Roundheaded Appletree Borer
Peak egglaying period roughly: June 14 to July 1.
First RAB eggs hatch roughly: June 10.

Codling Moth
Codling moth development as of June 1: 1st generation adult emergence at 73% and 1st generation egg hatch at 20%.
1st generation 20% CM egg hatch: June 1 (target date where one spray needed to control 1st generation codling moth).

Obliquebanded Leafroller
Where waiting to sample late instar OBLR larvae is not an option (= where OBLR is known to be a problem, and will be managed with insecticide against young larvae): Early egg hatch and optimum date for initial application of B.t., Delegate, SpinTor, Proclaim, Intrepid, Rimon, Altacor, pyrethroid or other insecticide effective against OBLR (with follow-up applications as needed): June 13.

Oriental Fruit Moth
2nd generation OFM flight begins around: June 19.

San Jose Scale
1st generation SJS crawlers appear: June 5.

Spotted Tentiform Leafminer
2nd STLM flight begins around: June 2.
WAA is difficult to control with insecticides because of its waxy outer covering and tendency to form dense colonies that are impenetrable to sprays. WAA is resistant to the commonly used organophosphates, but other insecticides are effective against WAA, including Diazinon and Thionex, and some newer products such as Assail (plus 1 qt. of oil per 100 gal) and Beleaf may offer suppression. Good coverage to soak through the insects’ woolly coverings is integral to ensuring maximum efficacy. Additionally, Lorsban trunk applications for borers made at this time will effectively control any crawlers that might be contacted by these sprays.

Similar to most years at this point in the season, we’ve received reports of the first infestations of woolly apple aphid (WAA) in problem sites in western NY. WAA colonizes both aboveground parts of the apple tree as well as the roots, where it commonly overwinters. In the spring, nymphs crawl up on apple trees from the roots to initiate aerial colonies. Most nymphs are born alive to unmated females on apple trees during the summer. Colonies initially build up on the inside of the canopy on sites such as wounds or pruning scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August.

The aerial colonies occur most frequently on succulent tissue such as the current season’s growth, water sprouts, unhealed pruning wounds, or cankers. Heavy infestations cause honeydew and sooty mold on the fruit and galls on the plant parts. Severe root infestations can stunt or kill young trees, but usually do not damage mature trees. However, large numbers of colonies on trees may leave sooty mold on the fruit, which interferes with harvest operations because red sticky residues from crushed WAA colonies may accumulate on pickers’ hands and clothing.

During late June most years, water sprouts, pruning wounds, and scars on the inside of the tree canopy should be examined for WAA nymphs. During mid-July, new growth around the outside of the canopy should be examined for WAA colonies. No economic threshold has been determined for treatment of WAA, but they are difficult to control, so the occurrence of any colonies should prompt the consideration of some remedial action.
The San Jose scale (SJS) is a pest of tree fruit that attacks not only apple, but also pear, peach, plum, and sweet cherry. The minute SJS adult males emerge in the spring from beneath scale covers on the trees, usually during bloom, and mate. The first of this year’s crawlers should be showing up any day now. The females produce live crawlers within 4-6 weeks of mating; these are bright yellow, very tiny insects resembling larval spider mites. About 24 hours after birth, the crawlers have walked or drifted to new sites and settled in by inserting their mouthparts into the tree and secreting a white waxy covering that eventually darkens to black.

SJS infestations on the bark contribute to an overall decline in tree vigor, growth, and productivity. Fruit feeding causes distinct red-purple spots that decrease the cosmetic appeal of the fruit. Control measures for SJS are recommended when the scale or their feeding blemishes have been found on fruit at harvest during the previous season. Insecticidal sprays are most effective when directed against the first generation crawlers, specifically timed for the first and peak crawler activity, which are usually 7–10 days apart.

The most reliable method of determining first appearance of the crawlers in your specific area is by putting sticky-tape traps on the tree limb near encrusted areas and checking them at least twice a week. We are closing in on the predicted time for this event, about 50 degree days away from the needed accumulation of 310° (50°F base) since the date of first adult catch (5/17 in Geneva this year). Effective materials for SJS control include Assail, Esteem, Leverage and Provado. Another option, new this year, is the IGR Centaur.

