scaffolds

Update on Pest Management and Crop Development

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

May 29, 2012 VOLUME 21, No. 12 Geneva, NY

INSECTS

JUNE BUGS

ORCHARD RADAR DIGEST

FIGHT BORER-DOM

(Art Agnello, Entomology, Geneva; ama4@cornell.edu)

CLEARWING OUT

❖❖ **Roundheaded Appletree Borer**
RAB egglaying begins: May 25. Peak egglaying period roughly: June 14 to July 1.

Dogwood Borer
First DWB egg hatch roughly: June 11.

Codling Moth
Codling moth development as of May 29: 1st generation adult emergence at 67% and 1st generation egg hatch at 12%.
1st generation 3% CM egg hatch: May 26 (= target date for first spray where multiple sprays needed to control 1st generation CM). 1st generation 20% CM egg hatch: May 31 (= target date where one spray needed to control 1st generation CM).

Obliquebanded Leafroller
1st generation OBLR flight begins around: May 26.

San Jose Scale
First adult SJS crawlers appear: June 5.

Spotted Tentiform Leafminer
2nd STLM flight begins around: June 3.

❖❖ In NY, there are two species of sesiid (clearwing) moths that attack peaches — the peachtree borer (PTB), *Synanthedon exitiosa*, and the lesser peachtree borer (LPTB), *S. pictipes*. The adult borers are striking clear-winged moths with yellow and steel-blue body markings. The adults of these insects have from one to four yellow-orange stripes across the abdomen, depending upon species and sex. The PTB enters the tree near soil level and does not require the presence of wounds or breaks in the bark for entry, but the LPTB nearly always enters the tree at a pruning scar, canker, mechanical injury, or winter-injured area. The LPTB additionally attacks cherries, causing the same type of injury in the upper trunk and scaffold branches of these

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trees. Both species pass the winter as borers inside the tree, and in the spring emerge as moths that lay eggs on or in the trunk during the summer. The LPTB moth emerges first, normally in late May, but this year's weather has advanced the date (we caught our first of this season in Geneva on May 15), and the PTB doesn't show up normally until mid-June, but look for it earlier this season; both stay active (laying eggs) through August. When the borer stages hatch, the PTB tends to crawl down the tree to soil level and burrow in there, but the LPTB will move to the nearest injured area, which may be on the lower trunk or just as easily up in the scaffold limbs. LPTB completes its development in one year, but some PTB larvae take two years to develop, so any control measure a grower would elect will require repeating for at least 2–3 years.

Injury is caused by larval feeding on the cambium and inner bark of the trunk close to the soil level (PTB) or on the upper trunk and lower scaffold branches (LPTB). Occasionally, larger roots are also attacked by PTB. Areas attacked often have masses of gum, mixed with frass, exuding from the bark. All ages of trees are injured. Young trees are at times completely girdled and subsequently die. Older trees are often so severely injured that their vitality is lowered and they are rendered especially susceptible to attack by other insects or by diseases. Although both species may be found in infested trees, younger plantings and those not afflicted by extensive cankers or other bark splits are attacked primarily by PTB.

Chemical control is difficult, owing to the concealed habit of the larvae. Growers have traditionally relied on one or more coarse insecticide sprays (e.g., Asana, Lorsban, Proaxis, Thionex, Warrior) of the trunks and lower scaffold branches to deter egg laying and kill newly established larvae. Because this is a labor-intensive measure that often fails to completely control these pests, many growers choose not to elect treatment, or else do an incomplete job, with the intention of getting what they can out of a planting until infestations combine with other peach production factors to warrant tree removal. However, there is a good alternative in the form of pheromone mating disruption (MD) tools for the control of these perennial pests.

Isomate-PTB Dual (Pacific Biocontrol/CBC America, EPA Reg. No: 53575-34) is the current version of the twist-tie pheromone dispenser labeled for use against both of these species in all NYS stone fruits. They are placed in the trees at a rate of 150–250 ties/A at or before the first flight, with the higher rate (250/A) recommended when pest pressure is high. This product has replaced the Isomate-LPTB and Isomate-PTB formulations. We have conducted trials on the efficacy of Isomate-LPTB with and without the addition of directed trunk sprays in peaches, and after 2 years we saw that the pheromone dispensers completely suppressed trap catches of both PTB and LPTB for both seasons, compared with relatively heavy flights noted in the non-disrupted comparison blocks, showing that pheromone treatment was highly successful in disrupting the chemical communication of males and females of these two species.

