2007 Annual Summer Meeting of the American Cranberry Growers Association

P.E. Marucci Center for Blueberry & Cranberry Research & Extension
Rutgers University, Chatsworth, NJ 08019

Thursday, August 16, 2007

Presentation Summaries

2007 Annual Summer ACGA Meeting
Thursday August 16, 2007

P.E. Marucci Center for Blueberry & Cranberry Research & Extension,
Chatsworth, NJ, Rutgers University

CRANBERRY BOGS:
8:00–8:30 Coffee & Donuts (Bog 3)

8:30-9:00 Alternative Methods for Cranberry Bed Establishment (Bogs 3&5)
Dr. Jennifer Johnson-Cicalese, Research Associate, *Dr. Nicholi Vorsa,* Extension Specialist, Rutgers University

9:00–9:20 Inhibition of fruiting to improve cranberry bed establishment (Bog 6)
Dr. James Polashock, Research Plant Pathologist, USDA-ARS, *Dr. Peter Oudemans*, Extension Specialist, Rutgers University

9:20–9:30 Phytotoxicity of new chemicals for weed control (Bog 10)
Dr. Bradley Majek, Extension Specialist, Rutgers University

9:30–10:10 Organic alternatives for cranberry fruit rot control/ Use of prophyte for Phytophthora root rot of cranberry/ Use of varying irrigation rates for cranberry cultivation (Bogs 11-16)
Dr. Peter Oudemans, Extension Specialist, Rutgers University

10:10-10:30 New tools for controlling cranberry insect pests – Field plots (Bogs 19-20)
Dr. Cesar Rodriguez-Saona, Extension Specialist, *Ms. Elizabeth Bender*, Senior Laboratory Technician, & *Mr. Robert Holdcraft,* Plant & Soils Technician, Rutgers University

CONFERENCE ROOM:
10:45-10:55 Opening remarks
Dr. Mark Robson, Director of the New Jersey Agricultural Experiment Station and Professor of Entomology, Rutgers University

10:55-11:10 New tools for controlling cranberry insect pests – The results
Dr. Cesar Ramiro Rodriguez-Saona, Extension Specialist, Rutgers University

11:10–11:30 Bumblebees for cranberry pollination: A practical guide
John Wolff, Koppert Biological Systems, Inc, Romulus, MI

11:30-11:50 Soil moisture and temperature wireless probes
Kevin Connolly, KC Enterprises, LTD, Buzzards Bay, MA

11:50–12:20 Pesticide/Farm Safety
Mr. Ray Samulis, Cooperative Extension Agent, Burlington County Extension, Rutgers University

12:20–1:30 LUNCH (POLE BARN)

1:30–1:45 ACGA PUBLIC RELATIONS COMMITTEE UPDATE

2:00–2:30 HAINES' FARM TOUR
Weed control trials in a new bed
Dr. Bradley Majek, Extension Specialist, Rutgers University

Alternative methods for cranberry bed establishment

Jennifer Johnson-Cicalese and Nicholi Vorsa, P.E. Marucci Center for Blueberry & Cranberry Research & Extension, Rutgers University, Chatsworth, NJ 08019

A trial was planted to test the practical potential of several alternative establishment methods, particularly when plant material is limiting. The following aspects were considered: 1) quantity of plant material used; 2) cost of planting, including plant material and labor; and 3) maximizing rate of establishment.

With the release of new cranberry varieties, more and more growers are considering replanting older beds. However, because of the limited availability of the new cranberry varieties, and the desire to maintain genetic purity, the traditional planting method using 1-2 tons of plant material per acre, is less viable. The methods tried in this study used from 27 to 440 lbs of plant material per acre. Both rooted and unrooted cuttings were used, with varied planting methods, dates and densities described in Table 1. The 'Sticks' treatments involved pressing 3" deep holes into the bed with a board covered with protruding nails, and then placing 6" cuttings into the holes; the holes were not pressed closed. With the "Layed-out" treatment, the 8" vine pieces were laid on the bed surface in such a way that a modified disk would run over the middle of each vine piece and press it into the soil; the rows were 7" apart and approximately 6 cuttings were placed per square foot.

