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Eastern NY Commercial Horticulture Program

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Tree Fruit News

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Regional Updates*:

North Country—Clinton, Essex, northern Warren and Washington counties

Tree phenology: Apple=post bloom

Current growing degree days 1/1/13 to 6/10/13	Base 43°F*	Base 50°F*
Chazy	895.8	526.6
Peru	877.5	532.9
South Hero, VT	918.2	552.9
Burlington, VT	932.9	561.8
Shoreham, VT	936.9	574.5

Pest focus—Apple: scab, rust, mildew, fire blight, plum curculio, European apple sawfly, codling moth.

Capital District—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington counties

Tree phenology: Apple, pear, peach, cherry, plum, apricot=post bloom

Current growing degree days 1/1/13 to 6/10/13	Base 43°F*	Base 50°F*
Granville	887.6	537.2
North Easton	985.5	596.4
Clifton Park	916.7	552.0
Guilderland	918.5	547.4

Pest focus—Apples: scab, rust, mildew, fire blight, plum curculio, European apple sawfly, codling moth. Stone fruit: brown rot, Oriental fruit moth, aphids; Pears: Fabraea leaf spot, pear psylla.

Mid-Hudson Valley—Columbia, Dutchess, Greene, Orange, Sullivan and Ulster counties

Tree phenology: Apple, pear, peach, plum, cherry, apricot=post bloom.

Current growing degree days 1/1/13 to 6/10/13	Base 43°F*	Base 50°F*
Hudson	1015.5	624.5
Highland	1068.4	656.9
Marlboro	1032.2	619.0
Montgomery	1030.9	623.4

Pest focus—Apples: scab, mildew, sooty blotch, flyspeck, codling moth, obliquebanded leafroller, 17-year cicada. Stone fruit: brown rot, oriental fruit moth, aphids. Pears: Fabraea leaf spot, pear psylla.

Coming Events

Coming Events: Range (normal ± std deviation)	Base 43°F*	Base 50°F*
American plum borer 1st flight peak	625-973	340-592
Codling moth 1st flight peak	571-999	311-591
European red mite summer eggs hatch	737-923	424-572
Obliquebanded leafroller 1st flight peak	826-1208	479-755
Peachtree borer 1st catch	789-1341	453-827
Pear psylla 2nd brood hatch	967-1185	584-750

**All degree day data presented are BE (Baskerviile-Emin) calculations.*

Serving the educational and research needs of the commercial small fruit, vegetable and tree fruit industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Rensselaer, Saratoga, Schoharie, Schenectady, Sullivan, Ulster, Warren and Washington Counties

The Control of Fabraea Leaf Spot on Pears

By Dave Rosenberger, Cornell Dept. Plant Pathology. Edited K. Iungerman CCE ENYCH.

Fabraea leaf spot caused by the fungus *Diplocarpon mespili* infects pear and also quince, hawthorn, *Amelanchier* sp. (shadbush or serviceberry), *Chaenomeles* sp. (ornamental flowering quince), *Cotoneaster* sp., *Mespilus* sp. (Medlar), *Pyracantha* (firethorn), *Photinia*, and *Sorbus*. Trees of these other species can provide inoculum to nearby pear orchards even where the disease is controlled within the orchard. Fabraea infection can lead to severe late summer defoliation of pears (Fig.1), failed fruit maturity, and otherwise unmarketable spotted fruit (Fig. 2). The disorder can befall most pear cultivars but is especially severe on Bosc and Seckel, and it has been besetting pear growers of the Hudson Valley, southern New England, and the Cumberland-Shenandoah region.

Figure 1. Fabraea late season defoliation of pear.

The fungus can overwinter either as twig canker on last year's shoots or in fallen leaves. Ascospore discharge from fallen leaves is similar to apple scab but it comes several weeks later. Fabraea symptoms also begin surreptitiously, first appearing as occasional, easily missed tiny purple spots on leaves, but with hot humid periods in July and August, the initial infections can begin to produce conidia and spread extremely rapidly to epidemic proportions if the trees are not protected with fungicides. Even the best fungicide programs may fail if the disease becomes established and July and August see a lot of rain. For these reasons it is critical to control early infections.

Lab analysis shows that initial leaf and also fruit spots may appear to be totally desiccated but if wetted they will suddenly swell as the spore matrix absorbs water to produce distinctive conidia in a gelatinous matrix (Fig. 3, 4 respectively). Subsequent splashing or wind-blown rain will readily disseminate these sticky spores, as will pear psylla and pear rust mites that contact the matrix. Such arthropod dissemination during long periods of dry weather may be significant if enough wetting from dew allows new infections; just eight hours of such summer wetting is needed.

