RUTGERS

THE STATE UNIVERSITY OF NEW JERSEY

Rise in Secondary Pests in Peaches

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Why this talk?

- BMSB has destroyed IPM
- Growers are spraying more and seeing more insects to spray for.

What's a Primary Pest? and Examples

What is a Secondary Pest? and Examples

Why have we been seeing more secondary pests?
(This could be a BMSB talk)
What about sprays?

What can we do about it?

Primary Pests

Critters we know that we have to manage every year

Internal worms – Oriental Fruit Moth

3-4 gen/yr
DD models
MD
Soft materials

Plum Curculio

1 gen/yr
Avaunt, Actara

Catfacing insects like Tarnished Plant Bug

Ground Cover
Monitoring flowering weeds
Sanitation

Peachtree Borer, Lesser Peachtree Borer

Fall treatments
MD

Sometimes Green Peach Aphids

Single spray if needed
Monitoring
Not each block each yr

Secondary Pests

- Usually an insect or mite that may be present below economically levels that you hardly notice.
- Populations normally suppressed by a balance of predators and/or parasitoids already in the orchard. (and you don't notice them either.)
- Spraying for secondary pests should not be normal.

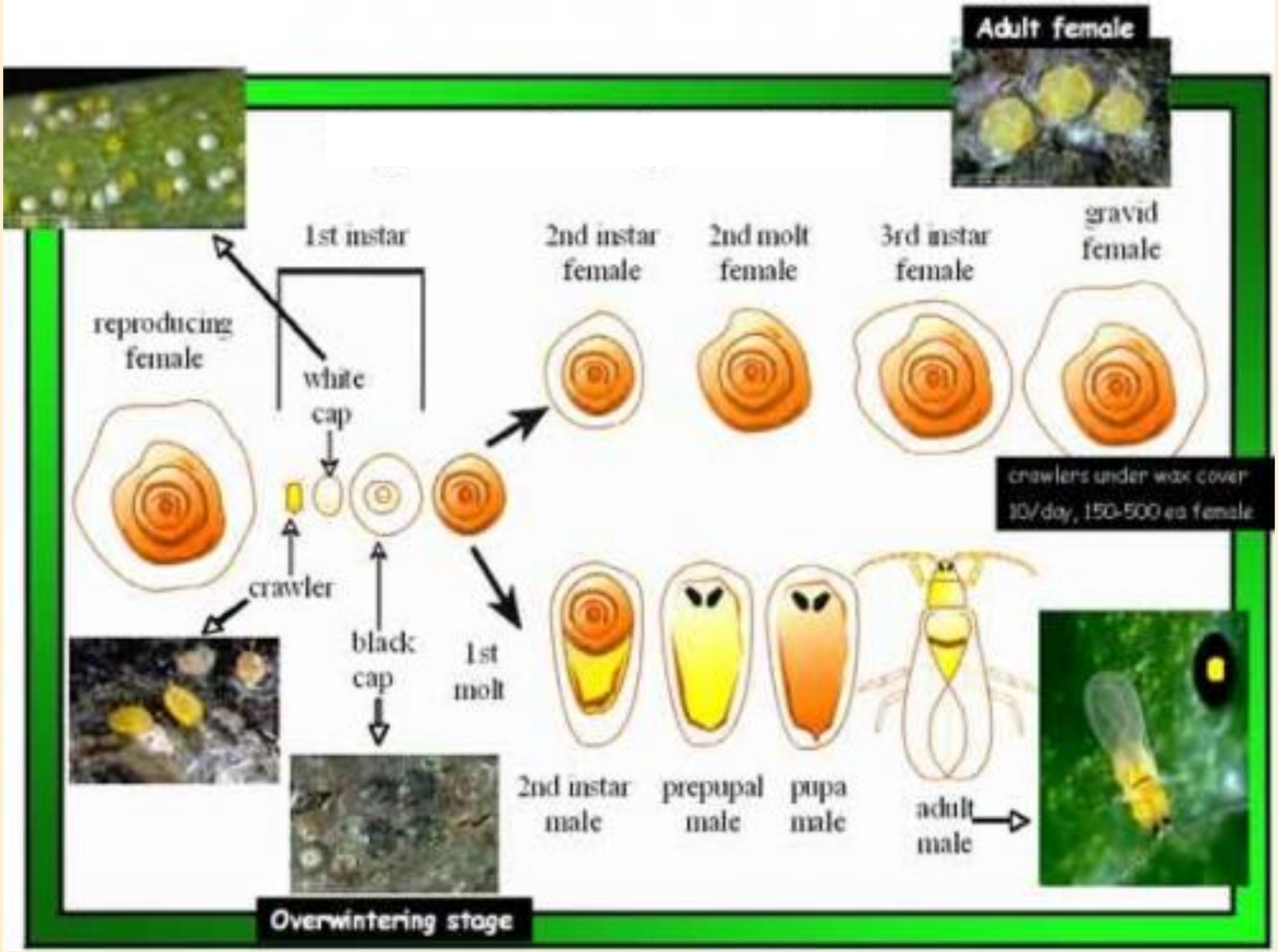
Key Secondary Pests

- San Jose Scale
- White Peach Scale
- Mealy bugs (Comstock)

- Mites
- European Red Mite
- Two Spotted Spider Mite

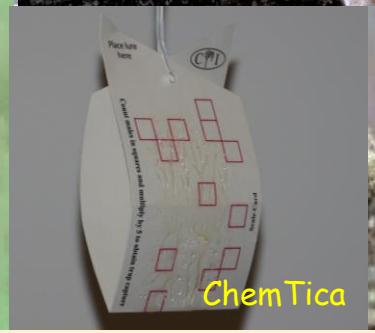
San Jose Scale

- 2-3 generations per year.
- Overwinter as immature and mature in early spring.
- Males emerge and mate late April early May.
- Live birth.
- 1st generation crawlers in early June~4wks.
- Mature adults by late July.
- 2nd generation adults by mid July.
- 3rd generation adults late October.
- Life cycle takes about 5 weeks.
- Each female can produce 300-400 offspring.
- Crawlers move around before settling and dev. waxy layer
- Adult males can fly, females do not.
- Monitor males or crawlers.


Adult female
1st instar
2nd instar female
2nd molt female
3rd instar female
gravid female
reproducing female
white cap
crawlers under wax cover
10/day, 150-500 ea female
crawler
black cap
1st molt
2nd instar male
prepupal male
pupa male
adult male
Overwintering stage


OKState


WVU


ChemTica

White Peach Scale

- 2-3 generations per year.
- Overwinter as mature females.
