Check plots, but this material was not one of the most effective of those evaluated in these trials (fruit damage ranged from 5–10.5%, compared with 13.5–17.5% in the Checks).

Our recommendations for OBLR management this year follow along lines similar to those we have given previously. Most materials available should be at their maximum potential effectiveness when used 2–3 times (in moderate or high pressure orchards, respectively) against the first summer brood larvae. Applications in a 3-spray program should be made at times approximately corresponding to periods of first hatch, mid-hatch, and 2 weeks after mid-hatch.

Confirm is not available for use this year; although this material was granted a federal label, its application for a NYS registration is still under review by the DEC. Because of the availability of another comparably effective product (SpinTor), it was not possible to apply for a Section 18 emergency exemption again in 1999, so it will likely not be labeled for use in NY until next year. In orchards where SpinTor is being used, the suggested optimal treatment times are generally defined as 200–300, 500–600, and 800–900 DD (base 43°F) after first catch of the adults. The inclusion of a low rate of an adjuvant such as LI-700 or Sil-Wet is recommended. Because this material is reported to have fairly good effectiveness against larger larvae, and therefore could conceivably be satisfactory in a 2-spray program targeting the later instars, 1999 field trials are being conducted to test this approach. Increased efficacy with any of the B.t. products may be obtained by making more low-rate applications at shorter intervals (e.g., 4–5 sprays of DiPel at 0.5 lb/A, on a 1-week interval). As always, standard materials such as Lorsban, Asana, and Penncap-M are likely to work better against populations not having a history of extensive exposure to them.❖❖

PEST FOCUS

Geneva:
1st **obliquebanded leafroller** trap catch 6/2. 1st **peachtree borer** trap catch. 1st catch of **codling moth** = 5/13. DD(base 50°F) accumulated since then = 328.

Highland:
Spotted tentiform leafminer 2nd flight beginning. 1st **obliquebanded leafroller** catch was on 6/2. **Two-spotted spider mite** and **pear psylla** nymph populations are building. 1st catch of **codling moth** = 5/2. DD(base 50°F) accumulated since then = 455.

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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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HOT SHOTS

BIOLOGY AND CONTROL OF SUMMER FOLIAR AND TRUNK INSECT PESTS

(Dick Straub, Entomology, Highland)

Leafhoppers

❖❖ In most of NY, white apple leafhopper (WALH), *Typhlocyba pomaria*, is a major foliar-feeding pest of apple. In eastern NY, rose leafhopper (RLH), *Edwardsiana rosae*, is also a major pest whose occurrence is correlated with the abundance of wild florabunda rose growing in close proximity to apple orchards. During their second generations, these two species occur simultaneously (Fig. 1), and thus generally make leafhoppers a more serious pest in the east. Leafhoppers are mesophyll feeders and damage is expressed as stippling or chlorosis of leaves, and the spotting of fruit by the excrement of nymphs and adults. The relationship of leafhopper damage to tree performance is controversial, but effects may be closely linked to the leaf:fruit ratio. In the past, management of leafhoppers has been accomplished by applications of methomyl (Lannate) or carbaryl (Sevin), materials that have been generally harmful to natural enemies. The recent registration of imidacloprid (Provado), which is essentially benign to natural enemies once it has dried, has provided an excellent tool for leafhopper control and integrated crop management. Generally, a single Provado treatment at 1st or 2nd Cover will provide season-long control of leafhoppers. Likewise, an application of Sevin (at the high rate) for thinning may provide season-long control.