Figure 2. Pear fruit with Fabraea injury.

Another pears to apple pathology comparison shows this difference: most pathogens causing apple foliar diseases infect only newly unfolded leaves, meaning the cessation of terminal growth in summer also slackens the pace of scab infection. Not so with pears; pear leaves and fruit do not gain resistance to Fabraea as they age and any gap in fungicide protection can allow rapid spread to all leaves and fruit to the disastrous effects cited.

Fungicide protection is usually exhausted after 1.5 to 2 inches of cumulative rainfall following a fungicide application – a not uncommon phenomenon this season. Alas, no fungicide seems to have much post-infection activity against Fabraea, meaning orchards require immediate re-cover orchards after residue-depleting rains, especially where Fabraea reigned last year or where leaf spotting is already visible this year.

Mancozeb fungicides are your best defense against spring and early summer Fabraea infection but they carry limitations: only seven applications can be made at the 3 lb/A maximum rate, and there is a 77-day preharvest interval. The best preventive strategy is to apply mancozeb at weekly from green cluster on until either all seven allowable applications are made or the 77-day preharvest interval arrives. If control is then still needed, shift focus to the summer control of pear scab and/or sooty blotch and flyspeck (SBFS) with Syllit, Flint, and Pristine;

(Continued on page 3)

(Continued from page 2)
these products will also help with Fabraea though they are specifically labeled for those diseases and not Fabraea.

Several labeled fungicides for pears, and also Merivon (still unlabeled in NY), were tested at the Hudson Valley Lab in 2012. Inspire Super was found to be less effective against Fabraea than either Flint or Syllit. Merivon and Fontelis-plus-Flint were no more effective than Flint used alone (Table 1). And so, the SDHI fungicides (that is, Fontelis and the non-strobilurin component of Merivon) either lack activity or are no stronger than the strobilurins with which they were applied in our tests. Pristine was not included in this trial, but is presumed equivalent to Flint for controlling Fabraea, and it also suppress pear postharvest decay if applied shortly before harvest.

Syllit, Flint, and Pristine should be effective if applied on 14 to 21 day summer intervals, if insects and mites are controlled, and if fungicide coverage is renewed following 1.5 to 2 inches of accumulated rainfall. Keeping current rainfall patterns in mind, it is instructive to note that none of the treatments in the 2012 trial provided complete disease control (Table 1); and accumulated rainfall in the intervals preceding fungicide applications on 15 June and 3 July totaled 3.0 and 2.5 inches, respectively. All treatments might have provided better control had the two spray intervals been shortened and fungicides reapplied before reaching 2 inches of rainfall.

Syllit represents a different chemistry group to include in summer rotations to control Fabraea but can be applied only three times per season.1 Syllit will not control late-season fruit rots or SBFS, which with sooty molds arising on pear psylla-caused honeydew may blemish smooth-skinned pear cultivars like Bartlett. So it may be advisable to use Syllit during the early summer, either in three back-to-back sprays, or in alternating sprays with Flint. In prior trials we found that Flint was not very effective against populous pear sylla-induced sooty molds but it did control both Fabraea and SBFS. Topsin M controls both SBFS and the psylla-related sooty molds but it is relatively ineffective against Fabraea (though labeled for that disease). Topsin M could be combined with Syllit or any

Figure 3. Seeming dessicated Fabraea spots on leaves

(Continued on page 4)

Table 1. Effectiveness of fungicides for controlling Fabraea on pears Hudson Valley Lab, 2012

Fungicides and amounts of formulated product/100 gal of dilute spray (multiply by 3 for an equivalent rates/A) [z]	Foliar ratings on Bosc [y]		% fruit with Fabraea [x]	
	% leaves infected	% defo-liation	Bosc	Bartlett
	29 Aug	29 Aug	4 Sep	22 Aug
1. Untreated control	95.5 e [v]	54.7 c	95.2 b	81.4 b
2. Flint 0.83 oz [z]	46.0 bc	17.4 a	18.5 a	11.0 a
3. Fontelis 4.67 oz + Flint 0.67 oz [z]	61.3 cd	21.8 a	28.1 a	6.5 a
4. Merivon 1.33 fl oz [z]	32.3 ab	23.0 ab	23.8 a	7.2 a
5. Syllit 16 fl oz [z]	18.3 a	20.8 a	0.0 a	6.0 a
6. Inspire Super 4 fl oz [z]	74.5 d	34.2 b	-- [v]	4.2 a

[z] Between 7 April to 21 May, all plots including controls received seven weekly airblast applications of Manzate 3 lb/A + LI-700 6 fl oz/100 gal. The treatments listed were applied (in combination with LI-700 at 8 fl oz/100 gal) on 1 & 15 June, 3 & 17 July, and 1 & 16 Aug.