- 100-150 eggs laid under the scale starting early spring.
- Eggs laid 10-15 days, hatch in 3-5 days.
- Female dies, first eggs orange & hatch to females, later eggs pink to white & male.
- Females 2 molts, males 5 molts.
- Crawlers move for about 12 hr, males in clusters, females move more.
- Over 100 host plants.
- Adult females remain under their scale.
- Adult males winged & emerge and seek out females
- Life cycle slightly longer than SJS, crawler period shorter.

White Peach Scale

Mealy Bugs (Comstock Mealy Bug)

- Mixed stages overwinter
- Male and females emerge in early to mid June
- 2 larval instars (crawlers), 3rd instar a pro-pupa in a cocoon (long and white)
- 4th stage the pupa, reddish brown
- Overwintered eggs hatch April through early May, done by petal fall (pear).
- Crawlers move to terminal growth but to protected areas as they mature.
- Contamination and aesthetic problem

Comstock Mealy Bug

Parasitoids and Predators

Insects that lay an egg in or on a life stage of another insect with the resulting offspring growing as a parasite in the host – Parasitoid. Usually somewhat or very host specific. – 1 Spp of parasitoid needs a specific genera or family of insect host.

Predators usually more generalist, feeding on anything that is the right size, or for example 'soft bodied', or on the correct plant host.

Examples of scale parasitoids -

Several parasitoids - Small chalcid wasps:
Encarsia perniciosi,
Aphytis aonidiae
Aphytis vandenboschi

Examples of Mealy Bug Parasitoids

Fig. 12.7 Many parasitoid species attack mealybugs. The examples here are (**a**) a female *Anagyrus pseudococci* (ca. 2 mm) next to a vine mealybug 'mummy' showing the round parasitoid exit hole, (**b**) the smaller (ca. 1.3 mm) male *A. pseudococci*, which has a different color pattern and 'hairy' antennae, feeding on a drop of honeydew, (**c**) a female *Leptomastidea abnormis* 'host feeding' on a vine mealybug crawler, (**d**) *Leptomastix epona*, which was imported for obscure mealybug biological control in California but did not establish because of Argentine ant interference, (**e**) the small (ca. 1 mm) and fast-moving *Acerophagus flavidulus* closing in on a *Pseudococcus viburni*, and (**f**) *Coccidoxenoides perminutus* (ca. 1 mm) next to *Planococcus ficus* first instar

