The
BLUEBERRY BULLETIN
A Weekly Update to Growers
Dr. Gary C. Pavlis, County Agricultural Agent
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Phone: 609/625-0056 Fax: 609/625-3646 Email: pavlis@aesop.rutgers.edu

AT A GLANCE…

Problem - Solution

Leafrollers -
Confirm 2F - 8.0 to 16.0 fl. oz/A
DiPel DF - 1.0 lb/A
Crymax - 1.0 to 1.5 lb/A
Javelin DWG 1.0 lb/A

Anthracnose -
Captan 50 WP 5 lb/A
Captan 80 WP 3.1 lb/A
Captec 4L 2.5 qt/A
Ziram 76DF- 3-4 lb/A

Mummy Berry -
Indar, 2fl oz/A
Benlate 50 WP 1 lb/A

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www.rce.rutgers.edu/pubs/blueberrybulletin

BLUEBERRIES
Insect Update
Dr. Sridhar Polavarapu, Extension Specialist in
Blueberry Entomology, Rutgers University
Mr. Dean Polk, IPM Agent - Fruit

Leafroller and other caterpillar activity: Larval infestation levels are close to the levels as seen last week, with larvae present in 20% of samples and over treatment threshold in just 2 samples. About 12% of samples show a small level of fruit injury.

Aphids: Aphid populations have shown a steady increase since bloom. Aphids were present in 56% of our samples, with about 50% of infested samples showing over 5% of terminals infested. There are 2 cases where Provado applications seemed less than adequate. Reasons could include insufficient coverage or the weathering of material immediately after application.

Plum Curculio (PC): No new PC injury was seen. All egg laying activity should be over for the season, although larvae will be found in early harvested fruit.

Cranberry Fruitworm (CBFW): The adult flight appears to have peaked in Atlantic County and is showing a flight peak in Burlington County. Thus, growers with CBFW populations should treat as soon as possible. One location was seen where first instar larvae were seen, indicating that eggs are hatching. Catches have been variable with as high as 26 moths per trap on one farm, but with traps on most other farms showing a "0" catch. Out of 26 farms, only 6 locations showed positive catches; 2 out of 16 in Atlantic County and 4 (Continued on page 2.)
out of 10 in Burlington County. Therefore, most locations do not have significant CBFW populations that are worth treating.

**Sharpnosed-leafhoppers (SNLH):** Adult flight has started and our yellow sticky traps are capturing adult SNLH for the past few days. This is the beginning of the first generation flight. SNLH is the principal carrier of the phytoplasma that causes the blueberry stunt disease. Leafhoppers acquire the phytoplasma when they feed on diseased bushes. The disease is spread when these leafhoppers inject phytoplasma into healthy bushes while feeding. Diseased bushes are generally stunted with many short, slender twigs and shortened internodes. Leaves on diseased bushes are often cupped downward and are reduced in size. Fruit set and berry size is generally reduced and bush life is shortened. Although several species of leafhoppers that occur on blueberries have been implicated in the transmission of blueberry stunt disease, the SNLH constitutes the bulk of the leafhopper population in New Jersey. SNLH has two generations in New Jersey. This insect overwinters as eggs laid in the tissues of fallen blueberry leaves. Eggs begin to hatch from mid-May, and nymphs reach adult stage in June after completing five instars. Both nymphs and adults have a distinctly sloped and pointed head.

Insecticides applied for Aphids and Fruitworms should also control SNLH. Provado 1.6F applied for controlling aphids may also control SNLH. Rouging and destroying stunted bushes is essential to reduce the spread of this disease. It is also important to control weeds and other woody non-blueberry plants in and around commercial fields, because they could act as hosts of SNLH. This is a good time to start looking for stunted bushes and complete rouging before the peak adult activity period.

**Blueberry maggot:** Pherocon AM yellow sticky boards have not captured adult blueberry maggot flies as of 6/7/2000. Adults are expected to emerge in the following 3-4 days. Blueberry maggot has a single generation each year. The adult BBM is somewhat smaller than a housefly and is readily recognized by black bands across the wings and whitelines on the abdomen. BBM overwinters as a pupa buried in the soil below the blueberry bushes. Bulk of the Adult emergence occurs over a 4-5 week period. Females begin to lay eggs about 10 days after emergence. Eggs are laid just beneath the ripe or ripening blueberries. The maggots mature in about 20 days under field conditions and then drop to the ground to pupate. Berries infested with BBM larval stages can be readily recognized by their soft and mushy appearance.