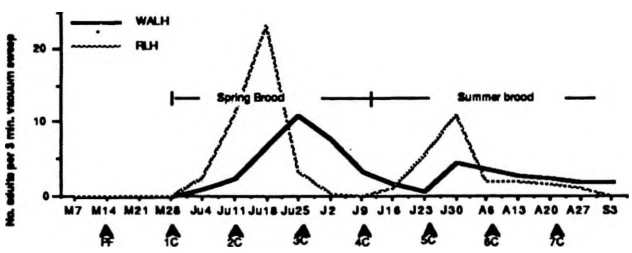

Fig. 1. Seasonal occurence of leafhoppers in Eastern NY

Aphids

Two species of terminal-feeding aphids occur in NY - green apple aphid (GAA), *Aphis pomi*, and spirea aphid (SA), *Aphis citricola*. Both species occur simultaneously, and cause similar damage. Economic importance of these two aphids is due to: a) the stunting of shoot growth of non-bearing trees; and b) direct feeding on fruitlets causing deformations, or c) the secretion of 'honeydew' upon which sooty mold grows. Occasionally, infestations persist for the entire season, but during most seasons populations have collapsed by the end of June. This collapse is largely due to beneficial predator insects, primarily syrphids and cecidomyiids, that increase to efficient numbers during aphid outbreaks. These predators are generally resistant to most OP insecticides used during early season. If control is deemed necessary, Provado is excellent. A less costly alternative would be dimethoate.

Leafminers

Severe damage by leafminer (in NY, primarily spotted tentiform leafminer [STLM], *Phyllonorycter blancardella*) causes premature drop of fruit, reduced fruit set and reduced crop load on many cultivars grown in NY. The specific causes for leafminer-induced drop are unknown, but two popular theories include decreases in foliar magnesium, and enhanced ethylene production in leaves. We do know however, that leafminer can acutely alter the amount of photosynthetic tissue available (Table 1).

Table 1. Leaf tissue loss due to STLM. 1992

# mines/leaf	$\bar{x}$ area lost per leaf (cm^2)	% leaf area *redn
1–2	1.5	10.3
3–4	4.0	15.1
5–6	6.2	25.3
7–8	7.2	29.8
9–10	8.7	36.0
11–12	16.1	57.7

* (area of a penny = 3.5 cm^2)

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STLM in NY has three generations: the 1st affects spur leaves, while the 2nd and 3rd broods affect terminal and bourse leaves. The last two generations can achieve high numbers (Fig. 2), and are often impacted by a host of predators and parasites. Third generation larvae are frequently heavily parasitized, reducing the proportion of overwintering pupae. Leafminers are generally resistant to organophosphate insecticides, but the carbamates Lannate and Vydate are effective. The recently registered 'soft' insecticides, such as Provado, SpinTor and Agri-Mek, have varying degrees of effectiveness against STLM.

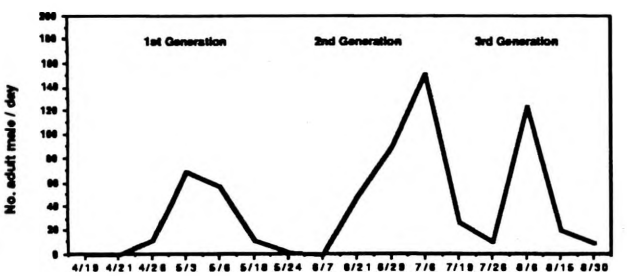

Fig. 2. Seasonal occurence (pheromone trap catches) of the spotted tentiform leafminer in Eastern NY, 1994.

Within the last decade, many Eastern NY orchards have become infested by apple leafminer (ALM), *Lyonetia speculella*. Adults begin emerging from overwintering pupae ~15 March, and ALM may have as many as seven generations per season (Fig. 3). Adults lay eggs almost exclusively on new growth, and are hence called terminal-feeders. During the latter generation (~10 July–15 Oct) the accumulated damage can be dramatic, and perhaps alarming to growers. In young non-bearing plantings, in which rapid shoot elongation is important, terminal damage by ALM can be serious. In bearing trees, however, the precise effects on tree performance are unknown, but are considered to be of minimal seriousness. Because ALM has numerous generations, and because damage is limited to succulent tissue, the timing of insecticide treatments is difficult. Even the best leafminer insecticides may be ineffective in limiting damage.

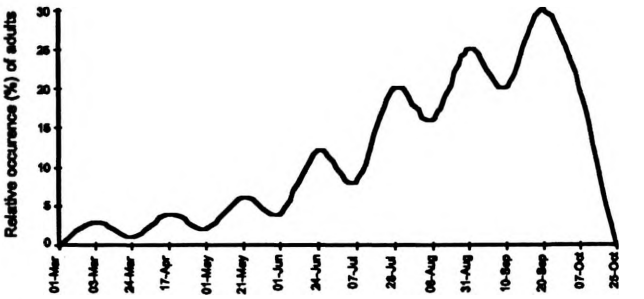

Fig. 3. Estimated seasonal occurence of apple leafminer adults in the lower Hudson Valley (based on 34-d life cycle).