Table 1. Establishment Study with Mullica Queen, Bog 5

Treatments	Planting method	Planting date	Cuttings per ft^2	Size of cutting	lb of vine per acre	New growth rating 8/7/07 1-5 scale, 5=most
Unrooted cuttings:						
Sticks-2	Cuttings stuck upright into holes on bed surface	25-Apr-07	2	6"	110	1.7
Sticks-4	Cuttings stuck upright into holes on bed surface	25-Apr-07	4	6"	220	2.2
Layed-out	Layed on surface in a row and pressed in with modified disk	25-Apr-07	6	8"	440	4.1
Sprinkled	Sprinkled over plot and pressed in with modified disk	25-Apr-07	6	8"	440	3
Rooted cuttings:						
Rooted-1	Hand planted	31-May	1	3"	27	4
Rooted-1.5	Hand planted	31-May	1.5	3"	41	4.5
Rooted-June	Hand planted	26-Jun	1	3"	27	4.2

With the unrooted cuttings treatments, 'Layed-out' and 'Sprinkled' had much better establishment than 'Sticks'. The 'Sprinkled' treatment was similar to the conventional planting method except the vine was cut up into 8" pieces, allowing for better contact of the vine with the soil. A high density of new plants has developed, even though less than a quarter ton of plant material was used. By laying out the pieces of vine in rows 7" apart (the distance between the disks), the 'Layed-out' treatment maximized the number of vine pieces that were pressed in. However, because it was so time-consuming, this method would only be practical if it was automated in some way. The 'Sticks' treatment is a planting method that has been traditionally used by cranberry growers. In our study, however, even though the plots were irrigated right after planting, there was poor soil/cuttings contact, and the cuttings either dried up and died, or were severely stressed. Perhaps 'rolling' of these plots at planting would have resulted in better growth.

With the rooted cuttings treatments, establishment was more uniform than with unrooted cuttings, and generally better, even though they were planted 1-2 months later. The ‘Rooted-June’ treatment had an equal amount of growth as the May plantings, indicating that the later planting date had little effect on establishment. An advantage of using rooted cuttings is being able to apply preemergent herbicides at planting and much better weed control can be achieved. Some studies suggest, however, that low rates of Devrinol have little to no effect on rooting so it may be possible to have better weed control when planting unrooted cuttings.

This study will continue to be evaluated for establishment rate and eventually yield. The cost of rooted cuttings is slightly higher than unrooted cuttings, but preliminary data suggests better establishment. Higher earlier yields may more than make up the initial expense. The small quantity of plant material (27 lbs/acre) needed with rooted cuttings allows for careful scrutiny of the material, optimizing genetic purity. The ‘Sprinkled’ treatment was the least labor intensive method, with the other treatments being about equal.

Acknowledgement: We thank Abbott Lee for generously supplying plant material and equipment, and for his suggestions and discussions on planting methods. And we thank our hard working crew for their help in the tedious task of planting this trial.

Inhibition of Fruiting to Improve Cranberry Bed Establishment

James Polashock and Peter Oudemans

Introduction

New cranberry beds are usually started with rooted cuttings or pressed in vines. Establishment and the time to first production harvest vary depending on such factors as planting density, fertilizer regime and cultivar, but 2-3 years is typical. During the first two years, inhibition or elimination of fruiting could be advantageous for several reasons. First, eliminating the fruit load will shift allocation of plant resources to vegetative growth. Second, we have shown that open ground in cranberry beds allows the establishment of undesirable seedlings from dropped and rotted fruit. Thus elimination of fruiting in the early stages of bed establishment will help preserve cultivar purity. Third, many fruit rot pathogens sporulate on infected fruit and then overwinter on vegetative tissue. Thus, eliminating the fruit could reduce build up of fungal inoculum.

Objective

The objective of this project is to eliminate flowers and/or fruit in establishing cranberry beds. There are two basic approaches to achieve this goal. First, there are various compounds, such as ammonium thiosulfate, that will burn the flowers. Second, there are plant growth regulators that can prevent flowering, prevent fruit set or cause early senescence of fruit and/or flowers, such as Ethephon. Both of these approaches are to be tested. The challenge with any treatment is to minimize the impact on normal vegetative growth.

