scaffolds

Update on Pest Management and Crop Development

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

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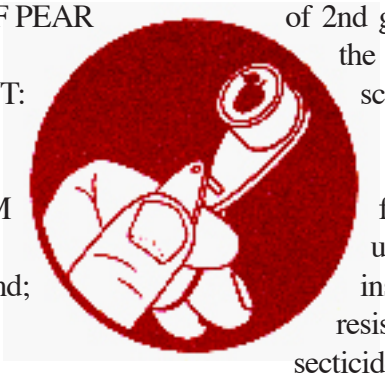
INSECTS

BEFORE AND AFTER

TWO SIDES OF PEAR PSYLLA MANAGEMENT: PRE-BLOOM SURROUND, POST-BLOOM HORTICULURAL OIL

(Peter Jentsch, Entomology, Highland; pjj5@cornell.edu)



❖❖ The pear psylla has 3–4 generations in the Hudson Valley of NY, residing as an adult within the orchard, hedgerows and woodland borders during the winter. Adults emerge to mate and lay eggs on dormant buds and leaf scales. As newly developing leaves

emerge, eggs hatch, giving rise to the 1st generation in early April, growing through 5 instars and developing as 2nd generation adults in Mid-May. Early season management during the pre-bloom period can effectively reduce populations of 2nd generation pear psylla that produce the lion's share of fruit injury and leaf scorch that leads to early defoliation.

Keeping pears clean of pear psylla from bud burst to harvest continues to be a challenge, despite new insecticide chemistries. Managing resistance to maintain old and new insecticide effectiveness only complicates management decisions. With Agri-Mek slipping in effectiveness, pear growers need an effective strategy to manage pear psylla that does not contribute to insecticide resistance.

Below is a Bartlett stem with a single bud and a single egg at its base (top bud). The stem has been sprayed with Surround WP at 50 lb./A. Both sides have 'textbook' coverage of the product, applied as the first eggs were laid on 14 March this season at the Hudson Valley Laboratory in Highland. Surround is a barrier film product containing kaolin clay, which has no known toxicity to pear psylla.

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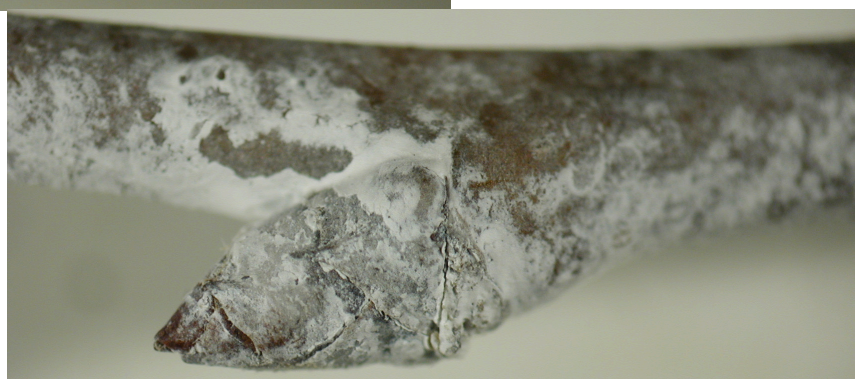

Modes of action of the kaolin clay include creating an unsuitable surface for feeding or egg-laying, and potentially disrupting the insect's host-finding ability by masking the color of the plant, while particles of kaolin may act as an irritant to the insect, causing excessive grooming that results in reduced feeding. It's unlikely that psylla will become resistant to these modes of action, as they have no specific target site within the insect that lead to genetic modification, a significant cause of insecticide resistance. Kaolin is hydrophobic and repels water once it dries. It adheres well to the tree and to itself as applications are layered on over the season, increasing its deposition and redistribution onto developing foliage. Its use at the petal fall timing reduces plum curculio injury; however, it has no impact on San Jose scale or rust mite, and low impact on the plant bug complex.

A strategy we have recently employed effectively utilizes Surround WP during the early season to reduce egg laying. We then switch over to the use of horticultural oil after petal fall, also to deter egg laying, smother eggs on the tree and reduce nymph survival as a "mechanical" contact insecticide. These two approaches provide growers a season-long pear psylla program. The use of horticultural oil post-bloom will also effectively manage pear rust mite and San Jose scale through the middle and latter part of the season. In our test plots we have observed reduced defoliation from the use of oil combined with the early Surround / mid-late season oil strategy (Table 1). Also, 1% oil has been observed to dislodge eggs from foliage when good coverage is achieved.