Borers

In recent years, the incidence of infestations by dogwood borer (DWB), *Synanthedon scitula*, has become noticeably more prevalent. Infestations of this clearwing moth in apples are almost always located in burrknots or graft unions that are planted too high above ground level. Burrknots are aggregations of root initials that can develop on the aboveground portion of the rootstock; all commercial dwarfing and semi-dwarfing rootstocks have a tendency to develop burrknots. Some chemicals with hormone effects, such as NAA, can increase the expression of burrknots, as will failure to keep the area around the trunk weed-free and open to sunlight.

The adult seeks out these spots to lay eggs, particularly if they are surrounded by vegetation or protected by something, such as mouse guards. Moreover, mouse guards may frequently house weeds, and shield the lower trunk from incidental exposure to insecticide cover sprays. Sustained feeding by dogwood borer at the graft union may severely weaken the tree at this juncture, or girdle the trunk and cause a slow decline in tree health. Orchards in which mouse guards are emplaced should be examined for signs of damage.

All grafted trees in NY should be periodically checked for infestation. White latex paint brushed on the exposed portion of the rootstock will prevent new infestations of the borers, and also protect against southwest injury to the bark. Dilute trunk

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applications of an insecticide with good residual activity can provide control of established infestations. Lorsban 50WP or Thiodan 50WP are the most effective materials if applied during the period between July 15 and August 15, bearing in mind the specific pre-harvest intervals.❖❖

DISEASES

PRIMARY SEASON

HUDSON VALLEY DISEASES
(Dave Rosenberger, Plant Pathology, Highland)

Apple scab

❖❖ Apple scab is appearing on a few terminal leaves in some orchards despite the relatively dry spring weather. In some cases, infections occurred primarily on vigorous terminal shoots that may have out-grown the fungicide coverage during the spring growth flush. We had several lengthy wetting periods with very little rainfall. The rainfall may have been insufficient to redistribute protectant fungicides to newly-developed foliage. Other factors that may have contributed to appearance of scab at this time are low fungicide rates, alternate row spraying, poorly calibrated sprayers, or poor spray coverage caused by windy conditions when sprays were applied.

What should a grower do if scab is appearing on terminal leaves at this time of year? There is no single correct answer. First, recognize that primary scab appearing in June is a totally different and much less serious situation than the one we faced last year when primary scab lesions appeared as early as April 27. Scab that appears several weeks after petal fall poses a much-diminished risk for fruit infection because fruit are gradually increasing in resistance to infection. Also, the fully-expanded leaf canopy present at this time of year can hold large amounts of fungicide for subsequent redistribution to fruit during rainy periods, and hot weather will reduce viability of scab conidia. Furthermore, if the weather to date provides any indication of the kind of summer we can expect, then the summer will be hot and dry and scab will be the least of our concerns.

Because we cannot foresee weather conditions for the remainder of the year, there is still a possibility that the primary scab appearing now will return to haunt us. Any active scab in the tree could provide inoculum for fruit infections should heavy and extended rains move into the area sometime during the summer. For this reason, most growers would like a fool-proof way to inactivate the scab that they are now seeing.

Unfortunately, there is no way to completely eradicate scab from primary infections. The SI fungicides (Nova, Rubigan, Procure) reduce sporulation and may provide some pre-symptom activity against incubating lesions that have not yet appeared. Benlate, Topsin M, and dodine used to be effective antisporulants, but their effectiveness in many orchards has been compromised by the presence of fungicide-resistant strains of apple scab. The combination of an SI fungicide plus dodine has proven very effective as for arresting scab epidemics so long as dodine-resistant scab is not present in the orchard. However, the SI/dodine combination is a high-risk strategy because this combination leaves the fruit virtually unprotected in orchards with dodine-resistant scab. (The SI fungicides are not very effective for protecting fruit.)