Approach and Preliminary Data

We selected an established bed of ‘Stevens’ for preliminary testing of selected compounds and treatments. The data collected so far show a dramatic reduction in viable flowers using some treatments. Figure 1 shows the results of a ‘flower burning’ treatment. Note that the open flowers were effectively burned, but that earlier flowers already set fruit. This suggests that timing is critical and that multiple applications of the selected compounds are required for complete flower elimination. Based on our preliminary data, treatments have been refined and full scale testing will begin next season. We will be monitoring flowering, fruit set, fruit maturation and yield as well as any impact (positive or negative) on vegetative growth.

Figure 1. Treatment of ‘Stevens’ with ammonium thiosulfate to burn flowers. Note that open flowers were effectively burned, but fruit set from earlier flowers was unaffected.

Cranberry Herbicide Phytotoxicity
B. A. Majek

Location: Rutgers Blueberry/Cranberry Res. and Ext. Center, Bog 10
Plot Size: 5 ft x 10 ft
Replication Number: 4 (rep 1 has signs)
Herbicide Rates: reported in active ingredient (ai), not as product.

Objectives: Evaluate new potential cranberry herbicides under bog conditions at rates higher than intended use rates, usually 2X, for crop safety in cranberries. Plots are rated for crop injury through out the growing season and cranberry yield is evaluated for 2 years after treatment.

Observations:
ZA 1296 did not injure cranberries.

The additive used, nonionic surfactant (0.25% v/v), oil concentrate (1% v/v), or methylated seed oil (1% v/v) and liquid nitrogen (2.5% v/v), did not affect the crop safety of ZA 1296.

BAS 670 H and AE 0172747 injured the cranberries. Both herbicides have similar modes of action. Initially, the injury appeared as a whitening of the new foliage and shoots within a week after application. The injury was more severe when oil concentrate (1% v/v), or methylated seed oil (1% v/v) and liquid nitrogen (2.5% v/v) was added. Injury was less severe when nonionic surfactant (0.25% v/v) used. Recovery was evident in the less severely injured cranberries within a few weeks after the whitening was observed. The more severely injured cranberries recovered more slowly, and some death of new shoots was observed. Niether of these two herbicides appears to have potential for use in cranberries.

Note: ZA 1296 was available for use in cranberries in certain states under a Section 18 Emergency Exemption in 2007, and a full label is expected in time for use in 2008.

Cranberry Plant Pathology - Issues of Disease Management

Peter Oudemans, Donna Larsen, Chris Constantelos, Jen Vaiciunas, Micah Torres

1. Lime Sulfur Experiments: Cranberry fruit rot is the most important cranberry disease in New Jersey. Control of this disease is dependent on broad spectrum fungicides such as chlorothalonil (i.e. Bravo), EBDC's (i.e. Dithane) as well as some new chemistries such as azoxystrobin (Abound) or fenbuconazole (Indar). The fungicides are able to inhibit several of the major fruit rotting fungi that cause this disease. There has been increasing interest in organic farming for increasing returns. Over the past several years we have tested a variety of organically approved fungicides and biofungicides all of which have failed to control this complex disease. This year we initiated testing of the fungicide Lime Sulfur. This material is typically used as delayed dormant application in deciduous fruit crops such apple, brambles, blueberries etc. The biggest problem with Lime Sulfur is the phytotoxicity of this material. Recent work on apples has demonstrated success with Lime Sulfur as an in-season application for diseases such as apple scab, bitter rot and fly speck. This work gave impetus to examine the effects of lime sulfur on fruit rot of cranberry with an eye on the relationship of rate, phytotoxicity and disease control. In this experiment we have tested the following treatments to assess the feasibility of Lime Sulfur in cranberry culture.

Treatments for Lime Sulfur Test, 2007				
Trt	15-Jun	27-Jun	4-Jul	11-Jul
1	Lime Sulfur 0.5%	Lime Sulfur 0.5%	Lime Sulfur 0.5%	Lime Sulfur 0.5%
2	Lime Sulfur 1%	Lime Sulfur 1%	Lime Sulfur 1%	Lime Sulfur 1%
3	Lime Sulfur 2%	Lime Sulfur 2%	Lime Sulfur 2%	Lime Sulfur 2%
4	Lime Sulfur 4%	Lime Sulfur 4%	Lime Sulfur 4%	Lime Sulfur 4%
5	Bravo	Bravo	Bravo	Bravo
6	Control	Control	Control	Control

2. Irrigation Experiments. In cranberry culture there are significant questions regarding irrigation volume, sprinkler efficiency and the relationship of disease management and yield with irrigation volumes. Over the past four years we have been utilizing a evapotranspiration model developed through SkyBit Inc. to irrigate cranberry canopies. We have used an expereimental design with four cranberry beds divided into three sections. Each section receives 0.5xET, ET or 1.5xET. This study is coupled with canopy temperature measurements.

