Roundheaded Appletree Borer
Peak egglaying period roughly: June 15 to June 29.

Codling Moth
Codling moth development as of June 18: 1st generation adult emergence at 98% and 1st generation egg hatch at 77%.

Lesser Appleworm
2nd LAW flight begins around: June 30.

Obliquebanded Leafroller
Early egg hatch and optimum date for initial application of insecticides effective against OBLR (with follow-up applications as needed): June 15. Where waiting to sample late instar OBLR larvae to determine need for treatment, or to check on results from earlier sprays: Optimum sample date is June 23.

Oriental Fruit Moth
2nd generation OFM flight begins around: June 18.

Redbanded Leafroller
2nd RBLR flight begins around: June 18.

San Jose Scale
First adult SJS crawlers appear: June 7.

Spotted Tentiform Leafminer
Rough guess of when 2nd generation sap-feeding mines begin showing: June 26.

It is once again the time of year when we expect the first appearance of apple maggot (AM) flies in wild apple trees and abandoned orchards, particularly in eastern N.Y.; western N.Y. could be about a week later, depending on what kind of temperatures and rainfall we get over the next week or so. Crop scouts and consultants have used traps to monitor AM populations for a long time, but this approach, useful as it is, nevertheless is not recommended in all cases. Some orchards have such high or such low AM populations that monitoring for them is not time-efficient. That is, in some blocks, sprays are necessary every season, often on a calendar basis; however, in some blocks the populations
are so low that they are rarely needed at all. However, most commercial N.Y. orchards have moderate or variable pressure from this pest, so monitoring to determine when damaging numbers of them are present allows growers to apply only the number of sprays necessary to protect the fruit from infestation.

Sticky yellow panels have been in use for over 50 years, and these can be very helpful in determining when AM flies are present. These insects emerge from their hibernation sites in the soil from mid-June to early July in New York, and spend the first 7–10 days of their adult life feeding on substances such as aphid honeydew until they are sexually mature. Because honeydew is most likely to be found on foliage, and because the flies see the yellow panel as a "super leaf", they are naturally attracted to it during this early adult stage. A few of these panels hung in such an orchard can serve as an early warning device for growers if there is a likely AM emergence site nearby.

Many flies pass this period outside of the orchard, however, and then begin searching for fruit only when they are ready to mate and lay eggs. That means that growers don't always have the advantage of this advance warning, in which case the catch of a single (sexually mature) fly indicates that a spray is necessary immediately to adequately protect the fruit. This can translate into an undesirable risk if the traps are not being checked daily and are used to signal an immediate response, something that's not always possible during a busy summer.

To regain this time advantage, traps have been developed in the form of a "super apple" — large, round, deep red, and often accompanied by the scent of a ripe apple — in an attempt to catch that first AM fly in the orchard. Because this kind of trap is so much more efficient at detecting AM flies when they are still at relatively low levels in the orchard, the traps can usually be checked twice a week to allow a 1–2-day response period (before spraying) after a catch is recorded, without incurring any risk to the fruit. Research done in Geneva over a number of years indicates that some of these traps work so well that it is possible to use a higher threshold than the old "1 fly and spray" guide-lines recommended for the panel traps. Specifically, it has been found that sphere-type traps baited with a lure that emits apple volatiles attract AM flies so efficiently that an insecticide cover spray is not required until a threshold of 5 flies per trap is reached.

The recommended practice is to hang three volatile-baited sphere traps in a 10- to 15-acre orchard, on the outside row facing the most probable direction of AM migration (towards woods or abandoned apple trees, or else on the south-facing side). Then, the traps are periodically checked to get a total number of flies caught; dividing this by 3 gives the average catch per trap, and a spray is advised when the result is 5 or more. Be sure you know how to distinguish AM flies from others that will be collected by the inviting-looking sphere. There are good photos for identifying the adults on the Apple Maggot IPM Fact Sheet (No. 102GFSTF-I8); check the web version at: http://www.nysipm.cornell.edu/factsheets/treefruit/pests/am/am.asp.

continued...
In home apple plantings, these traps can be used to "trap out" local populations of AM flies by attracting any adult female in the tree's vicinity to the sticky surface of the red sphere before it can lay eggs in the fruit. Research done in Massachusetts suggests that this strategy can protect the fruit moderately well if one trap is used for every 100–150 apples normally produced by the tree (i.e., a maximum of three to four traps per tree in most cases), a density that makes this strategy fairly impractical on the commercial level.