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These trials provided sufficient evidence that mating disruption alone is able to provide adequate protection from borer infestations in commercial orchards, giving growers an effective non-chemical alternative to trunk sprays for managing this pest complex in their stone fruit plantings. Growers interested in this approach should be placing the pheromone ties during these next 1–2 weeks, before the LPTB flight gets solidly under way statewide. ❖❖

THE HEAVY

WEIGHING IN ON SCALE
(Peter Jentsch, Entomology, Highland; pjj5@cornell.edu)

❖❖ Over the past decade, the San Jose scale, *Quadraspidiotus perniciosus* (Comstock) (SJS), has become a primary fruit-feeding pest in many orchards across the state. San Jose scale overwinters in the adult form, well protected from both the onslaught of winter and our most diligent IPM pest management practices. As we know, this pest can seriously affect fruit quality, cause significant yield losses, and if unmanaged for a number of seasons, can result in poor tree health and eventual death of the tree. The older chemistries such as Penncap-M and Lorsban that once held this insect in check have long been withdrawn from the pest management toolbox. With little in the way of residual insecticide presence in the orchard after the threat of plum curculio, producers are questioning us as to "How to keep this insect from establishing in the orchard", as once San Jose scale gets a foothold in a block of fruit, it is very difficult to eradicate.

We are quite fortunate to have a group of effective insecticides to assist us in managing this insect during key timing windows of the growing season. Yet despite the availability of newly registered materials, scale continues to cause economic damage to tree fruit. This may in part be due to the fact that pre-bloom weather challenges prevent effective early season applications. Alternatively, newer chemistries may be difficult to place into the program, as they may require the use of a penetrating non-ionic surfactant such as horticultural oil to be effective. The incompatibility concerns over Captan use in summer disease management programs can be a formidable barrier. Yet new materials can contribute greatly to the management of scale if alternate summer fungicides such as Pristine 38WP can be substituted when oil is required.

Whatever the case, we need to get a handle on scale management and take the mystery out of controlling this insect. So let's clearly define the three periods of San Jose scale management that target: 1.) "black cap" or adult phase during early pre-bloom; 2.) 1st generation corresponding to early post-bloom; and 3.) 2nd generation, which corresponds to the late post-bloom periods.

Pre-bloom: This is by far the optimum time to manage SJS, as they are least protected from a spray application at this time. The most effective timing during this period is delayed dormant from silver tip to 1/2"-green. We are all familiar with the use of horticultural oil, Lorsban, Supracide or Esteem 35WP directed against overwintered "black caps" during this period, as these are long-time standard controls. Supracide 25WP can only be applied during pre-bloom (delayed dormant), as stated by the label. Lorsban can be applied only as a foliar OR trunk application through pink. Remember, the earlier the application against the black cap phase, the greater the likelihood of success. Increased foliage equates to "shadowing" and reduced coverage, which of course is the essential control component against the adult life stage. Esteem 35WP can be employed with or without oil, while Centaur 0.7WDG requires a penetrating non-ionic surfactant such as 0.25% v/v oil.

Work conducted by Harvey Reissig & Dave Combs in 2003 suggests that there is not much synergism in the combination of the traditional oil + Lorsban tank-mixed combination, showing that either oil alone or Lorsban alone performs just as

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well. Studies conducted in Highland also show the efficacy of oil when used alone (Table 1). The use of oil in SJS management contributes to the reduction of selection pressure that gives rise to resistance, as historically SJS is very prone to the resistance development against insecticides. If you've missed the pre-bloom window, there are two other periods that will offer an opportunity for SJS control. However they will be somewhat less effective and generally more costly.

If pre-bloom insecticides were used, it is likely that commercial control was achieved. However, if pack-out in 2011 showed the presence of SJS-injured fruit, pre-bloom applications may need to be augmented by post-bloom management efforts. Here are some suggestions for upcoming treatment windows.

