

# The Blueberry Bulletin

A Weekly Update to Growers  
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## AT A GLANCE...

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Problem - Solution

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**Anthracnose -**

- Bravo 720, 3.0 to 4.0 pt/A
- Bravo Ultrex, 2.7 to 3.8 lb/A
- Captan 50WP, 5.0 lb/A
- Captan 80WP, 3.1 lb/A
- Captec 4L, 2.5 pt/A
- Ziram 76DF, 3-4 lb/A (N.J.)

**Aphids -**

- Diazinon 50W, 2 lb/A
- Asana XL, 6.0-8.0 oz/A
- Lannate LV, 1.5 pt/A

**Plum Curculio -**

- Guthion 2L, 2-3 pt/A
- Guthion 50 WP, 1.0-1.5 lb/A

## BLUEBERRIES

### Insect Management::

*By Dr. Sridhar Polavarapu  
Extension Specialist in  
Blueberry Entomology*

**Cranberry fruitworm (CBFW):** Pheromone traps have captured the first male moths in both Atlantic and Burlington Counties in the past few days. This represents the beginning of adult emergence.

CBFW overwinters as a fully grown larva about 3/8 inch long within a cocoon made of silk and soil particles. Pupation occurs during the early spring and moths begin to emerge during the second-third weeks of May onwards. Male moths emerge 3-4 days earlier than female moths. Adults are brownish gray moths with a pair of white markings on each forewing. The eggs are pale-green, flat, and laid singly, most often along the inside rim of the calyx cup. Eggs hatch in 5-7 days and the newly emerged larva is pale yellowish-green.

Upon hatching, larvae bore into fruit usually near the junction of stem and berry. The larva remains within the fruit until its contents are consumed whereupon it moves to enter another fruit. A single larva may feed on as many as six to eight berries before pupation. Infested berries are filled with larval excrement which can be seen near the entrance hole on the berry. CBFW infestations can be easily recognized by the presence of excrement filled webbings of infested and uninfested fruit. Infested fruit turn prematurely blue, shrivel, and often prematurely drop. Larvae

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drop to the ground under blueberry plants beginning the last week in June, and construct cocoons with silk and sand. There is only one generation each season.

CBFW populations in both Atlantic and Burlington Counties have been at moderate to low levels in the past 2-3 years. I think these low population levels can be controlled with a single well timed application of insecticides such as Diazinon, Lannate, or Guthion. Insecticides to control CBFW are recommended 5-7 days after the peak pheromone trap catch. We are at least 5-10 days away from the peak pheromone trap catches. Therefore, insecticide applications solely targeting CBFW are not necessary for at least 10-14 days.

**Aphids:** We are seeing small to medium sized colonies of aphids in almost all scouted fields. These populations belong to two different aphid species, *Fimbraphis fimbriata* and *Illinoia pepperi*. Considering that both these aphid species can transmit important viruses such as blueberry scorch virus and blueberry shoestring virus, our tolerance for aphids is rather low. Good coverage of the bushes, especially the underside of leaves, is essential to obtain satisfactory control of aphids. Use ground equipment for at least the first petal-fall insecticide application. Insecticide options for controlling aphids include Diazinon, Asana XL, and Lannate. In the previous years Lannate has not provided good control of aphids in some locations. Repeated use of Lannate for controlling aphids may lead to the development of resistance to Lannate in aphid populations. Remember that Asana XL can be applied only by ground equipment and has only a section 24 (C) label. You must have a copy of the Supplemental Label in hand when you are applying the insecticide. If you need a copy of the label please call your County Agent or my office at (609) 726-1590.

**Plum curculio on early varieties:** Last year we have seen a significant infestation of Plum curculio in some areas around Hamonton. This season we have already seen egg scars at low levels in some of these areas. Plum curculio is especially a problem in early varieties because the infested fruit is still on the bushes at the time of harvest of early season varieties. Consequently, the grubs from these infested fruit can show up in fresh packs as well as in processed fruit. On mid-season and late varieties, most of the grubs will either exit the infested fruit and enter the soil for pupation or infested fruit may fall to the ground before the beginning of harvest. Fields

surrounded by woodlands and orchards are more likely to have curculio infestations. If you have experienced Plum curculio infestations in the past, please be on the lookout for egg scars and use Guthion in petal-fall sprays. Repeat applications may be essential at 7-10 day intervals to completely control Plum curculio egg laying and feeding.