[y] Based on counts from 20 shoots per plot.

[x] Based on evaluation of 60 fruit/plot or all available fruit if < 60.

[w] Means separations within columns were determined using Fishers Protected LSD ($P \leq 0.05$).

[v] Data not available due to low fruit numbers caused by spring frosts.

(Continued from page 3)

of the other fungicides if protection against psylla-related sooty molds is needed.

Several years ago, Cornell Entomologist Peter Jentsch and I noticed that Fabraea leaf spot was less severe in Jentsch's plots at the Lab that received regular oil sprays. This prompted our testing oil sprays. We applying found 1% oil instead of fungicides delayed Fabraea-induced defoliation even though it did not delay the time that Fabraea first appeared in the oil-sprayed trees. Associated lab studies showed that the oil suppressed spore production and release, thereby slowing an epidemic's progress. Regular applications of 1% oil have a downside: they can adversely affect tree health, with enlarged lenticels on new wood being the most visible evidence. Because these tests showed oil to be less effective than fungicides in preventing infection, the suggestion is that oil be added to fungicides only if/when initial symptoms of Fabraea are observed on foliage.

Figure 4. Unique Fabraea spores in gelatenous matrix.

The operational assumption here is this: when Fabraea is visible on foliage, adding oil with late-summer fungicide sprays will enhance fungicide activity as it decreases conidial production/dissemination. Fungicides always perform better as inoculum levels are reduced. And so, using oil with fungicides adds benefit where Fabraea is not completely controlled by the fungicides alone.

Notes: 1. The Lab tests used the maximum label rate of Syllit so the effectiveness at lower rates is unknown.
Source: "Controlling Fabraea Leaf Spot on Pears", David Rosenberger, email to K. Iungerman et. al. June 2, 2013.
Article and photos edited and adapted for the Tree Fruit newsletter by Iungerman. The article also was separately edited and appeared in "Scaffolds, V22, N11 June 3,2013.

San Jose Scale – An Increasing Problem in Regional Orchards?

By Kevin Iungerman, ENYCH

At our petal fall – thinning meeting in Clinton County on May 28, one grower in attendance raised concern about the levels of San Jose Scale (SJS) that he had observed in his orchard, and then several others also spoke of it becoming a growing issue in their orchards. SJS, *Quadraspidiotus perniciosus,* is the most important arthropod pest of apple (and other fruit tree) branches.

San Jose scale (SJS) was first introduced from China into California in about 1870, and by 1895 had spread throughout the U.S. and Canada on nursery stock. SJS surface feed on the sap of trees. While it has historically been a pest of larger, poorly pruned, and inadequately sprayed standard-sized trees (i.e. sufficient coverage) planting and environmental circumstances may be altering this picture.

These insects are able to insert their mouths into tree bark and feed on the sap. When populations are high, the crawlers may also cover the fruit. While it takes a large population to cause injury, where an opening presents itself, and large populations establish, scale can kill a young tree in two to three years; even larger and older trees can succumb though their size affords a greater survival duration relative to the younger and/or high-density dwarf plantings. SJS can also feed on fruit and leaves, with the former causing bright red-to-purple spot discoloration as often seen on apple, especially toward the calyx ends. SJS attacks most cultivated fruits including apple, pear, quince, plum, apricot, sweet cherry, currant, and gooseberries. It also besets many ornamental and wild trees and shrubs and these can serve as reservoirs reseeding nearby treated orchards.

SJS overwinters as partially grown immatures on tree trunks, scaffolds, and branches, most as first instar nymphal life stage. (See diagram.) Historically SJS has been a lesser pest in the Upper Champlain and colder regions of NY, as extremely low winter temperatures were believed to cause high mortality to this overwintering generation. Moderating winter temperatures accompanying climate shift departures from historical norms will likely increase the threat posed by this pest.