Insecticides will not offer any control of BBM, if eggs are already laid in the berries. Because the adult female flies require about 10 days to mature and initiate egg laying, insecticide treatments are recommended 10 days after the first adult capture in the yellow sticky-traps. To completely protect the fruit from BBM infestations, insecticide sprays should be continued at 7-10 day intervals after the first application thru last harvest.

**Disease and Culture:**

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

*Atlantic County Agricultural Agent*

Visits to numerous fields in the Hammonton area this week revealed plants at different farms with similar symptoms, usually a lack of leaves throughout the plant and/or leaves that were small and burned at the tips. Many of the plants had been attacked by grubs. A good clue to this kind of feeding is when a good size plant can be pulled out of the ground with little effort indicating a small root system. The damage to the plants was largely done last fall and the grubs that are there now are very tough to kill. Last weeks newsletter described the use of Admire to control the new crop of grubs.

I also saw mealy bugs on the roots of many plants. This damage will also result in a very small root system. This critter is white and a little fuzzy and can do a lot of damage. It's about the size of a letter "o" in this newsletter.

**Note:** If you see a lot of ant hills in your field and plants are not healthy, you might have mealy bugs. Ants feed on the excretions of the mealy bug, as they do aphids above ground. Ants don't do any harm to the blueberry plants but they are moving the mealy bugs around.

The third cause of the lack of leaves is due to wet feet/Phytophthora Root Rot. If your plants have few leaves, but you can't readily pull the plant out of the ground, and the planting is in a low or wet site, you could very well have root rot. Disease severity is related to how often a soil becomes saturated in addition to how long individual saturation periods last, for example, more than 24 hours in standing water promotes infection.

The fourth cause of burned leaves that was seen was harder to put a finger on but it was a result of a spring application of something. Lime sulfur too late, Sinbar (Continued on page 3.)
too late, urea too late, or a high level of Foliar Fertilizer all can burn the young leaves. It is hard to tell one from the other. If you have burned leaves, check your applications and spray dates for the cause or give me a call.

**Pesticide PR:** The public is getting mixed signals concerning the foods they consume. On one hand, fruits and vegetables provide essential vitamins, minerals, and fiber, all of which help fend off diseases and keep us healthy. On the other hand, these same fruits and vegetables contain pesticide residues, which may cause cancer. These fears are heightened by press reports often based on emotional appeal rather than fact.

How should growers who elect to use chemical pest control deal with questions, which will arise from customers? Let me suggest several points which could be made in discussions with concerned individuals.

1) Pesticides undergo millions of dollars of testing before they are permitted to be used. Chemicals which show strong mutagenic or carcinogenic properties in lab animals are not allowed to be manufactured. (This is reflected in the somewhat ambiguous comments listed above concerning chronic health effects of pesticides.)

2) Growers must be licensed by the state in order to apply pesticides. To obtain certification, growers must be knowledgeable about regulations governing pesticide use. They follow guidelines established by both the state and federal government to provide for the safety of themselves and consumers.

3) Growers dislike applying pesticides, and try to do so only when necessary. Pesticides are quite expensive, and spraying on a hot day is miserable. Growers monitor for pest populations and spray only when numbers threaten the crop. Chemical pest control is only one of several strategies used to keep pests below damaging levels. Other practices are proper planting systems, resistant varieties, good nutrition, pruning, renovation, and sanitation. Growers have a vested interest in keeping the farm free of chemical contamination.

4) The safety of proper pesticide use is self-evident when one considers the thousands of tons of food eaten every day in this country, without incident of pesticide poisoning. With the exception of lung and skin cancer, rates of this disease continue to decline. This would not be the case if our food was tainted with powerful carcinogens. In a study conducted by the New York State Department of Health, farmers experienced more health and longevity than the general population. The area in which they do particularly well is with their low incidence of cancer. One would expect farmers to have high cancer rates if the chemicals they are exposed to daily were carcinogenic. For perspective, in 1983 there were 22 deaths in the U.S., which resulted from improper pesticide handling, but 2,886 from the use of legal medications.