Guthion and Imidan were once standards but now show limited effectiveness in most orchards.

Coverage and control are generally better if the spray is applied dilute and in every row. SJS is frequently a problem in larger, poorly pruned standard size trees that do not receive adequate spray coverage. Dormant or delayed-dormant sprays of oil, or 1/2-inch green applications of Lorsban, Esteem or Supracide will help prevent populations from getting established. Early season pruning is important for removing infested branches and suckers, as well as for opening up the canopy to allow better coverage in the tree tops where SJS are often con-
There are two generations of Comstock mealybug in New York, each taking 60 to 90 days to complete, depending on seasonal temperatures. The egg is generally thought to be the primary overwintering stage, but some nymphs and adult females from the second (summer) generation may also overwinter, with eggs being laid in the spring rather than the previous fall. Adult females and males emerge at the same time, from late June to mid-July for the first (overwintering) generation, and late August to mid-September for the second (summer) generation. Adult females are present for a total of 4-6 weeks, and oviposit for about one week after mating. Males survive for only a few days after emerging.

The elongate, orange-yellow eggs are laid in jumbled masses along with waxy filamentous secretions in protected places such as under bark crevices, near pruning cuts, and occasionally in the calyx of fruit. The summer-generation eggs are laid from mid-June through late July, and the overwintering eggs from mid-August into October. The early larval instars of the CMB are similar to adult females (wingless and elongate-oval in shape, with a many-segmented body) except that they are smaller, more oval-shaped, lack the long body filaments, and are orange-yellowish because they have less wax covering. Later instars are similar in appearance, but become progressively browner and redder.

The overwintered eggs hatch from mid-April through May and the nymphs (crawlers) migrate from the oviposition sites to their feeding sites on terminal growth and leaf undersides of trees and shrubs. This hatch is completed by the petal fall stage of pears. Nymphs that hatch from these overwintered eggs are active from roughly early May to early July (i.e., as in the above-mentioned reports). As the nymphs approach the adult stage, they tend to congregate on older branches at a pruning scar, a node, or at a branch base, as well as inside the calyx of pears. Second- (summer) generation nymphs are present from about mid-July to mid-September.

The Comstock mealybug poses two major concerns for the pear processing industry of New York: First, the emergence of crawlers and adult females from the calyx of pears at the packinghouse creates a nuisance to workers. Second, pears to be made into puree typically are not peeled or cored by processors who buy New York fruit, so infestations can potentially result in unacceptable contamination of the product.

Another problem, of concern to apple growers in the 1930s and 1940s, and again in the Hudson and Champlain Valleys in the early 1980s, is that the honeydew secreted by the crawlers is a substrate for sooty molds growing on the fruit surface. This problem also occurs on peaches in Ontario, Canada. These molds result in a downgrading of the fruit, and are therefore an additional cause of economic loss.

To date, the Comstock mealybug has been a problem to growers of processing pears because of the contamination and aesthetic reasons noted. An infestation generally requires one or more insecticide sprays during the growing season, directed against the migrating crawlers. Examine the terminal growth for crawler activity periodically throughout the summer. Crawler and adult female activity can be monitored best by wrapping white, double-sided carpet tape around low scaffold branches and inspecting for crawlers that have been caught on the tape. They can be recognized with a hand lens or, with some experience, by the unaided eye.

When we expect summer crawlers to appear in problem blocks a bit later, we’ll advise an application of a material such as Assail, Centaur, Movento, Portal, or Provado to control this insect.
Several times every year we encounter cases of leaf spotting, leaf burn, or other damage to apple leaves or fruit that we ultimately trace back to a specific pesticide application or to a sequence of applications. Sometimes the phytotoxicity is predictable. For example, streptomycin applied to control fire blight frequently causes a marginal yellowing on leaves that were just unfolding when the spray was applied (Fig. 1). Strep applications may also cause some yellow spots towards the center of leaves. The amount of yellowing varies depending on the number of strep sprays that were applied during bloom, the adjuvants used to enhance streptomycin activity, and the foliage condition at the time of application. The leaf yellowing caused by streptomycin sprays is a form of phytotoxicity that, so far as we know, does not have any negative consequences for the tree or the crop. In fact, leaf-edge yellowing could perhaps be viewed as comforting evidence that the tree is responding to the fire blight sprays that were applied earlier.