A variety of traps and lures are currently available from commercial suppliers; among them: permanent sphere traps made of wood or stiff plastic, disposable sphere traps made of flexible plastic, and sphere-plus-panel ("Ladd") traps. The disposable traps are cheaper than the others, of course, but only last one season. Ladd traps are very effective at catching flies, but are harder to keep clean, and performed no better than any other sphere trap in our field tests. Brush-on stickum is available to facilitate trap setup in the orchard. Apple volatile lures are available for use in combination with any of these traps. These tools are available from a number of orchard pest monitoring suppliers, among them:

- Gempler's Inc., 100 Countryside Dr., PO Box 328, Belleville, WI 53508; 1-800-382-8473, Fax, 1-800-551-1128 <http://www.gemplers.com/>
- Great Lakes IPM, 10220 Church Rd. NE, Vestaburg, MI 48891; 800-235-0285, Fax 989-268-5311 <http://www.greatlakesipm.com>
- Ladd Research Industries Inc., 83 Holly Court, Williston, VT 05495; 800-451-3406, Fax 802-660-8859 <http://www.laddresearch.com>

By preparing now for the apple maggot season, you can simplify the decisions required to get your apples through the summer in good shape for harvest.

Reports of true armyworm (aka common armyworm, formerly named *Pseudaletia unipuncta*, but now called *Mythimna unipuncta*; family Noctuidae) have been coming in from across New York, and in some cases causing apple damage. The larvae are smooth cylindrical caterpillars, 1–1/2 to 2 inches long when fully grown. Their color ranges from tan to dark olive green, with a lighter stripe running along each side. The highest concentration of armyworm activity so far has been in western counties, with reports of more scattered incidence in central, northern and eastern New York. While reports have been confirmed in many counties, not all plantings have been over threshold so it is important to get out and check your plantings. Alison DeMarree reports finding apple fruit damage (see photo next page) on her farm in Williamson following mowing of the row middles. The damage appears to be confined to the fruit; foliage is not affected. This damage is occurring at night, so they likely won't be found feeding on fruits during the day. In addition to the damage they may cause on fruit, the fact that they are grass feeders means they could destroy the row middles in orchards, vineyards or other fruit plantings, making the drive lanes slippery.

**TEN HUT!**

By preparing now for the apple maggot season, you can simplify the decisions required to get your apples through the summer in good shape for harvest.
Armyworm moths are long-range migrants that arrive on the spring storms from their southern overwintering locations. Armyworm moth migrations are somewhat sporadic, cyclic from year to year and difficult to predict. This year, the early spring in their overwintering areas enabled the moths to get an earlier start in their migrations north. True armyworms are primarily a pest of plants in the grass family: forage/pasture/grasses (& lawns), wheat, corn and small grains.

In many years, natural enemies, including various fungal and viral diseases and parasites such as tachinid flies, play a role in helping to suppress armyworm populations. This year our armyworm natural enemies appear to be lagging behind. Some tachnid fly parasitism has been observed in the Finger Lakes and diseased armyworm larvae are beginning to be observed in an increasing number of fields in western NY. Armyworms may have 2 and possibly 3 generations in New York. Each generation takes about 5 weeks to complete. In a "normal" year, the later generation armyworm impacts are usually minimal or isolated. However, the presence of varying sized armyworm larvae (1/2 inch and greater) indicates that there have been multiple flights, and we may see an extended period of armyworm activity. Many armyworms were first observed in western NY around Memorial Day, are now about 1.5 inches in length or greater, and may be pupating soon, if they have not already done so. If this is the case, the next generation of armyworms could be expected to be observed about mid-July. To be sure, all crops at risk should continue to be monitored for signs of this insect.