Early post-bloom: Treatment for 1st generation SJS crawlers varies depending on the mode of action of the insecticide you choose. Relatively new on the scene are Movento 240SC and Centaur 0.7WDG, while Provado, Esteem and Assail have become relative standards in SJS management. If you choose to use Movento 240SC, you will need make the application approximately one to two weeks before the emergence of 1st generation crawlers, typically between PF and 1st cover, with a follow-up application using lower rates. We are still two to three weeks early in our tree phenology and the emergence of SJS is lagging behind the models, allowing for Movento to still be effective if it was applied within the last week. This insecticide works as a systemic feeding toxicant with little direct toxicity as a residual material and it takes some time for the active ingredient to move into the plant tissue. You will need to tank mix this insecticide with a penetrating non-ionic surfactants such as horticultural oil or the penetrant rate of LI700 for it to be effective. A post-bloom label requirement allows for ample foliage to be present for adequate levels of active ingredient absorption to occur. Centaur will also require a penetrant, while Esteem does not have this requirement on its label.

Because each generation of crawlers is produced for extended periods of time, the first application must target the onset of emergence. A second application made 14 days later is advised for complete control. To determine emergence, we employ two different degree-day models that calculate degree-days using a base temperature of 50°F (DD50). These two models are either calendar-based beginning on the 1st of March, OR based on the biofix of the adult male flight.

Calculating the emergence for the 1st generation using the calendar model predicts crawlers to begin moving out of scale coverings at 500 DD50. This event falls on average 29 days from petal fall of McIntosh (+/- 12.5 days). This year that date fell on 30 April, just 9 days after McIntosh petal fall. Typically the 500 DD50 trigger allows for a 3–5-day window of application after the emergence date has been reached for applications to be made and residual materials to be in place while crawlers begin to appear. However, this year, this model proved to be very inaccurate. We are 5–10 days from emergence, well outside the efficacy period of contact insecticides for SJS crawlers.

The more reliable pheromone-based model uses the adult flight as a biofix, predicting emergence at 380-400 DD50F . The first adults were observed in traps at the Hudson Valley Lab on 14 May. We are presently at 229.1 DD50F . Looking at the 7-day forecast, we are expected to accumulate 18.5 DD50F per day, bringing us to 380DD or the onset of crawler emergence in about 8 days.

Centaur 0.7WDG acts to inhibit the synthesis of chitin (IRAC Class 16) working as an insect growth regulator (IGR). Esteem 35WP, also an IGR, functions as a juvenile hormone mimic, inhibiting metamorphosis from one stage to another (IRAC Class 7). These insecticides are most effective when directed against crawlers at first appearance, yet have no contact toxicity and tend to act very slowly. Assail (IRAC Class 4) is a broad-spectrum neonicotinoid that also is most effective when directed against crawlers as they emerge. The

efficacy of these materials is improved by the addition of oil; however, Esteem 35WP and Assail can be used effectively without the use of oil, whereas Centaur requires oil to be effective. Remember, rotating classes of insecticides for each generation will delay the onset of resistance. Making multiple applications of the same class or same insecticide at a 14-day interval ***for the same generation is recommended***. ❖❖

Table 1. Evaluation of early season insecticides for controlling San Jose scale on apple (a,b)
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2005

Treatment	Formulation infested amt/100 gal	caps Timing	Avg. % caps /Fruit	Live # 1st yr /Fruit	% SJS caps /Fruit	infstd SJS shoots	# /cm	# live /shoot
1. Damoil	3.0 gal	GT	0.0a	0.0a	0.3a	1.1a	0.1a	0.0a
2. Damoil	2.0 gal	HIG	0.9a	0.3ab	1.3a	29.2a	1.1a	0.3a
3. Lorsban	1.0 pt	HIG	3.0ab	1.5ab	1.2a	17.1a	0.3a	0.7a
4. Esteem	1.25 oz	HIG	1.4ab	1.3ab	2.6a	15.0a	0.6a	1.1a
5. Assail	1.25 oz	HIG	31.2bc	29.6cd	6.9ab	37.8a	1.4ab	5.7ab
9. Untreated	-	-	95.9d	277.0d	142.2c	98.9a	30.0c	97.9c

a) Data from "Empire" evaluation on 11 July for 1st generation SJS black cap population.
1/4 inch GT on 7 April, 1/2" GT (HIG) on 12 April, Pink on 26 April, Bloom on 8 May, PF on 19 May @ 80% PF of Empire. 310DD crawler emergence timing from adult biofix on 14 June, following 10d application on 24 June. 310DD crawler emergence timing for 2nd generation on 29 July.
b) Means separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different.