(Continued on page 5)

Speckling appearance of San Jose Scale infestation on apple scaffold limb, a closer image (center) and exposed feeding injury below the bark right. *Photos: Utah State University Extension.*

(Continued from page 4)

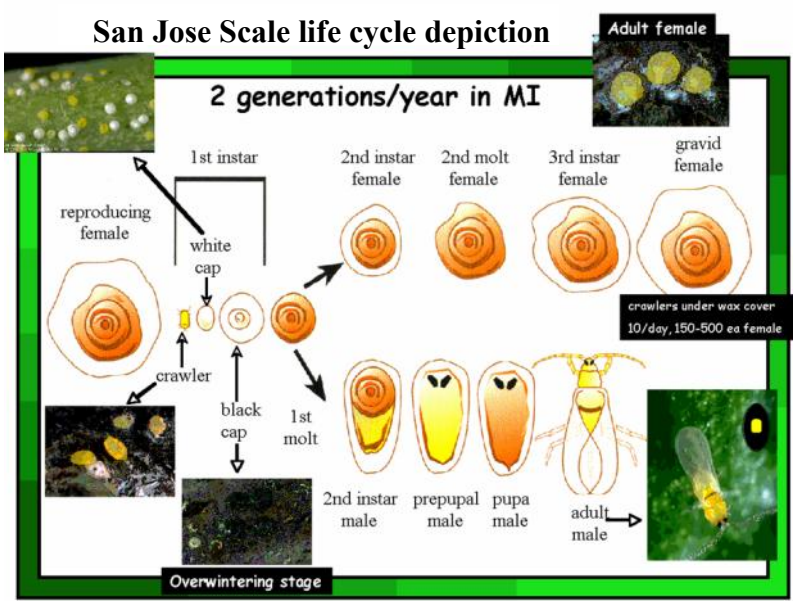
The nymphal SJS remain dormant under their waxy coverings, initiating feeding as sap begins to flow in spring's onset, and they continue to feed until mature, just about at apple bloom. The winged males emerge from under their waxy coverings to search out and mate females. Adult females produce a pheromone to entice males, but remain stationary under their scale covering, where mating occurs. The females do not lay eggs but produce live nymphal young known as crawlers.

Fertile females are capable of bearing 150-500 offspring. After mating, females continue to live for about another six weeks, and death arrives as one final step in the well synchronized series giving rise to first generation crawler emergence.

Generally, first crawlers are on the move about 30 days after first male flight, which is four to six weeks following bloom. The interval between first and peak crawler emergence of this first seasonal generation is only about seven days. Crawler self-dispersal is spatially quite limited; the main means of SJS dispersal comes not on the wings but the feet of birds, and on the wind, and courtesy of people's clothing, pruning, and farm machinery.

In three weeks crawlers molt, lose their old skins, legs, and antennae. Female crawlers will mature, developing in a flattened sac with waxy caps (the scale), where they remain attached to the trees via their mouthparts. Male crawlers will develop wings for dispersal. Together, the stage is then set for the next seasonal generation. (See accompany life cycle illustration.)

A delayed dormant timing through the pre-bloom period with oil, Lorsban, or Esteem is a preferred initial control strategy targeting adult scale as better spray coverage can be achieved because foliage is either absent or relatively negligible then compared to later season canopy development. Esteem for instance (an insect growth regulator-IGR) requires excellent surface coverage for the insect to contact the material on the tree surface.



Source: NW Michigan Horticultural Research Station, Michigan, August 5, 2008.

SJS have at least two generations per year in NY and so two very vulnerable life stages each year. As crawlers are on the move, are unattached to the trees, are not yet feeding, and especially, are as yet without scale cover, this is the best time to intervene with protectants to gain control of these pests before the insects form scale, which is a great obstacle to pesticide efficacy. Insecticide applications made at mid-June and mid-August timing, instead of, or in follow-up to pre-bloom efforts, can very effectively target crawlers and blunt the reproductive cycle.

Table 7.1.4 of the 2013 Tree Fruit guidelines suggests a mean DD base 50 °F accumulation of 688 degree days for first generation crawler emergence (about June 19th on average) and 1187 degree days for the second generation

(Continued on page 6)

(Continued from page 5)

(approximately July 15). Practically speaking, while thee estimates can be as much as two weeks off, the combined use of the degree-day model and biofix points do provide a useful heads-up, and perhaps a 5-7 day window, to plan and target spray interventions.

The neonicotinoid group (Assail, Provado) does provide translaminar movement into foliage for feeding activity as well as short contact activity during the first few days of application. Given that rapid and continuing tree growth expands canopy tends to inhibit spray penetration, it is likely that contact materials and even Esteem would not get to the nooks and crannies of trees with high San Jose infestations.

San Jose Scale on Apple.

The systemic insecticide Movento offers a more expansive option through penetration of both stems and foliage as newly emerging nymphs begin to feed. While trials at the Cornell Hudson Valley Lab have produced good control results using Esteem just prior to SJS crawler emergence (roughly at 3rd cover), Movento is likely to be superior in orchards with higher levels of tree infestation by benefit of its mode of action. Where contact insecticides are used they should be employed in two applications over the course of SJS crawler emergence for best results.