However, many cases of phytotoxicity are less benign, and these can be especially frustrating because no one wants to apply a pesticide that ultimately causes more problems than it solves. Everyone knows that some product combinations will almost always cause phytotoxicity (e.g., mixtures of captan plus oil or sulfur plus oil). In other cases, however, the causes and contributing factors are more obscure. Some causes of phytotoxicity were summarized in a 2006 Scaffolds article: (http://www.nysaes.cornell.edu/ent/scaffolds/2006/060605.html#diseases). Last week I encountered another unusual case in my own research plots.

In a small block at the Hudson Valley Lab where we are evaluating 12 different fungicide treatments in replicated plots, severe leaf burning was noted on McIntosh leaves in one treatment on 27 May (Fig. 2). Similar, but less severe injury was also evident on Ginger Gold and Golden Delicious trees in those same plots. The leaf damage was not evident when I applied the last round of fungicide treatments early on the morning of 25 May, so I initially assumed that the damage must have resulted from the last spray that I had applied. The plots with the leaf burn had been sprayed with a tank mix of Microthiol Disperss (sulfur) plus Dithane (mancozeb) on 25 May, with both products applied at the rate of 1 lb/100 gallons of dilute spray. The spray was applied with a handgun and trees were sprayed to drip. The temperature at the time of application was in the low 70s, but by mid-afternoon of 25 May the temperature topped out at 87°F and the following day the maximum temperature was 94°F. In retrospect, I realized that I should not have applied sulfur when weather forecasts indicated we would have temperatures that exceeded 80 or 85°F.
However, further inspection showed that the damage was not solely attributable to the application of sulfur ahead of hot weather.

The story was complicated by the fact that the same tank of sulfur/mancozeb had also been used to treat many other plots where trees showed no damage. In fact, the sulfur/mancozeb spray was applied across all plots for five different treatments on 25 May in a scheme where each of those five treatments had received different fungicides in the previous spray on 11 May. The damaged trees had been sprayed with 1% summer oil on 11 May, whereas undamaged trees had not received any oil on 11 May. We had received 1.5 inches of rainfall between the 11 May and 25 May applications, so I had assumed that the oil residues would no longer be a factor.

The pattern of damage on terminal shoots provided further evidence that the damage resulted from an interaction of the oil applied on 11 May with the sulfur plus heat on 25–26 May. Younger leaves on terminal shoots that had developed after 11 May did not show any leaf burn because they had not been exposed to the oil spray (Fig. 3). Thus, the evidence suggested that the oil spray on 11 May changed the leaf structure in a way that made leaves more susceptible to sulfur injury when sulfur was applied during a heat wave 14 days later.

continued...
Most experienced growers would not apply sulfur in the middle of a heat wave, so I doubt that this scenario will be repeated in commercial orchards. I don’t know for certain, but I also doubt we would have noted damage if we had used captan instead of sulfur because I suspect that high temperatures interact more with sulfur than with captan.

Although it may have been a unique scenario, this case study shows how an unusual confluence of events can contribute to unexpected phytotoxicity. It also helps to explain why many scientists and field advisors are evasive when asked how many days of separation are needed to avoid phytotoxicity when oil sprays are followed by captan or sulfur sprays. There are no simple answers for avoiding phytotoxicity because no one can identify all of the potential interacting factors. However, careful consideration of potential interactions is warranted every time we mix products into a spray tank.

