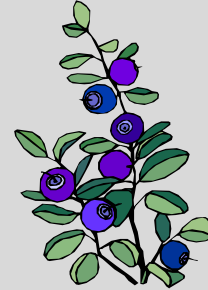


**RUTGERS**

New Jersey Agricultural  
Experiment Station



**The BLUEBERRY BULLETIN**

*A Weekly Update to Growers*

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**May 26, 2014**

**Vol. XXX No. 7**

***At a Glance.....***

PEST/DISEASE/CULTURE	MAY 19 - MAY 26 END OF BLOOM	MAY 26 - JUNE 2 FRUIT SET
CRANBERRY FRUITWORM (CBFW)  Intrepid, Esteem	If CBFW populations are high consider early treatment with Intrepid or Esteem (1 <sup>st</sup> of two sprays).	If bees are out consider use of Assail, Avaunt, Altacor, Delegate, or Imidan
PLUM CURCULIO  Avaunt, Imidan, pyrethroids	Monitor for fresh egg scars.	Monitor for fresh egg scars.  If bees are out, treat in first post pollination spray.
APHIDS Admire, Assail, Actara	Monitor for aphid colonies.	Treat if over 10% of terminals are infested.
NUTRITION	Continue N/P/K applications.	Apply last N/P/K application.

***Culture***

***Dr. Gary C. Pavlis, Ph. D***

***Atlantic County Agricultural Agent***

**No Leaves:** Growers visits this week have revealed many fields with plants that have canes with fruit but no leaves. This is not Scorch. The lack of leaves usually points to a root problem. It could be grubs, it could be root rot. In non-irrigated fields, the lack of leaves is due to root damage due to lack of water during the drought last summer. This fruit probably will not ripen and the plant may not survive. Late summer/fall water applications are critical. In irrigated fields, I have seen many plants damaged by grubs.

Admire is the control of choice in this case. Plants that have been damaged by grubs will pull out of the ground readily. Lastly, toxic levels of Boron can also result in no leaves. Do not apply Boron unless leaf analysis indicates a deficiency.

If you would like me to come out and diagnose the cause of no leaves, give me a call.

## *Insects*

*Dr. Cesar Rodriguez-Saona*

*Extension Specialist in Blueberry Entomology, Rutgers University*

*Mr. Dean Polk, IPM Agent – Fruit*

**Primary Insects to Control:** The primary insects that should be controlled in the first post pollination spray are: plum curculio, with materials that also are effective for Leps (like cranberry fruitworm). The following (2<sup>nd</sup>) treatment will deal with cranberry fruitworm as the primary target (if present), or aphids. This second treatment may also need to deal with the first spotted wing drosophila.

**Plum Curculio (PC):** Adults are still active, but at very low numbers. This should further decrease as the first post pollination insecticides are applied that target PC.

**Aphids:** Some aphids are present in a few samples, but at very low levels. Aphids were seen 1 site where small colonies were present on over 10% of terminals.

**Spotted Wing Drosophila (SWD):** Traps are going up this week to detect if there are any significant numbers of adults present and when they are flying. More on this in the next few newsletters.

**Leafrollers and Other Leps:** Out of the 45 samples taken last week, 6 samples were positive for leafroller larvae and other Leps in flower clusters and growing shoots. All samples were well below treatment levels.

**Cranberry Fruitworm (CBFW):** The first adults are being seen in traps at an average of 1.4 adults per trap. These are low numbers and should increase over the next week to 10 days.

**Mummy Berry:** Some mummy berry primary strikes were seen in isolated locations. This should not be a problem with the low numbers of strikes we have seen.



Primary mummy berry strike during 5/19-23

### **Blueberry Trap Counts – Atlantic County**

Week Ending	CBFW
5/24	1.2

### **Blueberry Trap Counts – Burlington County**

Week Ending	CBFW
5/24	2

## ***Pollinators and Pesticide Sprays during Bloom in Fruit Plantings***

By (D. Biddinger, E. Rajotte, N. Joshi – Dept. of Entomology; K. Demchak, Dept. of Plant Science; and T. Baugher – Penn State Extension)

Recently, there has been a lot of press related to pollinator health, and some troubling information indicates that certain fungicides, when used during bloom, can negatively affect the health of honey bees. This is a complicated problem with the solutions relying on understanding the detailed relationships among chemicals, pollinators and pest management needs. It is not prudent to treat this topic with a broad brush with statements such as "All neonicotinoid insecticides are bad for all pollinator species," or "No fungicides should be sprayed during bloom." Research is on-going, and we do not know all of the details yet.