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Table 1.Evaluations Of Insecticide Schedules For Controlling Early Season Pear Psylla On Pear[1]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

Treatment / Form.	Rate	Application Timing[2]	Mean # of missing leaves and presence of Fabraea Defoliation	Fabraea[3]
BioCover Hort. oil Damoil	1.0% v/v	WB, PF-EOS BB	5.7 a	0.0 ab
Surround WP BioCover Hort. oil	50.0 lbs/A 1% v/v	D, WB, PF 2C-EOS	5.7 a	0.1 ab
Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A	BB WB PF	54.4 cd	0.2 ab
Esteem 35WP Assail 30SG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB, PF 14, 28 dpPF	48.9 bc	0.2 ab
Esteem 35WP Calypso 4F + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 8.0 oz/A 7.0 oz/A	BB WB,PF 14, 28 dpPF	41.4 bc	0.4 b
Untreated			67.02 d	0.4 ab
P value for transformed data			0.001	0.429

1. Data taken on Bosc. Percent data were transformed using arcsine (Sqrt(x)) conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. All applications made using tractor mounted dilute sprayer using a pecan handgun at 300 psi at 300-400 GPA.
2. Applications on 7 April for delayed dormant (DD), 9 April (BB), 15 April for white bud (WB), 19 May for 10 day post petal fall (PF), 5 June for 14dp PF, 17 June for 28dp PF.
3. No applications for Fabraea were made to this block in 2011.

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Surround WP at 50 lb/A is effective in managing psylla when applied in three applications during the spring (Table 2). In this way we prevent the kaolin clay from depositing directly onto the fruit. We begin at 1st eggs laid, with the 2nd and 3rd application at early white bud and petal fall, respectively. Rainfall will act to redistribute the kaolin clay; however, in years of heavy rain, an additional application may be needed. Beginning at 1st cover we switch to 1% oil, applied dilute at no less than >150 GPA. In our trials we've used Damoil, BioCover, and PureSpray, all of which provided effective suppression of psylla population development. In our trials we DID NOT concentrate the oil, and used 150 GPA; we recommend that you use as much water as you need to get excellent coverage. The oil treatments need to be applied at no more than 2-week intervals to reduce egg laying and provide nymph mortality.

Table 2. Evaluations of insecticide schedules on pear psylla and pear rust mite populations on Bartlett pear. Hudson Valley Lab., Highland, N.Y.-2009.

			4 May		6 May	11 May		18 May
		Application	# / 25 lvs[2]		Adult	# / 25 lvs		Adult
Treatment	Rate	Timing[1]	nymph	egg	Sweep	nymph	egg	Sweep[3]
Damoil	3% v/v	DD	2.5 a	12.8 ab	0.8 a	1.0 a	4.8 a	1.0 a
Damoil	1% v/v	GC, PF – EOS						
Surround WP	50.0 lbs./A	DD, GC, PF	1.0 a	11.0 a	0.5 a	1.8 a	8.3 b	1.0 a
Movento 240SC	6.0 oz./A	WB	16.5 b	23.0 ab	1.8 a	12.3 b	39.0 c	3.3 ab
Movento 240SC	9.0 oz./A	WB	14.3 b	30.8 bc	1.3 a	10.0 b	34.0 c	1.3 a
Esteem 35W	5.0 oz./A	BB, WB	15.0 b	39.0 bc	1.5 a	9.0 b	55.8 c	2.7 ab
Centaur 70WDG	34.5 oz./A	BB, WB	22.3 b	78.0 c	1.5 a	13.5 b	43.5 c	5.3 b
UNTREATED			18.0 b	51.5 bc	2.8 a	38.8 c	62.0 c	7.3 b

1 Data taken on foliage of Bartlett. DD on 2 Apr, BB on 20 Apr, GC on 24 Apr, WB on 27 Apr, PF on 8 May, 1C on 18 May, 2C on 31 May, 3C on 10 Jun, 4C on 24 Jun, 5C on 4 Jul, 6C on 9 Jul, 7C on 15 Jul, 8C on 3 Aug. Treatments 3-11 received Imidan 70WP at 5.33 lbs./A @ WB & PF.

2 Foliar data was transformed using Log10 (X + 1) conducted prior to analysis. Untransformed data are presented in each table.

Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different.

