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New Jersey Agricultural
Experiment Station

The BLUEBERRY BULLETIN

A Weekly Update to Growers

Dr. Gary C. Pavlis, County Agricultural Agent

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AT A GLANCE...

BLUEBERRY TWILIGHT MEETINGS

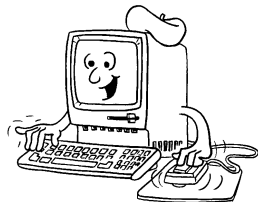
THURSDAY, APRIL 27, 2017 @ 5:30PM
MACRIE BROTHERS BLUEBERRY FARM
7836 WEYMOUTH RD
HAMMONTON, NJ 08037
FOR DIRECTIONS, CALL 609-561-6822

THURSDAY, MAY 25, 2017 @ 5:30PM
ATLANTIC BLUEBERRY COMPANY
7201 WEYMOUTH RD., HAMMONTON, NJ
FOR DIRECTIONS, CALL 609-561-8600

ATTENTION:

Visit our 'Web Page' for the
Blueberry Bulletin at...

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Culture

Dr. Gary C. Pavlis, Ph.D.

Atlantic County Agricultural Agent

As we begin the new season I hope you had a great winter. This is the first edition of The Blueberry Bulletin. Also, 'AT A GLANCE...' will continue, and is a summary of each week's information. I hope it is something you can and will use.

If you have a problem during the season, please call me.

Any comments, suggestions, constructive criticism about The Blueberry Bulletin newsletter would be greatly appreciated. Also if you have any specific problems which you feel should be addressed, please let me know.

Help me to serve you better. Here's hoping for all a very successful 2017.

Sincerely,

A handwritten signature in black ink that reads "Gary C. Pavlis".

Gary C. Pavlis, Ph.D.
Atlantic County Agricultural Agent

Editor - Blueberry Bulletin
GP/slp

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

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Pollination:

Pollination is an important factor in production of the highbush blueberry. Lack of adequate pollination causes reduced yield, small berry size, and a delay in berry maturity. It is chiefly the honey bee which performs this task. While bumble bees are efficient and diligent pollinators (even under more adverse weather condition), their numbers are steadily decreasing. According to MSU Entomologist, Dr. Roger Hoopgarner, "Historically, feral (wild) honey bee colonies have provided more than half of the pollination in Michigan." Wild bee populations are declining. This is due to changes in our own blueberry production practices which remove bee forage and suitable habitat.

What does this mean for blueberry producers? What happens when we lose the free pollination service provided by wild bees? You probably already know - more honey bees.

Blueberries have a tremendous number of blossoms per acre. A single bush may have 2,000 to 3,000 blossoms. At a planting density of 870 bushes per acre, that's 1.75 to 2.6 million flowers! Large-block single-variety plantings make it essential that high numbers of pollinators be available at one time.

The number of colonies needed per acre is determined by weather during the bloom period, colony size, variety, and blossom density per acre.

Weather during blossom time affects the honey bee's foraging efficiency. Honey bee activity increases as the temperature increases from 50 to 95oF. Sunshine also

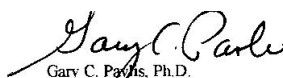
increases foraging, especially at lower temperatures.

Cold, wet, windy weather decreases foraging activity. Temperatures above 95oF will also reduce foraging as the bees spend their time cooling the hive.

As a general rule, over-wintered colonies are stronger than package bees. A three pound package may have 12,000 bees, while an over-wintered colony may contain two to three times as many. Honey bee colonies will be smaller in an early bloom year. In essence, the crop has developed faster than the development rate of the forager bees. Are honey bees the answer? Many of you have seen your bees fly out of the hive, past your 'Duke' bushes, and over to your neighbor's 'Bluecrop' field. This preference for one variety over another is not fully understood. It may be related to the quantity of nectar, pollen, sugar concentration, or flower color. At this time, honey bees are the best bet. For the long term, we need to learn to cultivate the wild pollinators.

The recommended concentration of hives per acre to use are tabulated on the following page: Remember that the number of hives needed per acre depends on the variety you have.

