

Getting Back into an IPM Program in Peaches and Nectarines

Dean Polk, Statewide Fruit IPM Agent Anne Nielsen, Specialist in Entomology Brett Blaauw, Post Doctoral Research Asscociate Rutgers Cooperative Extension polk@aesop.rutgers.edu





Getting Back into an IPM Program in Peaches and Nectarines

- The Peach Pest Complex
- The Way It Used to Be
- Where We Went in IPM Programs
- How BMSB Destroyed It
- What Are the Consequences
- Behavior & Monitoring of BMSB
- How To Rebuild IPM





The Peach Arthropod Complex - The Key Pests













Oriental Fruit Moth

- 4 generations/yr
- 1st & 2nd brood larvae enter
- growing shoots, flag shoots
- 2d 4th brood larvae enter fruit
- Eggs laid on leaf petioles & fruit







Monitoring

- Pheromone traps
- Flagging counts
- Fruit counts
- Degree day and model use







Oriental Fruit Moth D°D Model

Degree Day (DD) Spray Targets from Biofix				
Brood	OP's,Carbamates, Pyrethroids(Conv.)	Intrepid (Complete Sprays)		
1	150-200	Use Conventional		
	350-375	Insecticides.		
2	1150-1200	1100-1150		
	1450-1500	1400-1450		
3	2100-2200	2050-2100		
	2450-2500	2400-2450		
4	Monitor population to determine treatment.			

Can save 40% insecticide use over calendar method.





Catfacing Insects



Tarnished Plant Bug





Dusky Stink Bug



Green Stink Bug

Brown Stink Bug and now... BMSB

All these insects closely assc. with weeds & alternate hosts, brush, and woods borders. How can we use that in our management?







Catfacing Injury



Early -PF-shuck off



Recent - 1-7 days



Various ages



Several weeks Old - PF-SO





BMSB Injury is a Little Different



Very early to very late & in between.







Green Peach Aphids



An indirect pest on peach, but both an indirect and direct pest on nectarine.

AT = 2 colonies/tree by PF-SS, but 5-6 col./tree By mid-late May. Only 1 col./tree on nectarines.





Plum Curculio



Most damage SS - 1st C, but can feed Bloom - Early June





Peachtree & Lesser Peachtree Borers



PTB - 1 generation/yr In tree crown - at soil line & slightly above to a few inches below.



LPTB - 2 generations/yr. Assc. With Cytospora canker.

Treat both as eggs are laid.





The Way It Used To Be





From calendar spraying to:

- Use of models and action thresholds for OFM.
- Spraying as needed for CFI based on number found in groundcover and damage – Imidan, Lannate, Beleaf, pyrethroids.
- Use of herbicides for grass middles to minimize CFI.
- Action thresholds (AT) for aphids and mites Actara, Admire, Assail, Belay.
- Use of soft insecticides for OFM, LR and TABM Altacor, Belt, Delegate, Intrepid, Assail, Avaunt, even Imidan.
- Dormant to DD only sprays for scale.
- Mite treatments based on AT





Resulted in:

- Minimal mite problems.
- Good resistance management.
- Few issues with scale.
- Freedom to use mating disruption and IGRs.
- Sometimes fewer trips through the orchard.
- Easy scouting.
- Most treatments revolved around OFM and TPB.







How BMSB Destroyed It Insecticide Use Went Up





	IRA	OFM	PC	GPA	TPB/CFI	BMSB	Ben. Harsh
	C						
Altacor	28	++++	-	-	-	-	-
Belt	28	++++	-	-	-	-	-
Delegate	5	++++	++	-	-	-	+
Imidan	1B	+++	++++	+	+++	-	+
Lannate	1A	+++	++	+++	+++	++	++
Avaunt	22A	+++	++++	-	++	-	-
Beleaf	90	-	-	+++	+++	+	-
Actara	4A	-	+++	++++	+++	+++	+
Admire	4A	-	+	++++	++	-	+
Assail	4A	+++	++	++++	+++	++	+
Belay	4A	-	+++	++++	+++	++++	+
Permethrin	3A	++++	++	+	+++	++++	+++
Asana	3A	++++	++	+	+++	++	+++
Danitol	3A	+++	++	-	++++	+++	+++
Warrior	3A	++++	++	+	+++	+++	+++



Material	IRAC	PHI	Use Pattern
Belay	4A	21	Use early w/ 1 pyrethroid between sprays
Actara	4A	14	Use when PC is active
[Assail (30)]	4A	7	Weak, Close interval alternate with Warrior
Venom/Scorpion	4A	3	Save for preharvest use. Use high rate if available.
Baythroid	3A	7	5.6 oz – 2 appl 2.8 oz
Danitol	3A	3	42.66 oz - 2 appl 21.3 oz
Perm-up	3A	14	Alt. a 10 day int. mat w/ a 7 day (PermUp w/Actara, Warrior)
Warrior	3A	14	10.24 oz PB - 4 appl 2.56 oz
Bifenture EC/Brigade WSB	3A	14	Use on late varieties, 2 appl
Voliam Xpress	3A, 28	14	Use at same timing as 1^{st} or 2^{nd} generation OFM
Endigo	3A, 4A	14	Can use for PC timing
Leverage 360	3A, 4A	7	Use if aphid material is needed
Lamda-Cy	3A	14	Not a strong pyrethroid. Min. use under high BMSB
Lannate	1A	4	Maintain close intervals
Voliam Flexi	4A, 28	14	OFM and/or PC timing



Consequences of Intensive Repeated Use of Harsh Chemistry:

- Increased \$\$\$
- No rotations, poor resistance management.
- May lead to pyrethroid resistance.
- Kills predators and parasitoids.
- Produces increased populations of secondary pests - scale, WAA in apples.
- Increased \$\$\$







Eliminating Predators & Parasitoids results in this:







BMSB is an Edge Driven Pest and Highly Mobile.