3 Data taken from four replicates with the exception of 18 May adult sweep using three replications.

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Due diligence and common sense in applying oil requires that it be applied during moderate temperatures below 80°F to reduce the chance of fruit russetting or phytotoxicity. To utilize weather predictions prior to an application, there are a number of excellent Internet sites. The NEWA website (http://newa.cornell.edu) can provide a quick link to National Weather Service Radar for your region to easily access radar, wind speed and direction, predictive rainfall timing and relative humidity to determine drying time. As with most insecticide applications, coverage is very important with barrier films such as kaolin clay and horticultural oil. Optimizing coverage is an important part of pest decision-making that includes variables such as tractor speed, nozzle configuration, output volume, product rate, fan speed, wind speed and direction. Any one of these variables will influence deposition. My personal preference for making applications to our pear block is a light south wind with reduced fan speed to push the material into the canopy and allow the breeze to carry the product down the north-south rows, utilizing the slower fan and light wind to cover the trees in two directions. So...how often do conditions like this become available? Right. So, we need to keep from making poor decisions when application windows do become available, because coverage IS key, especially with these products.

To close, endemic insect populations having multiple generations per year, such as pear psylla, are likely to develop insecticide resistance over time. With the efficacy of Agri-Mek against pear psylla slipping, alternate strategies should be considered to manage this insect pest. This is but one strategy that may assist you with managing resistance, and pear psylla, over the long haul. ❖❖

WEATHER OR NOT

THE WARM WINTER: CLIMATE CHANGE OR JUST ONE OF THOSE YEARS?

(Alan N. Lakso & Jonathan Comstock, Horticulture, Geneva; anl2@cornell.edu, jpc8@cornell.edu)

❖❖ This winter has been the warmest in memory and likely the warmest on record, and has led to an extraordinarily early budbreak. Since it has been so unusual, it raises questions about whether it is an example of climate change or just normal crazy variation. We thought some brief points about climate change and weather would be useful.

Weather versus Climate - In the media, there is a lot of confusion about the difference between weather and climate. Weather refers to short-term changes, while climate is a long-term average of weather over typically at least 20, or preferably 30 or more years. So, any particular weather period such as this warm winter or a cold wet summer is NOT climate change. We cannot speak of climate change unless there is a clear trend of change over, say, 30 years.

Is this winter an indication of climate change? By itself, no. But the likelihood of such a winter occurring will be greater in a warming climate. The concern with the rapidly increasing CO2 in the air is that it adds heat to the earth. Think of placing a small heater in a room, and turning it on. Although something unforeseen might happen to cool off the room, it is most reasonable to assume it will get warmer over time. The increased CO2 is that heater in the atmosphere.

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Have we had climate change in Western NY in the last 30–40 years? Fortunately, we have an excellent history of weather data at the Experiment Station to examine. Yes, there have been several clear warming trends, but primarily in the winter. The coldest temperature each winter varies from year to year as we know, but these coldest temperatures have been getting warmer. This has not meant that much to apple growers, but it has allowed the development of the cold-tender wine grape industry in NY. By comparison, over the long-term, summer temperatures have not changed as much.

We have checked to see if there have been changes in the dates of the last spring frost compared with apple budbreak and bloom. Over the past 40 years, the average date of the last spring frost has gotten earlier by about 10 days. Interestingly, budbreak has only gotten earlier by a few days, although bloom has gotten earlier by about a week.

Even though the average dates of last frost and bloom have been changing similarly, we are concerned that the chances of frost damage may possibly increase. This may be due to the fact that the earlier the budbreak and bloom, the greater the temperature variation. For example, over the past 40 years, in July the range is about 50°F, with highest and lowest temperatures of 99/45°F, apparently because it is warm both north and south of us. But in March, the variation is almost 90°F (82/-7), probably because it is very cold north of us but quite warm south of us. So depending on which way the weather comes from, in March we can be below 0 or over 80° (sometimes it seems within days!).

Another consequence of earlier springs is longer growing seasons. This provides more potential productivity, but also earlier harvests occurring in warmer temperatures in the late summer. Earlier, warmer harvests can be good for some varieties but bad for others. As well as temperatures, the CO2 in the air has been rapidly increasing from about 320 parts per million in the mid-70s to over 390 today. To give perspective to this change, in the geological past it took tens of thousands of years for the CO2 to change that much. As discussed earlier, this increased CO2 adds to the greenhouse heating of the atmosphere, but is also used by the trees for somewhat more photosynthesis. So, as with anything complex like our economy and earth's climate, there are positives and negatives.

Will the warming continue? This is a difficult question to answer exactly, as we cannot do experiments on the earth's atmosphere. Using knowledge of the principles of physics of the earth's climate to estimate what may happen, climate scientists develop models. This is similar to how meteorologists make models to forecast the weather a week ahead, or how pathologists make models to forecast how diseases will develop. They all make simplifying assumptions, so none can be perfect. Any particular year or short period cannot be predicted, but the general trends can be understood. However, the physics of the atmosphere clearly indicate that continued warming, driven by the increasing CO2, is the most reasonable conclusion at this time.