Sincerely,


Gary C. Parks, Ph.D.
Atlantic County Agricultural Agent

Editor, Blueberry Bulletin
GCP/sp

VERY ATTRACTIVE TO BEES:

1 Hive/2 Acres:
Rancocas
June
Rubel
GN-87

MODERATELY ATTRACTIVE

1 Hive/Acre:
Weymouth
Bluetta
Blueray
Pemberton
Darrow
Bluecrop*
Duke

POORLY ATTRACTIVE:

2 Hives/Acre:
Stanley
Concord
Berkeley
Coville
1316-A
Elliott
Jersey*
Earliblue*

* Efficiency of pollination poor, add 1/2 hive more per acre.

Fertilizer Timing: Growers who receive this newsletter are also aware that we no longer are recommending first applications of fertilizer before bud break. This is inefficient use of fertilizer. In New Jersey, a May application is 10X as efficient as in April. Therefore, the first application should be applied at early petal fall. The growers who are now fertilizing through their trickle irrigation systems, fertigating, should also start fertilizing at this same time.

“IN-ROW” CONTROL OF ANNUAL WEEDS IN ESTABLISHED BLUEBERRIES WITH RESIDUAL HERBICIDES

March 2, 2017

Thierry E. Besancon, Ph.D., Weed Science Extension Specialist

The program for the control of annual weeds in blueberries should consider the weed free strip under the row and the row-middles, sodded or tilled, separately. The “Weed Control Season” in blueberries starts in late fall. The program implemented in the spring depends on what herbicides were applied the previous fall. If herbicides were applied in late fall, applications may be able to be delayed until later in the spring. Residual herbicides should be applied before bud break in late winter or early spring after the soil is no longer frozen if no late fall treatment was applied.

Winter annual weeds germinate in the fall or late winter, flower in the spring or early summer, then die. Summer annuals germinate in the spring and early summer, flower, and die in late summer or fall. Perennial weeds are weed species that live for more than two years. Control of these weeds must be considered separately.

Emerged annual weeds under the row are controlled with a postemergence herbicide. Annual weeds that germinate throughout the remainder of the season are controlled with residual herbicides. Two applications of postemergence herbicide plus residual herbicides are recommended annually in the weed free strip under the row.

1. The first application should be applied in late fall, after the blueberries are dormant, but before the soil freezes, or in late winter before the buds break in the spring. This application targets the control of winter annuals and provides early season control of summer annual weeds. The fall can be a less busy time to apply herbicides to the fields, usually after Thanksgiving in New Jersey. In March, growers find themselves scrambling to apply insecticides and fungicides, and prune. Pruned branches must be removed or chopped before weed spraying can be accomplished after pruning.

2. The second application of residual herbicides should be applied before bloom or later spring, depending on the herbicides to be applied. A postemergence herbicide may not be needed to control annual weeds in the spring if residual herbicides were applied in late fall. However, a postemergence herbicide may be included to control certain perennial weeds such as yellow nutsedge, Canada thistle, goldenrod species, or aster species.

Most residual herbicides primarily control annual grasses or annual broadleaf weeds (BLWs). A combination of an annual grass herbicide and an annual BLW herbicide is usually recommended. Rate ranges are recommended for most residual herbicides and will depend on soil type and organic matter content (see Table 3 in the 2017 Blueberry Weed Control Recommendations for New Jersey). Use the lower rates in fields with coarse textured (sandy) soil low in organic matter, and the higher rate when soils are fine textured (silt and clay) and have higher organic matter. For efficient weed control, **residual herbicides require a clean soil** (no weeds, organic mulch or pruning residues) before spraying and **need to be activated** with a minimum of ½" of rain or irrigation in the week following application.