There are no labeled options for armyworm treatment in apples, but incidental control may be obtained from applications of the following materials already being applied for management of caterpillar pests: Belt, Voliam Flexi, Intrepid, Dipel and other B.t. products, Lorsban, and the pyrethroids. Additional resources on armyworms is available on the NYS IPM website, at http://nysipm.cornell.edu/pest_alert/armyworms.asp.

Photo credits: Armyworm fruit damage, & Armyworm in stubble, T. DeMarree; True armyworm larva, James Kalisch, University of Nebraska, Bugwood.org.
FIRE BLIGHT SAMPLING - STREP TEST
Julie Carroll, NYS IPM Program, Geneva, jec3@cornell.edu; and Herb Aldwinckle, Plant Pathology, Geneva, hsa1@cornell.edu

Fire blight strikes are showing up in orchards across New York now, and we need to learn how widespread streptomycin resistance is in the bacterial pathogen, Erwinia amylovora. This information will support our request for a Section 18 Emergency Exemption from US EPA for kanamycin, a material with efficacy comparable to streptomycin.

How do you sample an orchard with a single variety where many trees have strikes? In cases like this, the epidemic is considered a single event and testing can be done on three well-chosen samples from that orchard. Collect three samples from each variety when more than one variety is affected.

It's counterproductive to cram a bag full of several samples of the same thing, so place a single sample in each bag. Most samples sent to us have followed the guidelines for sample size and type — a few inches of tissue spanning the edge of an active lesion. It's tempting to focus on the dead and dying leaves when cutting samples; instead, focus on the shoots and follow the blackened, shriveled bark downward to where it meets healthy bark. Make the cut at least three inches below the diseased/healthy junction, in the healthy tissue.

Fill out the sample sheets (Fire Blight Sample Form; available on the Scaffolds homepage or 2012 Issues page http://www.scaffolds.entomology.cornell.edu/). We really need that information on all samples for the work and results to be meaningful. Again, this information will support our request for a Section 18 Emergency Exemption from US EPA. Send samples early in the week, and for samples collected late in the day or late in the week, keep them in the refrigerator in a plastic bag (sample sheet attached on the outside) to keep them fresh and hydrated.

We won't be able to sample every fire blight outbreak in the state. Concentrate on suspect fire blight outbreaks. These include new plantings and outbreaks where streptomycin has been applied. We are coordinating sampling of suspect fire blight outbreaks across the state via a NYS IPM Program grant.

For help sampling an orchard, contact us.
Hudson Valley — Dave Rosenberger, 845-691-7231
Lake Champlain & Capital District – Kevin Iungerman, 518-744-0720
Lake Ontario – Debbie Breth, 585-747-6039
Lake Ontario & Finger Lakes – Julie Carroll, 315-787-2430

EPA-approved pesticides are all sold with labels that present extensive and detailed information on how, when, and where a product can be legally applied and what safety measures are required to protect applicators, farm workers, consumers, and the environment. To the uninitiated, the product labels may appear to contain a lot of "fine print" and lawyer-generated warnings that have little relevance for someone hurrying to get a fungicide applied. However, ignoring label restrictions and warnings can be both dangerous and illegal. It can also result in damage to the crop.
Compatibility problems with older products are often so well known that we don't need to refer to the labels to learn about them. For example, most fruit growers don't need to read the product label to know that Captan is not compatible with oil, but many may be unable to remember the apple cultivars listed on the Captan labels as being prone to leaf spotting if Captan is applied with sulfur. On newer products those label warnings can be especially valuable for avoiding crop damage because we lack the oral histories that are associated with older products.