UPDATES FROM MICHIGAN COLLEAGUES

Mark Longstroth, an MSU Extension Educator who formerly dealt with tree fruits but who is now focused on small fruit, reports that the new MSU Fruit Page can be found at: http://news.msue.msu.edu/news/category/fruit. Also, there is a new link to the Crtical Temperatures Table that he compiled several years back:
http://news.msue.msu.edu/news/article/freeze_damage_depends_on_tree_fruit_stage_of_development. Apropos of this season's irregular spring weather and its effect on bees, Mark passes along the following report from Mike Hansen, the Michigan Dept of Agriculture State Apiarist in St. Joseph:

There are several issues affecting the movement of bees. Trucking: most of the truckers that haul bees are booked. You have to be equipped

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to haul bees, netting is required and a beekeeper needs to work with a skilled and reliable firm. It is no help at all if a trucker stops during the day and roasts your bees. Nor is it helpful if an inexperienced trucker loses a load. Bees are just now being released from Florida. The issue is that beekeepers who go to Florida need to be inspected and released if they are to be able to return to Florida next fall and winter. Florida houses 450,000 or more colonies in the winter; most are leaving that state now. Bees coming back from Florida were probably split and requeened this winter. As a result, beekeepers time their activity to have bees ready and built up on time. When the date of return changes drastically, you simply cannot push a new queen to comply. Moving bees before the new queen is well established is very hard on the colony. And those colonies were scheduled to be in peak condition for a normal year – mid to late April. When the hives were manipulated this winter, there was no way to predict this early of a spring.

Bees that are returning from California are stronger than their sisters in Florida because those colonies had been built up for almonds. Trucking is the issue for the California bees. I also learned that with the early spring, the flow of maple nectar has been tremendous. Some northern Michigan beekeepers have had to remove maple honey from their colonies to make room for brood. ❖❖

BUTTER NOT

SPRAY INCOMPATIBILITY NOTE
(Dave Rosenberger, Plant Pathology, Highland, dar22@cornell.edu)

❖❖ We have been warned by the manufacturer, following a query by a private consultant, that Syllit is not compatible with chlorpyrifos (or at least with some formulations of chlorpyrifos under some conditions). Because we currently lack details on what formulations and conditions contribute to the problem, prudence suggests that growers should avoid mixing Syllit wth all chlorpyrifos products until the manufacturer can determine which chlorpyrifos products and/or conditions trigger the incompatibility problems. I'm not certain what happens when the incompatibility occurs, but I believe the products "butter out" or at least create visible problems in the spray tank.❖❖

GENERAL INFO

PEST FOCUS

Geneva:
1st **redbanded leafroller** trap catch 3/21.

Highland:
Pear psylla egg laying continues.

PHENOLOGIES

Geneva:
Apple (McIntosh, Red Delicious, Empire): tight cluster
Pear (Bartlett): green cluster
Peach: pink
Sweet cherry: bud burst
Plum: white bud

(Lake Ontario Region, from Deb Breth):
Apple (McIntosh): Inland, tight cluster; lakeshore, 1/2-in. green
(Idared, Gingergold, Inland): tight cluster
Peaches (Inland sites): early bloom
Apricots (Inland sites): full bloom
Sweet Cherries (inland sites): white bud

Highland:
Apple: tight cluster
Pear (Bartlett): green cluster
Apricot (early): 80% petal fall
Sweet cherry (Danube, Hudson): white bud
Sweet cherry (Balaton): bud burst
Sweet cherry (Attica): swollen bud
Peach (early): 80% bloom
Peach (late): 60% bloom
Plum (Stanley): white bud

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–3/26/12):	246	131
(Geneva 1/1–3/26/2011):	44	10
(Geneva "Normal"):	54	18
(Geneva 1/1–4/2 predicted):	263	135
(Highland 1/1–3/26/12):	280	146
(Highland 1/1–3/26/11):	56	19

Coming Events:	Ranges (Normal ±StDev):	
Green fruitworm peak catch	102–216	39–101
Green fruitworm flight subsides	247–451	111–239
Spotted tentiform leafminer 1st catch	112–206	42–96
Spotted tentiform leafminer 1st oviposition	143–273	58–130
Green apple aphid present	111–265	38–134
Rosy apple aphid present	134–244	56–116
European red mite egg hatch	231–337	100–168
Obliquebanded leafroller larvae active	158–314	64–160
Oriental fruit moth 1st catch	224–328	95–165
Pear psylla 1st egg hatch	174–328	60–166
Comstock mealybug crawlers in pear buds	215–441	80–254
Redbanded leafroller 1st flight peak	231–363	105–185
McIntosh pink	274–316	125–159

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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