5) Agricultural chemicals are necessary to prevent insects, 'worms', fungus and harmful bacteria from invading the food we eat. It is estimated that harmful microbes in our food affect 10 million people each year. Pesticide use prevents these numbers from becoming even higher. The insecticide DDT was probably responsible for saving more lives than any synthetic chemical or drug ever developed, as it prevented widespread epidemics of malaria. Consumers no longer have to fear widespread famine, such as occurred with potatoes in Ireland in the 1840's, because pesticides control the spread of plant diseases.

6) Crop protectant chemicals also keep the cost of food low. Herbicides save the grower hundreds of dollars per acre compared to pulling weeds by hand. Consumers would not be willing to pay high prices for blemished food, which results when crops are grown without pesticides.

7) Agricultural chemicals are indeed poisonous, and must be that way to control pests. However, pesticides were developed to have low toxicity to humans and, in fact, are often less toxic than many substances we consume daily (see table). Also, these crops protectants are applied at the rate of only ounces per acre, and the amount on fruit is very small. Regulations have been developed which ensure that these residues are below safe levels.

8) Our bodies have the ability to detoxify poisons that we encounter in the environment every day. For example, all plants contain natural poisons to fend off insect attack and diseases. Onions, peppers, potatoes, broccoli, carrots, bananas, coffee, spices, mushrooms and peanut butter are just a few of the foods which contain significant amounts of toxic substances. If our bodies can detoxify these naturally occurring poisons at concentrations of parts per thousand, they should also be able to handle synthetic chemical residues present in parts per million or billion.

(Continued on page 4.)
Following is a list of chemicals and their lethal dose — the approximate amount required to kill an average 150-lb person. The higher the number, the less acute toxicity. (There are 454 grams per pound.)

<table>
<thead>
<tr>
<th>Chemical</th>
<th>LD50</th>
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<tbody>
<tr>
<td>Parathion</td>
<td>&lt; 1 gram</td>
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<tr>
<td>Guthion</td>
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<tr>
<td>Endosulfan (Thiodan)</td>
<td>3</td>
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<tr>
<td>Methiocarb (Mesurol)</td>
<td>9</td>
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<tr>
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<td>Paraquat</td>
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<td>Nicotine</td>
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<td>Caffeine</td>
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<tr>
<td>Diazinon</td>
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<tr>
<td>Acetaminophen (Tylenol)</td>
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<td>Sevin</td>
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<tr>
<td>2,4-D</td>
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<tr>
<td>Metalaxyl (Ridomil)</td>
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<td>Valium</td>
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<td>Diphenamid (Enide)</td>
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<td>Ibuprofen (Motrin)</td>
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<td>Table salt</td>
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Many of these chemicals are very toxic, and the applicator should use extreme caution when mixing and applying them. The health risk of these chemicals is much greater for the applicator than consumer. Also note these values are for oral acute toxicity only, and do not measure carcinogenicity.

Sincerely,

DR. GARY C. PAVLIS
Atlantic County Agricultural Agent

Editor - Blueberry Bulletin

Insect Trap Counts - Blueberry

<table>
<thead>
<tr>
<th>Week Ending</th>
<th>RBLR</th>
<th>OBLR</th>
<th>CBFW</th>
<th>SNLH</th>
<th>BBM</th>
<th>OB</th>
<th>RBLR</th>
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Insect Trap Count Key: RBLR=redbanded leafroller, OBLR=obliquebanded leafroller, CBFW=cranberry fruitworm, SNLH=sharptossed leafhopper, BBM=blueberry maggot, OB=oriental beetle.
OHIO STATE: SPRAYER CUTS PESTICIDE USE IN HALF!

A new farm sprayer does more with less. Invented by Ohio State University researchers, it uses half as much pesticide as conventional sprayers yet kills pests and weeds the same or better.

Scientists at the Ohio Agricultural Research and Development Center said the "spray less" double-nozzle sprayer-designed to be retrofitted to existing hydraulic sprayers slashes application rates by 50 to 75 percent and increases how well the pesticides work without increasing pesticide drift.

The scientists said the device could benefit both farmers and the environment: it can boost farmers' profits by cutting their pesticide bills and can lessen how much pesticide pollutes air, soil, and water.

In addition, they said it pays for itself quickly in only one growing season on an average Ohio farm or as little as 10 weeks on large farms or pesticide-intensive crops.

The sprayer works in laboratory and field experiments. Prototypes are being used by six Ohio Farmers. Data from the research is at http://oardc.ohio-state.edu/lpcatefficacy.htm.

