scaffolds

Update on Pest Management and Crop Development

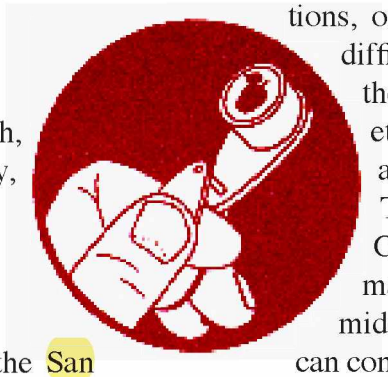
F R U I T J O U R N A L

April 18, 2011 VOLUME 20, No. 5 Geneva, NY

INSECTS

DO YOU KNOW THE WAY?

WEIGHING IN ON SCALE (Peter Jentsch, Entomology, Highland)



❖❖ 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 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 eventually death of the tree. The older chemistries such as Penncap-M and Lorsban that once held this insect in check have long been either withdrawn from the pest management toolbox or else severely restricted in their use, respectively. With little in the way of residual insecticide presence in the orchard after the threat of plum curculio, producers are questioning 'How to ***keep*** this insect from establishing in the orchard', because 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 be in part because pre-bloom weather challenges prevent effective early season applications, or because newer chemistries are 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 alternative 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. the 'black cap' or adult phase during early pre-bloom; 2. the 1st generation, corresponding to early post-bloom; and 3. the 2nd generation, which corresponds to the late post-bloom periods.

continued...

IN THIS ISSUE…

Pre-bloom: This is by far the optimum time to manage SJS, as this is when they are the least protected from a spray application. The most effective timing during this period is at delayed-dormant, from silver tip to half-inch 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 pre-bloom (at delayed-dormant), as stated by the label. Lorsban can be applied only as a foliar OR trunk application through pink – OR to the trunk only, after bloom. 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 and 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 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 developing resistance to 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.

Early post-bloom: Treatments made against the SJS crawlers of the 1st generation will vary depending on the insecticide chosen. 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 to 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. 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 LI-700 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.

Because each generation of crawlers is produced for extended periods of time, a second application 14 days later is advised for complete control. To determine emergence, we employ a degree-day model that calculates degree-days using a base temperature of 50°F (DD50) from the 1st of March. To calculate emergence for the 1st generation, we use 500 DD50. This falls, on average, 29 days from the petal fall of McIntosh (+/- 12.5 days). 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. Again, a second application at 14 days is recommended.

continued...

scaffolds
is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 3 pm Monday to:

scaffolds FRUIT JOURNAL
Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-1371
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@cornell.edu

Editors: A. Agnello, D. Kain

This newsletter available online at:
http://www.scaffolds.entomology.cornell.edu/index.

Centaur 0.7WDG is an insect growth regulator (IGR), and acts by inhibiting the synthesis of chitin (IRAC Class 16). 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. 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 is recommended *for the same generation.*

Late post-bloom: Treatments to be applied against the 2nd generation of summer brood crawlers are best timed using the degree-day model of 1451 DD50 from 1 March. Generally this occurs in mid-July in the Hudson Valley. More precise real-time degree-day accumulations for specific sites throughout New York are easily accessible from the NEWA website (http://newa.cornell.edu/index.php?page=degree-days), and should be used to get the most from this application. By selecting degree-days base 50 and your nearest weather station, you can quickly determine the 500 and 1451 DD accumulations from March 1, to most accurately time SJS crawler applications. Correct timing of treatments is critical with the contact toxicants such as the OPs, pyrethroids, neonicotinoids and insect growth regulators, as calendar dates are generally too imprecise to be of benefit. For example, Table 2 shows that on average, appearance of 1st generation crawlers occurs approximately 29 days after petal fall. Also evident, however, is the extreme variation in this timing; i.e., the 500 DD event at the Hudson Valley Lab during the last 6 years has occurred at intervals between 27 May and 24 June.

Table 1. Evaluation of early season insecticides for controlling San Jose scale on apple (footnotes 1, 2) NYSAES, Hudson Valley Lab, Highland, N.Y. 2005

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

1. 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.
2. 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
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.

San Jose scale on the calyx end of Empire apple, October 2005.

continued...

INSECT TRAP CATCHES
(Number/Trap/Day)

Geneva, NY

	4/11	4/14	4/18
Green fruitworm	0.3	0.1	0.0
Redbanded leafroller	0.0	0.0	0.0
Spotted tentiform leafminer	0.0	0.0	0.0

Highland, NY

	4/18
Green Fruitworm	0.3
Redbanded leafroller	3.9
Spotted tentiform leafminer	0.4
Oriental fruit moth	0.0

* first catch

PHENOLOGIES

Geneva:

	4/14	4/21 (Predicted)
Apple(McIntosh):	green tip	half-inch green
Apple(Red Delicious):	early green tip	green tip
Pear(Bartlett):	bud burst	bud burst
Sweet cherry(Hedelfingen):	swollen bud	bud burst
Peach(Red Haven):	swollen bud	bud burst

Highland:
Apple (McIntosh/Ginger Gold, Red Delicious): half-inch green
Pear (Bartlett/Bosc): bud burst
Peach(early and late): green tip
Plum(Italian/Stanley): green tip
Cherry(Sweetheart) - Early): bud burst
Apricot (Early): early bloom

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–4/18/11):	120	44
(Geneva 1/1–4/18/2010):	281	149
(Geneva "Normal"):	154	66
(Geneva 1/1–4/25 Predicted):	160	61
(Highland 1/1–4/18/11):	159	61

Coming Events:	Ranges (Normal ±StDev):	
Green fruitworm peak catch	102–216	39–101
Pear psylla adults active	31–99	8–34
Pear psylla 1st oviposition	40–126	11–53
Redbanded leafroller 1st catch	108–174	39–79
Spotted tentiform leafminer 1st catch	113–199	41–93
Green apple aphid present	111–265	38–134
Rosy apple aphid nymphs present	134–244	56–116
Pear thrips in pear buds	118–214	50–98
McIntosh green tip	95–147	36–62

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.