Topguard, a newly introduced fungicide in the DMI group, is very active against apple powdery mildew. In research trials, it has consistently been as good as or slightly better than Rally for controlling mildew. However, the Topguard label warns, "DO NOT add adjuvants to spray solution." That warning is on the label because Topguard can occasionally cause a slight leaf-edge burn when applied with adjuvants. Being aware of this restriction is important because many insecticides applied at this time of year require oil (or some other adjuvant that enhances penetration), and adding Topguard to those mixtures or spraying it within a few days before or after oil was applied may result in phytotoxicity on some cultivars.

We recently noted some leaf-edge burning on Redcort (Fig. 1) in replicated plots where we had applied Topguard earlier this spring, along with some necrotic spotting on Golden Delicious leaves (Fig. 2) in those same plots. Jerseymac, the third cultivar in the test plots, showed no evidence of leaf injury.

Detailed leaf counts on 14 and 15 June showed that 17 to 19% of Redcort and Golden Delicious terminal leaves showed damage in plots treated with Topguard, whereas the background level (presumably from other non-fungicide maintenance sprays) was 3 to 4% for plots that had received other fungicides. We did not use any adjuvants when applying Topguard, but a review of our records showed that we had applied streptomycin with LI-700 (1 pint of LI-700 per 100 gal) on 16 April when trees were at king bloom and again on 4 May when we still had straggler flowers at petal fall. Topguard sprays were applied on 18 April and 7 May. Apparently, the streptomycin plus LI-700 applied two or three days prior to the Topguard sprays had altered the leaf surface conditions enough to allow enhanced uptake of the Topguard and the resulting leaf burn that we observed.

In a similar trial last year (2011), we had also noted significant leaf injury on Golden Delicious trees that had been sprayed with Topguard. At the time, we could not determine why that injury oc-
curred, and scientists in other states who applied Topguard in similar treatments did not report any leaf injury from their Topguard sprays. A check of our 2011 spray records revealed that we had applied Topguard on May 12 and followed that with an application of streptomycin plus Regulaid (1 pt/100 gal) on 13 May. Thus, we have two years of evidence that Topguard, under some conditions, may cause leaf burn if it is applied shortly before or after sprays that included adjuvants designed to enhance product penetration into leaves.

In both years in which we noted leaf burn, the strep sprays were applied with an airblast sprayer delivering 65 gal of spray solution per acre, but the Topguard sprays were applied to drip using a hand-gun. No damage to fruit was evident in either of these trials. It is quite possible that no leaf burn would have developed if Topguard had been applied with an airblast sprayer rather than as a full dilute spray.

Topguard fungicide is arguably our most active mildewcide for apples, but our experiences illustrate that the label warning to avoid adjuvants should not be ignored. Cautions with Topguard may need to parallel those that we have traditionally used with Captan when considering applications shortly before or after oil sprays.

Other label warnings found on almost all pesticides include restrictions on the number of applications per season, the number of sequential applications, the total amount of product that can be applied per acre during each year, and the days-to-harvest (or PHI: preharvest interval). Days-to-harvest restrictions may create some unique challenges this year because harvest dates for some cultivars may be earlier than normal due to our exceptionally early bloom dates. Thus, preharvest intervals must be based on anticipated harvest date and cannot be based on calendar dates that worked in previous years.

The labels for Flint, Sovran, and Pristine pose a specific challenge for apple growers because all three of these product labels specify that only four applications per year can be made with any product in this chemistry group. That means that it is illegal to apply more than four sprays per year that include Flint, Sovran, or Pristine. Additional restrictions may apply. For example, the Flint label specifies that Flint can be applied only twice in succession and that two applications involving a different chemistry must be made before Flint can be applied again. The Sovran label still includes the statement "DO NOT reduce the Sovran rates specified on the label", and that restriction means that it is illegal to apply less than the labeled rate of 3.2 oz/A on apples. In most cases, products can be applied at less than the rates per acre shown on the product label if there is a logical reason for doing so (e.g., spraying small trees that have not yet filled their spaces), but rate reductions are not allowed for products where rate reductions are specifically prohibited on the label, as is the case for Sovran.