The research was led by Robin Taylor of the entomology department and Andrew Chapple, formerly of the center's Laboratory for Pest Control Application Technology, or LPCAT, who now works in Germany. Co-researchers included Frank Hall, LPCAT head, and Roger Downer, also of the lab.

Ohio State and the Cleveland Advanced Manufacturing Program, or CAMP, teamed up to develop the device. The university holds the patent and is licensing it to Spray Redux LLC, which recently started manufacturing and selling the sprayer.

A retrofit kit for a typical 20-nozzle sprayer is $2,200, but not all farmers will need the whole kit.

A discovery by the scientists led to the new design. They found that while large pesticide drops have little biological effect on their target - most of them shatter and pollute the environment - they're needed in a spray nonetheless.

Reason: The big drops carry the small drops into the plant canopy, where the small drops stick and do most of the work. Without the big drops, most of the small ones would drift away.

"Think of it as a bicyclist drafting behind a bus or a truck," Taylor said. "You get a free ride."

Knowing this, the scientist built a new sprayer that has two nozzles instead on one. One nozzle shoots a course spray of water. The other shoots a fine spray of pesticide. The two sprays intersect. The big drops do their job - they pull the small ones - but they don't carry pesticides and don't contaminate the environment.

"You should be able to get a 50-percent rate reduction across the board," Taylor said. "But it depends on the product and the application."

"With Roundup, for example, 33 percent of the label rate works very well. The results are indistinguishable from 100 percent with a conventional sprayer," he said.

Roundup (glyphosate) is the world's most widely used herbicide.

Pesticide application is an inefficient practice; previous studies have shown that most sprayers never reach their target.

Indeed, less than 1 percent of herbicides and less than .0006 percent of insecticides actually kill what they're aimed at, Taylor said. The new sprayer does much better.

In experiments using Roundup, the sprayer killed 100 percent of weeds at rates as low as 25 percent of the label rate. It has also been tested with 2,4-D, Kelthane (dicofol), Ambush (pen-nethnin), paraquat and other common insecticides and herbicides.

With all these pesticides, "excellent results" were achieved at rate reductions of 50 percent or more, Taylor said.

Roundup Ready soybeans, Liberty Link canola, aphids on lettuce and diamondback moths on cabbage have been among the targets.

An average Ohio farm - 450-500 acres, a mix of corn, soybeans and small grains - typically spends $4,000 to $6,000 a year on pesticides.

By cutting pesticide use in half or more, the device would pay for itself in one growing season on those farms, Taylor said.

At the same time, a 300-acre potato farm might spend more than $7,000 on pesticides in a year, while a 1,500-acre farm might spend $8,000 to $10,000.

In both cases, the sprayer would pay for itself in less than half a season.

Smaller farms or farms that use fewer pesticides - Amish farms, for example - might take two or three years to offset the cost.

"From the farmer's perspective, there's no guarantee that this isn't snake oil," Taylor said. "So until the sprayer is actually seen in use, it's not going to prompt too many people to part with $2,200."

"But there are fields out there now that have been sprayed this season already," he said, "and there are six farmers out there who have first-hand experience. They're pretty pleased with it."

(Continued on page 6.)
The first big push to demonstrate and sell the sprayer will be at this year's Ohio State Farm Science Review, September 19-21 near London, Ohio.

Spray Redux was set up and is owned by CAMP, Ohio State, the nine researchers who worked on the project and the Spray Redux Foundation.

The foundation will use its portion of income to establish an endowment. Income from this endowment will be used to fund innovative but high-risk agricultural research - projects that otherwise might not be funded - at Ohio State.

Of note is that while many companies set up charitable foundations of this sort, they don't do it right at the start of the company. In the case of Spray Redux, the company and the foundation were created together. As far as Taylor knows, this is the first time this has been done.

According to the company's five-year plan, sales will start in Ohio and then, if successful, will expand to other states and countries. Projected sales in that period are $200 million.

Initial funding came from the U.S. Department of Agriculture and U.S. Environmental Protection Agency.

Taylor is a mathematical ecologist who grew up around farming in England. His interests are in improving the environment by improving pesticide efficiency and in securing the economic future of farming.

To that end, the new sprayer can "simultaneously help the farmer stay in business while cutting the amount of noxious chemicals in half," he said. "What's good for the farmer is good for the environment."

"What's exciting is that maybe we can make a difference." (Reprinted: The New Jersey Farmer, 6/1/00.)

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