Regular cover sprays of captan at 10–15 day intervals will provide excellent protection of fruit against apple scab provided that sprays are applied in a manner that ensures good spray coverage. The rate for captan should be 4.5 to 6 lb/A for the 50W formulation or 2.8 to 3.75 lb/A for the 80W formulation. The activity of captan seems to be enhanced when temperatures exceed 80–85 degrees. If the summer weather pattern is predominantly hot and dry, then captan rates can be reduced after trees stop growing and terminal buds are set.

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Those who want maximum antisporulant activity against the primary scab lesions that appeared last week should probably consider captan (at the rates noted above) in combination an SI fungicide. However, the economics of using SI fungicides this late in the season are questionable except where an SI is also need to control mildew.

Fabraea Leaf Spot

Fabraea leaf spot is the second most important disease of Bosc pears in New York State, second only to fire blight. In the Hudson Valley, Fabraea leaf spot affects more acres of pears annually than does fire blight. Fabraea leaf spot does not kill trees as fire blight frequently does. However, Fabraea can cause early defoliation and total loss of the crop in orchards that are left unprotected during summer.

Many pear growers face an increased risk of Fabraea this year because Bosc pear orchards were left unprotected through much of 1998 after the pear crop was damaged by spring frosts. Some orchards had relatively high levels of Fabraea leaf spot in September of 1998. Leaves infected last year may provide unusually high levels of inoculum for the 1999 season. Unlike apple scab where disease risk decreases in June, the disease risk for Fabraea leaf spot is greatest during June and early July.

Fabraea leaf spot is caused by a fungus, *Fabraea maculata*. The fungus overwinters either in fallen leaves on the orchard floor or in small (<one-quarter inch) indistinct cankers on pear twigs. We do not know which of the two methods of over-wintering is most common in New York. Studies conducted in New York have shown that ascospores from last year's leaf litter can mature anytime from mid-May through early July. No one has determined why the time of ascospore maturation is so variable and so much delayed as compared to maturation of apple scab ascospores.

Fabraea first appears on new leaves as small round purple spots that are visible on both the upper and lower surfaces of the leaves. Similar leaf spots can be caused by many other fungi or by phytotoxocity from pesticide sprays. Therefore, the only way to determine if leaf spots are actually caused by Fabraea is to check under a microscope to determine if Fabraea conidia are present in the leaf spots. Fabraea produces distinctive four-celled conidia with two hair-like setae that make the conidia look like microscopic insects.

Each leaf spot produces millions of slimy conidia that are disseminated by splashing rain or by rust mites, pear psylla, or other insects. A minimum of eight hours of wetting are required for infection. If spores are disseminated by insects, infection can occur during long dew periods in the absence of rain.

Economic damage is usually caused by the rapid development of secondary infections in orchards where primary infections became established in late May or during June. If fungicide protection is inadequate during June or early July, a few primary infections can provide enough inoculum for an explosive epidemic. Secondary infections can appear almost simultaneously on most leaves throughout the tree canopy.

Fabraea can build up more quickly than apple scab because older apple leaves gradually become resistant to infection by the apple scab fungus whereas leaf age does not affect susceptibility to Fabraea. All leaves and fruit remain susceptible to Fabraea right up until harvest. Thus, when a Fabraea epidemic develops in early-summer, all of the existing leaves

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can become infected over a short period of time. Where the disease is severe, fruit become severely spotted and are unmarketable.

Fabraea is relatively easy to control with fungicides if primary infections are prevented during the period from petal fall through early July. Mancozeb is most the effective fungicide for controlling Fabraea. However, mancozeb cannot be applied within 77-days of harvest and its use is limited to a maximum 21 lb per acre per year. Ziram is the best choice for controlling spread of Fabraea during summer. Ziram applied on a three-week interval usually provides adequate protection except where heavy rains remove fungicide residues or where the disease is well established on leaves before the first spray is applied. Where disease pressure is very high (i.e., early infections were not controlled), ziram sprays should be applied on a 14-day interval.