In wet years, when frequent fungicide applications are required to replace fungicides removed by rains, one must be aware of seasonal limits on the use of even older fungicides such as Captan. The current Captan labels limit the total amount/A/yr to 40 lb for Captan 80W, 64 lb for Captan 50W, or 32 qt of Captan 4L.

In summary, there is no substitute for reading product labels. It is generally easier to read labels in the comfort of an office as opposed to trying to find the relevant sections of the label while squinting at small print in the early morning hours while the sprayer tank is filling with water. Most pesticide labels can be found on-line at the CDMS website http://www.cdms.net/LabelsMsdslMDefault.aspx?=&, but the CDMS website may list products that are not yet registered in NY or that have specific use restrictions in NY. The approved NY labels can be viewed on-line at http://pims.psur.cornell.edu/#pims_products. Reading and reviewing labels regularly is the only way to stay abreast of warnings, restrictions, and changes on product labels.
QUESTIONS ABOUT INDAR FOR BROWN ROT
(Dave Rosenberger, Plant Pathology, Highland; dar22@cornell.edu)

Questions have been raised by NY fruit growers who have noted that, in the "2012 Cornell Pest Management Guidelines for Commercial Tree Fruit Production," the rate shown for Indar 2F on stone fruits is 6 to 12 fl oz/A, whereas the product label on their container of Indar shows a rate of only 6 fl oz/A. The difference is explained by the fact that EPA has issued a "24(c) Special Local Needs Registration" for use of up to 12 oz/A on cherries, peaches, and nectarines in NY. The New York 24(c) label allowing for rates above 6 oz/A does NOT include apricots or plums. The reason for allowing higher rates via the 24(c) labels is to enable better control of brown rot in orchards where the 6 oz/A rate was losing effectiveness due to development of DMI resistance in the brown rot fungus.

Similar 24(c) labels have been approved for OH, WI, GA, SC, NJ, MI, MD, and PA, although cherries are not included on the 24(c) label in some of those states. These special local needs registrations cover most east-coast states that have significant acreages of stone fruits, but the higher rates of Indar have not been approved (so far as I know) for any of the New England States.

Although the 24(c) label allows Indar 2F to be applied at rates as high as 12 fl oz/A on the stone fruits listed on the 24(c) label, the total amount of product that can be applied per acre per year has remained constant at 48 fl oz. Thus, when applied at the rate of 6 fl oz/A, one could use a maximum of 8 applications per year of Indar 2F, whereas only four applications are allowed if the rate is boosted to 12 fl oz/A. Or one might opt for 6 applications at 8 fl oz/A. The traditional rate of 6 fl oz/A should be sufficient in most orchards if that rate has provided good control of brown rot in the past. However, in orchards with documented DMI resistance in brown rot, or in orchards where Indar has seemed to be losing activity, growers may benefit from using higher rates of Indar.

Activity of Indar on smooth-skinned fruit is often improved if Indar is applied with a non-ionic surfactant that will enhance uptake of the product into the fruit epidermal cells. The benefits of using a non-ionic surfactant have been less apparent on peaches.

Although Indar can be applied up to 6 or 8 times per year (depending on the rate used), it should not be used more than twice in succession so as to minimize selection for resistance. Indar applications should be alternated (either after each spray or after two consecutive sprays) with a fungicide of a different chemistry such as Pristine, Gem, or Cabrio, all of which are in the QoI or stroby chemistry group. Indar is in the same chemistry group as Tilt, Tebuzol, and Elite, so alternating Indar with any of the latter three products has not benefit for fungicide resistance management.

Geneva:
Obliquebanded Leafroller DD43 developmental model @ 470 (May 28 biofix); first egg hatch predicted at 360 DD.

Highland: 1st sparganothis fruitworm moth caught today, 6/18. Apple maggot observed.
Obliquebanded Leafroller DD43 developmental model @ 499 (May 27 biofix); first egg hatch predicted at 360 DD.
INSECT TRAP CATCHES
(Number/Trap/Day)

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* first catch

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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