Table 2. Historical record of calendar dates and corresponding degree-day accumulations to the treatment period (500 DD) for 1st generation summer brood crawlers of San Jose scale. Cornell's Hudson Valley Lab, Highland, NY.

Year	P.F. date	Days post PF to reach 500DD50	Date (500DD50)	Cover period
2012	4/21	9 days	4/30	1C
2011	5/16	16 days	6/1	2C
2010	4/28	29 days	5/27	3C
2009	5/7	21 days	5/28	2C
2008	5/7	28 days	6/5	3C
2007	5/14	16 days	5/30	2C
2006	5/8	41 days	6/22	3-4C
2005	5/16	39 days	6/24	3-4C

Reference:

Reissig, W. H. and D. Combs. 2003. A why, what and when approach to San Jose scale. Proceedings 79th Cumberland-Shenandoah Fruit Workers Conf., Winchester, VA.

PEST FOCUS

Geneva: 1st **peachtree borer** trap catch Friday (5/25).1st **pandemis leafroller** and **obliquebanded leafroller** trap catch today (5/29).
Plum Curculio 308DD model for required insecticide residue @ 310. Cooler sites will still need protection this week.
Codling Moth egg hatch 250-360DD treatment window model prediction @ 285 (May 11 biofix). Treatment advised now in high-pressure sites.

Highland: 1st **obliquebanded leafroller** trap catch 5/27.

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	5/21	5/25	5/28
Redbanded leafroller	3.0	1.0	0.0
Spotted tentiform leafminer	1.1	1.3	1.0
Oriental fruit moth	0.9	0.3	0.3
American plum borer	0.1	0.0	1.0
Lesser appleworm	0.1	0.0	0.5
San Jose scale	0.1	0.0	0.0
Codling moth	0.8	1.0	1.3
Lesser peachtree borer	2.1	0.2	0.7
Dogwood borer	0.0	0.0	0.0
Peachtree borer	–	0.5*	0.2
Pandemis leafroller	–	0.5*	1.8
Obliquebanded leafroller	–	0.0	2.2*

* first catch

Highland, NY

	5/21	5/29
Redbanded leafroller	0.0	0.0
Spotted tentiform leafminer	0.8	13.6
Oriental fruit moth	1.0	0.4
Codling moth	2.6	2.5
Lesser appleworm	1.7	1.7
Tufted apple budmoth	2.2	2.1
Fruittree leafroller	0.0	0.0
Variegated leafroller	0.4*	9.4
Obliquebanded leafroller	0.0	1.1
San Jose scale	0.1	0.1

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/29/12):	959	585
(Geneva 1/1–5/29/2011):	676	381
(Geneva "Normal"):	652	355
(Geneva 1/1–6/4 predicted):	1091	676
(Highland 1/1–5/29/12):	1097	641
(Highland 1/1–5/29/11):	893	523

Coming Events:	Ranges (Normal ±StDev):	
American plum borer 1st flight peak	636–982	349–597
Black cherry fruit fly 1st catch	702–934	380–576
Cherry fruit fly 1st catch	755–1289	424–806
Codling moth 1st flight peak	574–1008	313–597
Rose leafhopper adult on apple	809–1053	440–622
Dogwood borer 1st catch	831–1301	473–791
Pandemis leafroller flight peak	870–1182	496–722
Obliquebanded leafroller 1st flight peak	843–1139	491–707
Peachtree borer 1st catch	796–1350	456–834
Spotted tentiform leafminer 2nd flight begins	987–1161	587–725
Lesser appleworm 1st flight subsides	990–1466	604–932
Oriental fruit moth 1st flight subsides	831–1121	485–695
Pear psylla 2nd brood hatches	967–1185	584–750
San Jose scale 1st flight subsides	851–1233	506–764

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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