Ferbam is an alternative to ziram and will provide better residual protection through extended wetting periods. However, ferbam leaves a black residue on fruit, slows ripening (yellow color development) of Bartlett pears, and can cause a rougher fruit finish. Benlate is not labeled for Fabraea leaf spot and has only marginal effectiveness against this disease. Benlate may help to suppress Fabraea if it is applied to control sooty blotch at the maximum label rate of 6 oz per 100 gallons of dilute spray, but lower rates are ineffective against Fabraea. If Benlate is used, it should be used in combination with ziram or ferbam to ensure adequate protection against leaf spot.❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	6/1	6/3	6/7
Spotted tentiform leafminer	12.1	7.0	4.6
Redbanded leafroller	0.4	1.0	0
Oriental fruit moth	10.4	8.8	0.4
Lesser appleworm	2.2	3.0	1.0
San Jose scale	0	0	0
Codling moth	6.6	11.5	14.1
American plum borer	6.8	3.4	0.8
Lesser peachtree borer	4.1	4.8	7.9
Pandemis leafroller	0.6*	3.0	3.5
Obliquebanded leafroller	–	0.3*	3.5
Peachtree borer	–	0	0.1*

Highland, NY

	5/25	6/1	6/7
Spotted tentiform leafminer	2.9	2.8	15.9
Redbanded leafroller	2.1	0	0
Oriental fruit moth	1.2	1.1	0.6
Codling moth	0.9	3.3	1.1
Lesser appleworm	0.8	2.8	0.9
European red mite(#/leaf)	18.0	11.0	6.4
Two-spotted spider mite(#/10 lvs.)	–	–	0.7
San Jose scale	0.1*	0	0.4
Fruitree leafroller	–	0.5*	0
Obliquebanded leafroller	–	0	3.8

Hudson, NY

	5/24	6/1	6/7
Spotted tentiform leafminer	3.4	1.9	0.2
Oriental fruit moth	2.0	0.9	1.5
San Jose scale	0.8	0.1	–
American plum borer(cherry)	2.9	4.6	1.9
Lesser peachtree borer(peach)	2.8	0.6	1.4
Peachtree borer	0.3	0.1	0.9
Tarnished plant bug	0	0	0

* first catch

GENERAL INFO

BOOK SMART

GET 'EM WHILE THEY'RE HOT!

❖❖ Hot off the presses from the Ontario Ministry of Agriculture, Food and Rural Affairs is a new, soup-to-nuts manual for practioners of IPM in pome fruits. Written by Bernie Solymar, Pome Fruit IPM Specialist with OMAFRA, **Integrated Pest Management for Ontario Apple Orchards** is an attractive (includes 275 color plates), user-friendly handbook that treats just about every conceivable aspect of real-life, get your hands dirty IPM for apples. Chapters include discussion of the concept of IPM, monitoring and economic thresholds, sprayer technology, pesticide impact and environmental fate, and practical resistance management. Complete descriptions of pests are in fact sheet form.

The manual is titled Integrated Pest Management for Ontario Apple Orchards, but would be of general use anywhere in the Northeast. Cost is $50.00 (I assume Canadian) although growers registered with the Ontario Apple Marketing Commission are entitled to one free copy. To order send name and address, number of copies desired, and check (payable to Ontario Apple Marketing Commission) to:

Ontario Apple Marketing Commission
7195-B Millcreek Drive
Mississauga, Ontario
Canada L5N 3R3
Fax # 1-(905)-858-3299

❖❖

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/7):	890	523
(Geneva 1998 1/1–6/7):	1037	623
(Geneva "Normal" 1/1–6/7):	799	457
Hudson (3/17–6/7):	919	521
(Highland 1/1–6/7):	1082	640

Coming Events:	**Ranges:**	
Spotted tentiform leafminer 2nd flight begins	795–1379	449–880
Codling moth 1st flight peak	547–1326	307–824
European red mite summer eggs hatch	773–938	442–582
Obliquebanded leafroller 1st flight peak	869–1548	506–987
American plum borer 1st flight peak	360–962	134–601
Dogwood borer 1st catch	798–1182	456–718
Pear psylla 2nd brood hatch	992–1200	609–763

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