Casoron (dichlobenil), applied in late fall, followed by a spring application of a residual annual grass herbicide is the most effective residual weed control program recommended. More different species of weeds are controlled than any other residual herbicide combination available. Apply 4.0 lb active ingredient Casoron CS (2.7 gallons per acre) or 4.0 to 6.0 lb active ingredient Casoron 4G (100 to 150 lb per acre) in late fall when soil and air temperatures will remain below 50 degrees Fahrenheit until rainfall moves the herbicide into the soil. The active ingredient in the granular formulation can be lost to volatilization in warm weather. The Casoron CS formulation is encapsulated, which prevents loss due to volatilization. Casoron provides annual broadleaf weed control until fall and annual grass control until early summer the next year. Certain herbaceous perennials, including goldenrod species, aster species, and yellow nutsedge will also be controlled or suppressed by Casoron applied in late fall. Late winter applications provide less consistent winter annual and perennial weed control. Apply an additional residual annual grass herbicide in early or late spring to provide late summer annual grass control following the late fall application of Casoron.

If Casoron is not applied in late fall, choose your residual annual grass herbicide for the coming season before the late fall or late winter herbicide application. Options include **Devrinol** (napropamide), **Surflan** (oryzalin), or **Solicam** (norflurazon). All three residual annual grass herbicides can be used at the rate of 4.0 lb active ingredient per acre per year. Apply half the yearly labeled rate, 2.0 lb active ingredient per acre, in the late fall, and the second half, an additional 2.0 lb active ingredient per acre, in the spring, or the full rate in early spring, in no late fall application was applied.

Your residual BLW herbicides should be chosen considering crop safety, effectiveness, and price. For many years **Princep** (simazine) was recommended at 1.0 to 2.0 lb active ingredient per acre in the late fall, and **Karmex** (diuron) was recommended at 1.0 to 2.0 lb active ingredient per acre in the spring. Both herbicides have been safe, reliable, and cost effective choices for many years, and continue to good options where their use provides good weed control. Both Princep (simazine) and Karmex (diuron) share the same mode of action, inhibition of the light reaction of in photosynthesis. Unfortunately, triazine resistant weeds (horseweed, common lambsquarters) with cross resistance to urea herbicides, including Karmex, are present at some sites.

Where a triazine resistant weed has become established, switch to a BLW herbicide(s) with a different mode of action. Use **Chateau** (flumioxazin) at 0.19 to 0.38 lb of active ingredient per acre or **Callisto** (mesotrione) at 0.094 to 0.19 lb of active ingredient per acre in late fall or late winter. Chateau and

Callisto must be applied before bud break in early spring to avoid crop injury. Chateau can cause speckling and crinkling the crop's foliage if spray drift occurs. The activity of Chateau occurs at the soil surface as sensitive BLW seedlings emerge. Do not disk, till or otherwise mechanically mix Chateau into the soil after application, or the effectiveness of the herbicide will be reduced or eliminated. Callisto bleaches foliage white. Horseweed, also called marestail or stickweed, and common lambsquarters are very sensitive to Callisto both pre and postemergence. Chateau and Callisto can be used in combination, or either herbicide can be tank-mixed with Princep (simazine) and Karmex (diuron) to improve BLW control.

Sandea (halosulfuron) controls BLWs and yellow nutsedge in blueberries, and has postemergence and residual activity. Sandea is an ALS inhibitor. Herbicides with this mode of action rely on a single site of action in susceptible weeds, putting herbicides with this mode of action at high risk for weed resistance development. Weed resistance to ALS inhibitor herbicides is already present in the New Jersey and the surrounding mid-Atlantic region. Due to resistance management concerns, **Sandea is recommended ONLY for yellow nutsedge control later in the spring, but not for annual weed control.**

Stinger (clopyralid) is a growth regulator herbicide with postemergence and residual activity labeled in New Jersey for use in blueberries to control annual and perennial weeds in the legume and composite plant families. Legume weeds found in blueberries include vetch and clover species. Composite weeds targeted include horseweed, dandelion, aster species, goldenrod species, Canada thistle, and mugwort (also called wild chrysanthemum). Stinger rates and application timing depend on the weed targeted.

When annual weeds have emerged before residual herbicides are applied, a postemergence herbicide should be included in the tank.