**Leafrollers and other caterpillars:** Small numbers of caterpillars are present in many areas. These are mainly larvae of Green fruitworm, Red-banded leafroller, and Obliquebanded leafroller. Petal fall sprays for aphid control will also control the caterpillar pests. 🐛

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### **WORKSHOP ON BLUEBERRY MAGGOT MONITORING AND CONTROL REQUIREMENTS FOR FRESH FRUIT EXPORT TO CANADA**

As you may already know, the Canadian Food Inspection Agency (CFIA) is in the process of setting up a Blueberry Certification Program designed to prevent the spread of Blueberry maggot from infested areas of North America to non-infested areas in Canada. To qualify for export of fresh fruit, growers should meet certain "requirements" specified by the CFIA. To facilitate grower participation in this program, **Rutgers Blueberry and Cranberry Research Center is hosting a workshop on June 2, 1998 between 1:00 PM and 4:00 PM.** Speakers for this Workshop include personnel from the State Department of Agriculture and Rutgers Cooperative Extension. The topics to be discussed at the workshop include Blueberry Certification Program requirements, Blueberry maggot monitoring with yellow sticky traps and control, and Blueberry maggot detection in fresh fruit. This workshop is specifically designed for growers who export fresh blueberries to Canada and Rutgers Cooperative Extension personnel involved in blueberries. We have only a limited number of slots available to attend this workshop. **Please call Dr. Gary Pavlis's office if you wish to attend.** A detailed program will be included in the next week's Blueberry Bulletin. 🐛

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### **IPM Summary:**

*By Mr. Dean Polk*

*IPM Agent - Fruit*

**Leafrollers and Leps. (Redbanded leafrollers - RBLR, Obliquebanded Leafroller - OBLR, Green Fruitworm - GFW):** Although numbers are low, larval numbers are increasing. Two fields were seen

this week with larval populations that were above treatment levels. Most larvae are green fruitworms and spanworms.

**Aphids:** Again this week about 90% of scouted samples have aphid populations. Additional fields were seen where over 10% of terminals were infested with light colonies. One area had up to 30% of terminals infested with small colonies. Growers are often interested in tracking the progress of treatments used for certain pests. In one such instance, aphids were present at 8% of terminals infested last week. After treatment with Diazinon 50W, no colonies were found on Monday.

**Plum Curculio (PC):** While the first PC eggs scars were seen about 2+ weeks ago, no additional activity was seen the following week. However, additional sites were seen this week with PC egg scars. Levels are low and were recorded at .4, 1, and 2% of clusters being marked with egg scars, particularly in fields which border the woods. This additional activity, combined with the warmer weather (see next section on apples below), indicates that curculio could be a potential problem on early varieties, especially in fields that border the woods. In this event, treatment is suggested. If growers are treating for aphids, then these applications will also control plum curculio.

(This section on **Plum Curculio (PC)** is from the Fruit IPM newsletter under **APPLES** from Dean Polk.) This insect is usually not a problem and is controlled in the petal fall spray. This year we are finding some activity in all parts of the State. One block (South Jersey) showed 50% of the fruit with egg scars in a part of the block bordering the woods. The insect has 2 generations per year. Overwintering adults come out from hedge rows and wooded areas on warm days to lay eggs on developing fruit. Usually only the first generation causes damage, but during some years, late egg scars and larvae can be found in fruit.

**Cranberry Fruitworm (CBFW):** Low numbers of adult moths continue to be captured in pheromone traps. While this is just a scattering, three sites recorded CBFW captures this past week. During a 'normal' year the flight usually peaks during the first week of June. We are somewhat early this year.

**Blueberry Scorch:** Although not as common as in some previous years, we have 6 sites showing scorch symptoms as of this past week.

**Trap Captures**

Blueberry - Atlantic Co.

Week-	RBLR	OBLR	CBFW	SNLH	BBM	BBM
4/3	105.8					
4/10	144.7					
4/17	66.3					
4/24	11.9					
5/1	6.4	0.08				
5/8	2.2	0	0.2			
5/15	0.04	0.05	0.57			

Blueberry - Burlington Co.