We do know that there are another 4,000 species of bees in the US in addition to the honey bee and they also play an important role in pollinating many crops. In Pennsylvania fruit plantings, many growers large and small, have forgone the use of honey bees completely and rely solely on about 50 species of solitary bees, bumble bees and feral honey bees. It has been shown that the susceptibility of honey bees, the most tested type of bee, is not a very accurate predictor of the responses of wild bees like the mason bees (*Osmia*), leafcutter bees or bumble bees to pesticides and that susceptibility varies by bee species and pesticide. For example, one of our recent trials showed that our Japanese orchard bee was 26 times less susceptible to contact by Provado than the honey bee, but 12 times more susceptible to Assail. Both products are neonicotinoid insecticides and in the same pesticide class.

The purpose of fungicide sprays applied during bloom has been to protect plants from diseases that can infect future fruit tissue

through the blossom; thus, fungicide sprays during bloom can decrease or negate the need for fungicides closer to or during harvest. The period from just prior to bloom to just after petal fall are critical times during the disease cycles of pathogens such as apple scab, botrytis, powdery mildew, cherry leafspot, brown rot and cedar apple rust. These are major disease problems, which if left untreated during this time, will devastate the quality of a tree fruit or strawberry (for botrytis and powdery mildew) crop. Some can cause the decline and eventual death of trees. In the case of apple scab, controlling the early season form called primary scab, which attacks foliage mostly until just after bloom, prevents the buildup of secondary scab which attacks the fruit during the summer. The need to control secondary scab would require 3 to 4 times more fungicide sprays (and cost) than if the disease was stopped as primary scab. Now it turns out that practices long utilized to minimize fungicide residues on the fruit are being questioned. So, what is a grower (or field researcher, for that matter) to do?

It might help to understand why this shift in thinking came about, especially since fungicides had previously been thought to be quite safe for bees. For decades, we've known not to apply most insecticides during bloom – except for a very few with unique modes of action – and fungicides alone still appear to be safe, but now it's feared that the combination of some fungicides in special cases with other materials may synergize their toxicity. The first of the situations are with the neonicotinoid insecticides such as Assail, Calypso, Actara and Belay that can be used pre-bloom in some crops. Because they are to varying degrees systemic and move through the plant tissues,

we have found them in apple pollen and nectar at low levels where they can be ingested along with fungicides even though these insecticides were not sprayed during bloom. This systemic movement can also be found in some fungicides to varying degrees which helps their efficacy against pathogens. We have had many other systemic insecticides in the past (e.g., Orthene, Mitac, Swat, Lannate, Vydate, etc.) that were not neonics, but they were usually used much later in the season and not a problem to pollinators. Spraying at night may help with many pesticides as they are less toxic when dried, but not with systemic pesticides that are ingested in the nectar and pollen. So much for the "do not spray when bees are actively foraging" clause of many pesticide labels.

Our work at the Penn State Fruit Research and Extension Center has measured the movement of most registered neonicotinoid insecticides into the pollen and nectar of apple from pink sprays (i.e., closed blossom) and has shown that Assail and Calypso, which are also much less toxic to bees than the other compounds of the same class, are also much less systemic with little movement into the nectar and pollen. We did find, however, higher levels of the fungicide Nova/Rally in the nectar and pollen from the same pink application. When we say "higher," it is relative. A typical application of a neonicotinoid insecticide would be applied at 100-150 parts per million in the spray tank. Pollen and nectar samples taken 5 days later at about 25% bloom, however, were at the 1-5 parts per billion level. This is up to 100,000 times less than what was in the spray tank. While in most cases, we know that these levels are below what is toxic to the honey bee when exposed to this pesticide alone, it is not well understood how combinations of pesticides affect the long term health of bees, especially the 4,000 other species of bees in the US besides the honey bee. So why use neonicotinoids pre-bloom? With apples, the

intent is to control the Rosy Apple Aphid which has resistance to organophosphate and pyrethroid sprays and can only be controlled by these pesticides at this critical time. Sprays after bloom are "revenge" sprays that may kill the aphids, but don't prevent the stunting of the fruit that happens from feeding during bloom.