It has many alternate hosts.

How can we exploit that?



How does trapping and damage look under "normal" spray programs?







Determining Sampling Method and BMSB Populations in Relation to Woods Borders

Transects established in 7 apple orchards and 9 peach orchards:

Area	Apple	Peach
South Jersey	3	6
North Jersey	4	3
Total	7	9

Each sampled block done with paired transects; one with a trap at the first tree by the woods (TT or T), and the other with no trap (NT or S). Sampling points placed ~120 feet starting at border. Traps: Single ground mounted black pyramid, baited with ARS#20 + ChemTica MDT. Data: BMSB/trap, BMSB/3min count at each sampling point, % injured fruit at harvest. Following is an example from 3 apple orchards and 6 peach

orchards in southern NJ.



Monitoring w/Traps vs. Distance From Woods Transects w/Traps (TT) vs No Transect w/o Trap (NT) Sample Trees ~120' Apart, Positions 1,2,3,4; 1 starting at woods



Peach transects

Apple transects





Total BMSB per 3 Min. Ct. Apples SJ - 2013











Peach South Jersey 2013 - Total Number BMSB Adults & Nymphs/3 Min by Transect, N=6







Peach South Jersey 2013 - % BMSB/Catface Damage by Transect, N=6







South Jersey Peach 2013 - Percent Clean Fruit by Transect, n=6







Mean At-Harvest Visible BMSB Damage Late Season Peach 2014, North Jersey Transects, n=3







Mean At-Harvest Total BMSB Damage Late Season Peach 2014, North Jersey Transects, n=3







How do you define damage?





Take away the bugs in the top photos and there is no 'damage'?

Is this the only one damaged?





No, Because much of the unseen damage can be very early early, or very late and not be visible unless the fruit is cut.











Mean Total BMSB Trap & Tree 3 Min. Counts Late Season Peach South 2015, 8/20,27, n=4





Mean At-Harvest Visible BMSB Damage Late Season Peach South 2015, Transect Locations 8/20,27, n=4



More damage on block edge doesn't hold up when populations are light.





Integrating some new old technology to:

- Maximize BMSB control
- Reduce harsh insecticide use
- Increase beneficials / increase bio control
- Increase resistance management
- Reduce costs
- Be kinder and gentler to bees





IPM - Crop Perimeter Restructuring - IPM-CPR

- Border/Perimeter sprays for BMSB accompanied by monitoring.
- Mating disruption for Oriental Fruit Moth.
- Groundcover management for catfacing insects.
- Early broadcast applications for PC, GPA and other early pests.

Pest	Management
Tarnished plant bug and other catfacing insects	Treat orchard floor 1 st week of May w/ clopyralid 40.9% @ 4oz/A and/or add 2,4-D 1qt/A
Oriental fruit moth	Mating disruption (OFM TT) @ 70-100 disp/A
Brown marmorated stink bug	Weekly insecticide sprays on the outside edge and first full middle (both sides)





- Used late season peaches for maximum BMSB pressure.
- Compared IPM-CPR blocks to Grower standard either full cover or ARM sprays, no border sprays.
- Measured clean fruit and effectiveness on pest management.
- Impact on natural enemies.
- And now Impact on pollinators.







Mating - Find the Female





Mating - Trying to Find the Female, but can't







Pheromone Everywhere -Can't Find the Female, or Delayed







Used Isomate - OFM TT Throughout Demonstration Blocks, @70 dispensers/A

- Rate Minimum of 100 dispensers per acre (1.84 fl oz or 48.0 g a.i. per application).
- Do not exceed 150 g a.i. (or 312 dispensers) per acre per year.
- Application Place dispensers in lateral branches in upper third of tree canopy

ISOMATE®-OFM TT

"Twin-Tube" Design for even faster application

Superior Mating Disruption Technology for Oriental Fruit Moth Rutgers



Ground Cover Management Tarnished plant bugs & other catfacing insects Increase in the weedy groundcover & need to be sprayed.







Left with spraying border rows on clean groundcover







Spraying by Borders







- Standard: whole block or ARM sprays
- IPM-CPR: perimeter + first full row
 - + Ground cover management

+ Mating disruption for OFM

- Weekly insecticide applications beginning late-May (140-266 DD₅₇)
- Visual and trap based monitoring
- Harvest sample for injury assessment





Pyramid traps may be more efficient monitoring tools than visual sampling





Pyramid traps are not necessarily more effective in peaches







Generally more damage in standard blocks (2014)

JTGERS







Similar trend during 3 years of testing









Looks promising in apples (2014)





Fewer wooly apple aphid colonies in IPM-CPR orchards (2014)









More natural enemies found on sticky cards in IPM-CPR orchards







What about insecticide use and costs?





Lb AI Insecticide Use 2013

2013	3	Lb Al/A	
Blk	MD/CPR	Std	
PF24	0.52	0.62	
JQ	0.53	0.74	
PF24	0.28	0.37	
JQ	0.23	0.37	
PF24	1	3.07	
	0.512	1.034	





Costs Over 3 Years ('13,'14,'15) w/3 Growers Using Their Spray Records to Model

Farm	Border Sprays Only	IPM-CPR Border Sprays, MD, Herbicide GC	ARM Sprays Only (Grower Standard)	Whole Block ER Sprays
1	\$25	\$75	\$55	\$110
2	\$75	\$130	\$145	\$285
3	\$40	\$95	\$65	\$140





- IPM-CPR reduced insecticide use by 50-75% vs Std
- Less insecticide better for beneficials and pollinators.
- IPM-CPR blocks had increased levels of biological control based on predator-damaged sentinel egg masses.







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Thank You