Article Information Sources: Davis College of Agriculture, Natural Resources and Design, Division of Plant and Soil Science, West Virginia University, Kearneysville. Tree Fruit Research and Education Center. http://www.caf.wvu.edu/kearneysville/pest_month/insectfocusapril98.htm. "San Jose Scale Biology And Control In Fruit Crops" and accompanying life cycle illustration, Northern Michigan FruitNet Weekly Update, August 5, 2008, Nikki Rothwell and Erin Lizotte, NW MI Horticultural Research Station, and John Wise and David Epstein, MSU Entomology. The 2013 Cornell Tree Fruit Pest Management Guidelines; Peter Jentsch email to Kevin Iungerman et. al. on the subject of San Jose control, Wed, 29 May, 2013; and photos from the Utah State University Extension Utah Pests Integrated Pest Management Fruit Image Gallery at http://utahpests.usu.edu/IPM/htm/fruits/fruit-images.

Registration Opens for Cornell's 2013 Storage Workshop Tuesday August 6

By Kevin Iungerman ENYCH

Registration has opened for Cornell's 2013 Storage Workshop on Tuesday August 6 and for the accompanying barbeque the prior evening, Monday, August 5.

This Storage Workshop will feature an international, national and statewide cast. Our guest speakers include Dr. Angelo Zanella, who heads the post-harvest research group at Laimburg Agriculture Research Centre in Italy, and who will be presenting their work on DCA and ILOS, as well as their experiences with DPA.

Other presentations will include Honeycrisp, and Empire and Gala browning by Jim Mattheis (USDA, Washington), Jennifer DeEll (Ontario Ministry of Agriculture and Food, Canada), as well as the Cornell team of Chris Watkins and David Rosenberger. Industry presentations include DECCO, PACE and Storage Control Systems.

Early Registration. Act now to obtain your registration rate of $70 per person and to ensure your payment is ireceived by July 30th. Early registration includes lunch. After July 30 th registration rates increase to the "at-the-door" amount of $80 per person and they *will not include lunch!*

Free BBQ. Early Registrants are also invited to attend a free BBQ on August 5th from 6 – 9PM at the Cornell Orchards. For unregistered guests or those registering for the Storage Workshop after July 30, the barbecue cost will be $15 per person.

LODGING: A block of rooms is being held at a special conference rate at the Best Western Motel. Rooms are $109 plus tax (free breakfast and free shuttle to CU) and must be booked by July 9th to guarantee the conference rate. Phone 607-272-6100. Please state that you are attending the Cornell Storage Workshop.

FURTHER INFORMATION. For more information contact Max Welcome, at mw45@cornell.edu or by phone at 607-255-5439. You may also view the complete Storage Workshop agenda and other details and find Workshop registration forms: http://blogs.cornell.edu/fruit/files/2013/05/2103storageworkshop-152r2of.pdf

Registration Open for Cornell Geneva Fruit Field Day August 1, 2013

Cornell University will host the 2013 Fruit Field Day at the New York State

Agricultural Experiment Station in Geneva, NY, on Thursday, August 1st, from 8:00 a.m. to 5:00 p.m.

The field day will encompass all the fruit production sectors that are of key importance to New York's $350 million fruit industry: apples, grapes, cherries, raspberries, strawberries, blueberries and other berry crops

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 Cornell researchers in Geneva and Ithaca and on commercial farms around New York State.

Rounds of field research plots and featured presentations by Cornell Faculty and personnel will be conducted as distinct tours within a broader organizational context for the day, as there will be two tours of tree fruit presentations and a single tour of grapes and small fruit presentations. Visitors and attendees may elect to mix and match as may be possible between these several focused production tours.

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 Road in Geneva, NY. Signs will be posted. Attendees will travel by bus to the research plots to hear presentations by researchers on the work being conducted. The cost of registration is $30 per person ($40 for walk-ins) for all-day attendance. Lunch will be provided.

Scenes from 2010 Field Day: Dr. Susan Brown, top, Dr. Terence Robinson, bottom, describing research endeavors to field day attendees. *Photos K. Iungerman, ENYCH*

Pre-registration is required for the $30 rate. Register on-line at: http://is.gd/ffd2013

For sponsorship and exhibitor information, contact Debbie Breth at 585-798-4265 or dib1@cornell.edu

Source: Immediate release information, Michelle Cowles, NYSAES, June 4, 2013, michellecowles@cornell.edu, 315-787-2274