By the way, Lorsban applied just before bloom is also very toxic to bees through its high vapor pressure "fumigating" the orchard and from residues on flowers in the ground cover. Some private business recommendations from NY seem to be pushing for the pink application of Lorsban for control of Rosy Apple Aphid. Most growers in Pennsylvania not only face complete resistance to Lorsban for this pest (and to pyrethroids, which is why Assail and Calypso are critical here), but this is an illegal application. The label allows pre-bloom sprays in strawberries, but only allows for Lorsban applications until delayed dormant in tree fruit. For those relying on wild bees for their pollination, we had a large kill of the Japanese Orchard Bee (*Osmia*) last year from this type of treatment.

The second special situation where spraying fungicides during bloom can cause problems is where the honey bee keepers are using the insecticide/miticide amitraz for control of varroa mites in the hive. Most tree fruit growers will remember amitraz as Mitac which was used heavily for pear psylla control in the past. This product was routinely used for synergizing organophosphate and pyrethroid insecticides in crops like cotton where key pests had developed resistance, because it shut down the enzymes insects used to detoxify pesticides. This raises concerns about amitraz being used to treat mites in honey bee hives. While it may be effective in controlling varroa mites now that they have quickly developed resistance to the organophosphate coumophos and the pyrethroid fluvalinate, adding this synergist to

a hive basically shuts off a bee's immune system to pretty much any pesticide with which it later comes into contact. In addition, work presented by Dr. Jeff Pettis, from USDA-ARS in Beltsville, MD indicates that amitraz interferes with mating in honey bees. Finding a replacement for amitraz in controlling varroa mites should be another research priority.

A key point is that most fungicides are still considered pretty safe to bees even in combination with other pesticides. We refuted a previous lab study with technical product dissolved in acetone that implied synergism of over 1,000-fold when a sterol inhibitor fungicide such as Rally or Indar was mixed with a neonicotinoid insecticide. When we tested formulated product of Assail and Provado with field rates of the sterol inhibitor fungicide Indar in water, we found synergism to be barely significant at a 5-fold level with Assail and non-significant for Provado. We now consider almost all fungicides with the exceptions of captan (Captan, Captec, Captevate), chlorothalonil (Bravo) and mancozeb (Penncozeb, Dithane etc.), to be safe even in combinations, until we see further data showing otherwise.

What about Captan, Bravo and Penncozeb? All are old products that are still the mainstays of disease control and resistance management in many crops because they have multiple modes of action. They are also not systemic, so the chances of the bees coming in contact with them from pre-bloom sprays are nil and spraying at night to give the residues time to dry also helps reduce short-term toxic effects. All of these products are suspected to be synergists for other pesticides, and both captan and mancozeb are somewhat insecticidal by themselves at the highest rates (this is typically 6 lb/acre, depending on the formulation). This toxicity is thought to be from chronic long term ingestion exposure of

bees of all types feeding on contaminated pollen during their development. The best solution until we know more about the effects of these compounds on bees is to restrict their use to the half rate that is used in combination with other fungicides rather than the full rates or the extensive use of the combination of both Captan and Penncozeb, commonly referred to by growers as "Captoze".

Also, since captan, chlorothalonil and mancozeb seem to be the fungicides most implicated, at least for the time being, their use should be avoided when bees are actively flying. Instead, they should only be used when contact with pollinators is avoidable. Other fungicides that might be used during bloom appear to be relatively safe, though any of this information could change as we learn more. Thus, if possible, fungicides other than captan, chlorothalonil, and mancozeb should be utilized in bloom sprays, remembering to alternate among modes of action. One additional restriction relating to fungicides is the use of sulfur and lime sulfur around or during bloom as the odor is repellent to bees for up to 48 hours, depending on the rate and formulation. Most growers would not use lime sulfur during bloom anyway as it is caustic to the flowers.

Fortunately, we also now have a new table that was put together for tree fruit growers that lists toxicities of primarily insecticides and miticides to bees, and also provides useful guidelines to follow to protect all pollinators in general. All growers should follow these guidelines, and avoid the materials that are toxic to bees during bloom *or* when blooming weeds that bees visit are present in the field. The table can be found here: <http://extension.psu.edu/plants/tree-fruit/commercial-tree-fruit-production/honeybees>.

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## ***BLUEBERRY BULLETIN***

If you have any comments about this newsletter, please make them in the space below and mail to:

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I would like to see an article on the following subjects: \_\_\_\_\_

I would like to comment on the following articles: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

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