### INSECT TRAP CATCHES

**Geneva, NY**

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<td>Oriental fruit moth</td>
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<tr>
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<tr>
<td>Pandemis leafroller</td>
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<tr>
<td>Obliquebanded leafroller</td>
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**Highland, NY**

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### UPCOMING PEST EVENTS

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<tr>
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<tr>
<td>(Geneva 1/1–6/1/2009):</td>
<td>733</td>
<td>414</td>
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<tr>
<td>(Geneva &quot;Normal&quot;):</td>
<td>708</td>
<td>387</td>
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<tr>
<td>(Geneva 1/1–6/7 predicted):</td>
<td>1162</td>
<td>763</td>
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</table>

**Ranges (Normal ±StDev):**

- **Lesser appleworm 1st flight subsides**: 990–1466 604–932
- **San Jose scale 1st flight subsides**: 842–1232 499–763
- **Codling moth 1st flight peak**: 574–1008 313–597
- **Obliquebanded leafroller 1st flight peak**: 843–1139 491–707
- **Cherry fruit fly 1st catch**: 755–1289 424–806
- **Peachtree borer 1st catch**: 779–1347 444–830
- **Oriental fruit moth 1st flight subsides**: 834–1120 485–695
- **Pear psylla 2nd brood nymphs hatch**: 967–1185 584–750
- **Spotted tentiform leafminer 2nd flight begins**: 982–1152 582–718

**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.
EVENT REMINDER

Cornell Fruit Field Days to be held July 28-29

Cornell University will host the 2010 Fruit Field Days at the New York State Agricultural Experiment Station in Geneva, NY, on Wednesday and Thursday, July 28 & 29, from 8:00 a.m. to 5:00 p.m each day. Grapes and berry fruits will be the focus on July 28, and tree fruits will be addressed on July 29.

Fruit growers, consultants, and industry personnel are invited to tour field plots and learn about the latest research and extension efforts being carried out by researchers on the Geneva and Ithaca campuses, and on commercial farms elsewhere in the state. The focus will be on all commodities key to New York’s $300 million fruit industry: apples, grapes, cherries, raspberries, strawberries, blueberries and other berry crops.

During lunch, equipment dealers and representatives from various companies will showcase their latest products and technologies to improve fruit crop production and protection.

The event will be held on the Experiment Station’s Fruit and Vegetable Research Farm South, 1097 County Road No. 4, one mile west of Pre-emption Rd. in Geneva, NY. Signs will be posted. Attendees will be brought to the different research plots by bus to hear presentations by researchers on the work being conducted. The cost of registration is $15 per person for single-day attendance and $25 for both days; lunch will be provided each day.

Pre-registration is required, and can be done either online (via credit card) or by mailing in a check plus the registration form (see insert, last page in this issue).

For sponsorship and exhibitor information, contact Debbie Breth at 585-798-4265 or dib1@cornell.edu. More program information and the online pre-registration site will be posted to the “News and Events” section of the Cornell Fruit web page (http://www.fruit.cornell.edu/) in the very near future.
### Cornell Fruit Field Days 2010

**NYS Agricultural Experiment Station, Geneva, NY**

**July 28 & 29th 8 am - 5 pm**

**July 28 (Grapes and Small Fruit) & 29th (Tree Fruit) 8 am - 5 pm**

**Advance Registration is Required**

Registration is $15.00 for one day or $25.00 for both days. Lunch is included in registration fee.

**For More Information:**

Contact Amy Andersen by calling: 315-787-2331 or email ada10@cornell.edu

Please mail this registration form along with payment (checks made payable to Cornell University) by July 18 to:

Nancy Long, NYS Agricultural Experiment Station
630 W. North Street, Geneva, NY 14456;

or fax your registration to Nancy at:

315-787-2443 by July 18 or register online at:

http://www.nysaes.cornell.edu/

Registration (check one): July 28th ($15) ___ July 29th ($15) ___ July 28th & 29th ($25) ___ Total amount enclosed ($US): ______

Lunch selection (check appropriate boxes)

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Chicken BBQ</td>
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<td>Vegetable Lasagna</td>
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Name______________________________________________________
Address____________________________________________________
City________________________________State______Zip__________
Phone:____________________Email:____________________________

All who pre-register will be eligible for door prizes.