- **Gramoxone** or other labeled generic paraquat formulations applied at 0.6 to 1.0 lb active ingredient per acre plus nonionic surfactant to be 0.25% of the spray solution will control most of broadleaf and grass seedlings that are 2 inches tall or less. As a contact herbicide, paraquat will not be translocated and regrowth may occur from the root system of established weeds (taller than 2 inches).
- **Roundup** and other labeled generic glyphosate products can also be used to control emerged weeds as a spot treatment, and can be especially useful where susceptible perennial weeds are a problem. Take great care when spot treating with Roundup or other glyphosate formulations to never contact the blueberry bush, or serious crop injury could occur. The rate depends on the perennial weed targeted and the glyphosate product used.
- **Rely 280** (glufosinate) is an alternative to glyphosate that is registered for use in blueberries. It is not as fast as Gramoxone, but tends to provide more complete and faster control than glyphosate without the concern for systemic movement in the blueberry bush. Similarly, to glyphosate, do not allow spray to contact desirable foliage or green bark as this would result in serious injury. Consult the label for preemergence herbicides that can be tank mixed to broaden the spectrum of weed control.

Consult the [Commercial Production Recommendations](#) for rates and additional information.

BLUEBERRIES

Insects

Dr. Cesar Rodriguez-Saona, Extension Specialist in Blueberry Entomology, Rutgers University

Mr. Dean Polk, IPM Agent – Fruit

Ms. Carrie Mansue, IPM Program Associate – Fruit

Cranberry Weevil: Up until the start of bloom we were finding increasing numbers of cranberry weevil adults. Of 181 samples taken just prior to bloom, the average weevil level was .09 per bush with a maximum of 0.47 weevils per bush. The treatment threshold for cranberry weevil is 5 weevils per bush. Since bloom moved in rather fast, a number of growers did treat, but the overall populations were very low and no problems were seen.

Plum Curculio (PC): PC adults overwinter under fallen leaves and other protected areas in the woods borders and nearby hedgerows. The earliest adults can become active at the beginning of bloom. The first adults were seen this past Monday near Mays Landing, with additional adults picked up in beating trays on Thursday 4/20. We should continue to see PC activity throughout bloom, but since bees are in the fields, there are **No Sprays** that can be used while this is going on. PC is the primary insect target as soon as the bees are removed from the fields and there is no remaining bloom. While it is too early to predict the exact timing for other early season pests, Avaunt used at the 1st post pollination timing will control PC as well as early season Leps/worms. See the 2017 Blueberry Pest Control Recommendations for other suggestions.

There is no treatment recommendation for **plum curculio** (PC) (Figure 1) at this time, and any effective insecticide that controls PC, is also deadly to bees. Therefore PC cannot be treated until bees are removed at the end of pollination.

Life Cycle. In New Jersey, PC completes a single generation a year in blueberries. This insect overwinters as an adult in leaf litter. Adults become active during bloom and feed on young fruit just after bloom, causing feeding scars. We have noticed that in the absence of fruit, adults feed on blueberry flowers (petals). Females lay eggs in the fruit causing crescent-shaped oviposition scars (Figure 2). White maggot-like larvae develop inside the fruit (one larva per fruit). Feeding by the larvae causes fruit to develop prematurely and fall off the bush. Mature larvae exit the fruit to pupate in the ground, and become an adult in July and August. If berries are picked before they drop, larvae can contaminate harvested fruit.

Scouting and Control. To monitor PC populations, scout for the semi-circular scars on the fruit. Sampling should be biased towards field edges or infields that border woods and hedgerows. PC infestations are more common in weedy fields and those with sod middles. This



Figure 1. Adult plum curculio. Photo credit: A. Raudenbush.



Figure 2. Crescent-shaped scar on fruit caused during PC oviposition (Photo by D. Polk)

pest is more of a problem on early maturing varieties. No threshold has been established, so treatment is mainly based on past history and an estimate of damage to fruit. Chemical controls targeting the adults should be applied soon after bees are removed. Post-bloom control options include Avaunt, Danitol, Brigade, Mustang Max, and Imidan.