Week-	RBLR	OBLR	CBFW	SNLH	BBM	BBM
4/3	18.3					
4/10	21.6					
4/17	13.6					
4/24	6.7					
5/1	2.5	0				
5/8	1.1	0.05	0			
5/15	1.06	0.06	0.00			

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**Disease and Culture:**

*By Dr. Gary C. Pavlis*

*Atlantic County Agricultural Agent*

**Iron Chlorosis:** When the symptoms of iron chlorosis occur, the blueberry plants are sending the grower a message. Yes, the plants are deficient in iron due to an elevated pH. However, iron is just the first deficiency that shows up. When the pH is high, the blueberry plant has a harder time taking up all nutrients and water. So iron chlorosis is an early warning sign which can be fixed by a couple of foliar sprays of iron chelate and lowering the pH with sulfur. Please remember that if you have iron chlorosis, the plant growth is being stunted and this will reduce yield the following year. Powdered sulfur is the fastest acting, about 1-2 months to bring the pH all the way down to the 4.5 - 4.8 range. Pelleted sulfur is much slower, sometimes 6 months. This form is easier to apply however too slow if the plants are deficient. This is a good formulation for a late fall application when a new planting is going in the next spring. Lastly, never use aluminum sulfate. Blueberries don't like aluminum.

So, if you see new leaves with green veins and the rest is yellow, get a pH test of your soil. Here is a quick chart to determine the amount of sulfur to use to lower the pH.

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**The following amounts of sulfur are recommended lbs/per acre to reduce the soil pH one-half unit (ex. 5.0-4.5):**

<u>Loamy Sand</u>	<u>Sandy Loam</u>	<u>Loam</u>	<u>Silt Loam</u>
196	305	435	609

Sincerely,

DR. GARY C. PAVLIS  
*Atlantic County Agricultural Agent*  
*Editor - Blueberry Bulletin*

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## **DIAGNOSING STUNT VS ROUNDUP INJURY**

*By Bill Cline, Plant Pathology Dept., NCSU*

Blueberry stunt is a devastating disease that occurs on blueberries in NC and other states. The disease is caused by an organism called a phytoplasma, which is spread via the feeding activity of the sharpnosed leafhopper. Stunt is often confused with injury caused by improper application of the systemic herbicide Roundup (glyphosate). Part of this confusion is due to the fact that Roundup injury appears the year after the herbicide is applied.

Being able to tell the difference between stunt and Roundup injury is important because a proper diagnosis determines what you do next to correct the problem. With Roundup injury, there is little to be done except wait for the bush to recover. You might want to point out the affected bushes to whoever made the application, just to drive home the point that Roundup cannot be applied to any part of the plant that will absorb it (leaves, stems, 1-2 yr old canes). Stunt, however, is an infectious disease. Once infected, a bush will not recover and should be removed from the field as soon as possible.

### How do you tell the difference?

Both disorders cause smaller-than-normal leaves and the plants appear more yellow than nearby healthy bushes. In both cases, individual branches have a bushy appearance due to shorter stems with small leaves, and have little or no fruit with berries that do not size or ripen well. However, Roundup injury will only occur where the herbicide was applied the previous year, and affected leaves are much narrower than the small, cupped leaves on stunt-infected bushes. Stunt also causes yellowing between the veins in the leaves.

## Stunt Control Measures

1. Infected bushes are easily seen at this time of the year, but will become harder to spot after midsummer. Scout fields and mark bushes now. Infected bushes provide a source of disease and should be removed as soon as possible. Removal of wild bushes near cultivated fields will also be of benefit in reducing disease sources and sites for leafhopper survival.
2. The leafhoppers that carry stunt must be controlled. Insecticide sprays listed in the *1997 Blueberry Spray Schedule* are timed to coincide with peaks in leafhopper populations. Malathion and Asana are two of the most commonly used materials.
3. Stunt can also be transmitted via cutting wood. Be sure to use cuttings only from uninfected plants. If you plan to propagate using hardwood cuttings this winter, now is the time to find stunt-free bushes to propagate from.

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## **WORK INJURIES AMONG FARMERS IN NEW JERSEY**

Based on the results of the Traumatic Injury Surveillance of Farmers (TISF) survey published by the National Institute of Occupational Safety and Health (NIOSH), an estimated total of 592 lost-time injuries occurred on New Jersey farms in 1993. Eight-six percent of these injuries required professional medical attention. The major highlights of the injury data include:

1. The leading causes of lost-time work injuries on New Jersey farms were working surface (24.5%), livestock (18.9%), machinery (17.9%), and plant/tree (13.9%). Farm tractors accounted for 4.2 percent of these non-fatal injuries.
2. The highest injury rates were associated with crop handling (28.8%), followed by field work (23.3%) and livestock handling (20.7%).
3. More injuries occurred during the growing season months, April (19.6%), May (19.6%), June (12.1%), and July (10.3%), than the other months.
4. The injuries typically occurred to the farmers' and farm workers' head/neck (19.3%), back (16.5%), leg/knee/hip (10.9%), and arm or shoulder (9.7%). Sprains and strains accounted for the largest number of lost-time injuries (33.4%), followed by fractures (30.5%), and bruises (18.1%).