Daane et al, 2012 in Bostanian eds. Arth Mang in Vineyards

Examples of Mealy Bug Predators

Fig. 12.8 Common mealybug predators include lady beetles. Examples here are (**a**) an adult *Scymnus* sp. feeding on a grape mealybug, and (**b**) a large *Cryptolaemus montrouzieri* larva near the smaller obscure mealybug. The larvae of many of these lady beetle species have waxy filaments to mimic the mealybugs and reduce interference from mealybug-tending ants, (**c**) a cecidomyiid larva about to feed on *Pseudococcus maritimus*, and (**d**) a third instar green lacewing (*Chrysoperla carnea*) larva attacking a *Ps. maritimus* and prompting the mealybug to secrete a ball of red ostiolar fluid in defense

Daane et al, 2012 in Bostanian eds. Arth Mang in Vineyards

Mites

European Red Mite
Two Spotted Spider Mites
Peach Silver Mite

Not usually peach problems
Can tolerate high numbers (except for picking)
Same predators as in apple systems

Why have we been seeing more secondary pests?

% Peach Acreage Where Pyrethroids Used

2005	2014
15.25%	95%

Plus: More applications
Insecticides every 7-9 days,
No skipping times of no OFM activity
Discontinued use of diamides or Delegate alone

Results in killing everything, permitting secondary pests to increase.

Scale materials in addition to Esteem

Treatment/ formulation	Timing	Appl. date	Rate amt product/acre	9-Jun	17-Jun	24-Jun	1-Jul	8-Jul	15-Jul
Damoil	DD	1-Apr	4.0 gal	2.8 ns	0.8 b	0.0 b	0.3 ns	0 ns	0.0 ns
Centaur WDG	DD	1-Apr	46.0 oz	0.3	0.0 b	0.3 ab	0	0	0
Centaur WDG	PF	5-May	46.0 oz	0.8	5.8 ab	1.0 ab	0.5	0	0
Sivanto	DD PF	1-Apr 5-May	12.0 oz	1.5	1.5 b	0.0 b	0.3	0	0
Sivanto	DD PF	1-Apr 5-May	14.0 oz	2.5	0.0 b	0.0 b	0	0	0
Movento 240SC LI-700	DD PF	1-Apr 5-May	6.0 oz 0.25% v/v	0	0.0 b	0.3 ab	0	0	0
Sivanto Movento 240SC LI-700	DD PF	1-Apr 5-May	10.5 oz 6.0 oz 0.25% v/v	0	0.8 b	1.3 ab	1	0	0
Centaur WDG	Crawler	9-Jun	46.0 oz	1.5	1.5 b	2.0 ab	0.8	0	0
UTC				7.8	27.8 a	8.5 a	9	2.5	0

Nielsen, 2014 1st half of season

Treatment/ formulation	Timing	Appl. date	Rate amt prod/acre	Mean SJS crawlers/5 cm tape				
				22-Jul	29-Jul	6-Aug	12-Aug	18-Aug
Damoil	DD	1-Apr	4.0 gal	0.5 ns	0.0 ns	0.0 ns	5.8 ab	1.8 ns
Centaur WDG	DD	1-Apr	46.0 oz	0	0	0	0.0 b	0.3
Centaur WDG	PF	5-May	46.0 oz	0	0	0	0.5 ab	0
Sivanto	DD PF	1-Apr 5-May	12.0 oz	0	0	8.8	24.0 a	0
Sivanto	DD PF	1-Apr 5-May	14.0 oz	0	0	2	0.3 ab	0
Movento 240SC + LI-700	DD PF	1-Apr 5-May	6.0 oz 0.25% v/v	0	0	0	0.5 ab	0
Sivanto Movento 240SC + LI-700	DD PF	1-Apr 5-May	10.5 oz 6.0 oz 0.25% v/v	0	0	0.3	0.3 ab	0.3
Centaur WDG	Crawler	9-Jun	46.0 oz	0	0	0	1.5 ab	0.0 0
UTC				2	0	6.3	3.0 a	1.5

Coverage is still the name of the game!

Nielsen, 2014 2nd half of season

General Pest Management& Summary

- Use traps for monitoring BMSB.
- When you don't have them don't use harsh BMSB insecticides.
- Use border sprays every 7 instead of whole block sprays when BMSB present.
- Stretch out and time other materials as needed for key (primary) pests.
- Consider mating disruption and ground cover management for OFM and CFI
- Use dormant or delayed dormant oil.
- Tolerate mites if possible.

Thank You