5. Farm family members accounted for about 75 percent of the injuries on New Jersey farms, followed by the hired farm labor (25%). Injured farmers and farm workers were usually male, accounting for 81.7 percent of the total injuries. The race or ethnic origin of the injured workers was typically white (88.0%), and Hispanics accounted for the other 12.0 percent of the injuries.

6. Injuries occurred more frequently among people aged from 50 to 59 years old, accounting for over 30.3 percent of the total injuries on New Jersey farms in 1993. The next highest injury age group was those 30-39 years old (19.8%), followed by the 20-29 age group (15.2%), 60-69 age group (15.0%) and 40-49 age group (13.0%). Children age 10-19 years old accounted for 4.0 percent of the total injuries in New Jersey.

Reprinted: RCE - Agricultural Health & Safety Newsletter. 🐾

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## RESEARCH UPDATE ON BENEFICIAL MEDICINAL COMPOUNDS IN BLUEBERRIES

By Dr. Amy Howell, Research Scientist, Rutgers Blueberry & Cranberry Research Center

Research is showing that blueberries contain a number of compounds that have medicinally beneficial properties. The earliest recorded use of blueberry for medicinal purposes dates from the Middle Ages, and it has been used in European folk medicine since the 16<sup>th</sup> century. Some of its reported medicinal benefits include preventing urinary tract infections, antioxidant (anti-cancer) activity, reducing heart disease risk, strengthening collagen, regulating blood sugar, improving night vision, reducing replication of the HIV virus, and treating diarrhea.



Research has been done by our lab at Rutgers and by scientists in Israel on the ability of blueberries to prevent urinary tract infections. The compounds inhibit the binding of *E. coli* bacteria to the urinary tract wall, thus preventing the bacteria from invading the tissues and causing an infection. Treatment with blueberry compounds offers an alternative to the use of antibiotics.

Recent work indicates that blueberries contain compounds having anti-cancer properties. They act to induce enzymes that protect against cancer and reduce rapid tumor growth. A survey of the antioxidant capacity of a number of fruits and vegetables conducted by Dr. Ron Pryor of the USDA placed blueberry at the top of the list.

Work is now underway in a collaborative effort between our lab at Rutgers and researchers at the University of Wisconsin to determine the blueberry compounds responsible for anti-platelet aggregation (protecting against heart disease). The compounds act in two ways: They reduce the oxidation of LDLs, which can result in lowering of arterial plaque build-up, and they reduce the stickiness of blood platelets, which can lower the tendency to form blood clots.

Some reports exist on the favorable effects of blueberries on eyesight. One study showed that when Israeli fighter pilots were given regular doses of blueberry, their night vision significantly

improved. The effects result from the ability of the blueberry compounds to enhance capillary elasticity and permeability of the eye.

The molecules in blueberry that are responsible for these medicinal effects are called bioactive compounds. A bioactive compound is found in plants and elicits a positive (or negative) effect on animal or plant tissues. Examples of some compounds that exist in plants that have bioactive properties are proteins (enzymes), lipids (steroids), sugars (glycosidic linkages), acids (antioxidants), vitamins (fat and water-soluble), and polyphenolics. The focus of research in our lab at Rutgers is on certain polyphenolics of blueberry, including anthocyanins, flavonols, and tannins. Functions of anthocyanins in plants include acting as plant colorants, attracting animals for pollination and seed dispersal, and playing roles in light filtration and general metabolism. Functions of flavonols in plants include intensifying flower petal color, attracting pollinator insects, and acting as anti-microbial agents. The role of tannins in plants is mainly one of defense, acting to deter insects and animals from feeding and to protect the plant from fungal and bacterial attack.

These polyphenolic compounds are responsible for a number of the medicinally beneficial properties attributed to blueberries. However, when these compounds are isolated from the plants, they can be toxic when ingested at high dosages. Therefore, it is unwise to ingest these isolated compounds in capsule or pill-form until further studies are undertaken to determine dosages and toxicity levels. It is often better to eat the whole blueberry, fresh from the field, to obtain the maximum healthful benefits. Presented at the '98 Blueberry Open House. ☺

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