3. Use of Prophyte and Issues Related to Phytotoxicty. Prophyte is a fungicide used for Phytophthora managmetn. This material is one product (of many) that has as its active ingredient, phosphorous acid. We have seen rather dramamtic cases of phytotoxicity of this material in blueberry over the past three years and our aim in this trial was to examine the impact of prophyte on cranberry. This set of experiments was designed as an aerial application and subsequent plot work was conducted with a CO_2 sprayer using 20 gal/acre. Results indicate that Prophyte can have phytotoxic effects however these effects can be avoided by following certain guidelines.

1. The pH of the spray water should be 6 or above.
2. Phytotoxic effects can be avoided with higher volumes of spray water (dilution).The spray volume should not be below 20 gal/acre.
3. If possible use chemigation.
4. Do not use these products before the canopy is Phosphorus sufficient

NEW TOOLS FOR CONTROLLING CRANBERRY INSECT PESTS

Cesar Rodriguez-Saona, Elizabeth Bender, and Robert Holdcraft

INTRODUCTION

Implications of Food Quality Protection Act (FQPA) and New Alternatives- Tolerance re-assessment of organophosphates and carbamate insecticides under FQPA is likely to impact the cranberry industry more than other crops because of the minor-crop status of cranberry and the non-registration of pyrethroids due to proximity of aquatic habitats. A group of newer, more selective, chemicals were implemented in recent years as alternatives to the broad-spectrum organophosphates and carbamates and are now available to growers. These include: tebufenozide (Confirm 2F), methoxyfenozide (Intrepid 2F), and the naturalyte spinosad (SpinTor 2SC), which are labeled for use in cranberries for control of lepidopteran pests and have shown to be effective against *Sparganothis* fruitworm and spotted fireworm. This year indoxacarb (Avaunt) has been added to this list. Avaunt, a Dupont product, is a newer class of carbamates. This insecticide is highly effective against lepidopteran larvae, as well as a few other non-lepidopteran pests. Avaunt is currently labeled for use against spanworm, blackheaded fireworm, and cranberry weevil in cranberries. Avaunt has a unique mode of action: in addition to the traditional carbamate cholinesterase inhibition, it blocks the sodium channel within the insect's nervous system. If ingested, insects will stop feeding, become paralyzed, and die. Avaunt is a stomach and contact poison. It is activated in the gut of the insect, which reduces mammalian toxicity and effects on non-target organisms.

As broad-spectrum insecticides phase out, more selective chemicals need to become available to growers to reduce the chance for development of resistant populations to currently registered insecticides. In addition, new chemicals need to be tested for efficacy against insects that threaten to reach major pest status.

Insect Problems- A diverse group of insect pests attack all parts of cranberries. Insecticide treatments are targeted to control major pests that feed on leaves, buds, flowers and fruit (*above-ground pests*) and those that feed on roots (*below-ground pests*). Major above-ground pests include gypsy moth, *Sparganothis* fruitworm, and spotted fireworm. Some of the most important below-ground pests are several species of *Phyllophaga*, mainly *P. georgiana*. *Phyllophaga* grubs feed on the fine roots and can potentially stunt vine growth; severe infestations can result in vine death.

In addition to these major pests, cranberries serve as host for many secondary pests. In the past, secondary pests in cranberries have been kept below economic threshold by applications of broad-spectrum insecticides. As broad-spectrum insecticides are being replaced with reduced risk, selective, insecticides, there is potential for these secondary pests to become major pests. Since adoption of reduced-risk chemicals and reduction of broad-spectrum insecticides in New Jersey cranberries, there has been an increase in the populations of the blunt-nosed leafhopper. This insect vectors the cranberry false blossom, a disease that caused devastating losses in cranberry production in the first half of the 20th century. Its incidence, however, was reduced during the second half of the 20th century with the use of broad-spectrum insecticides.

OBJECTIVES AND APPROACH

2007 Experiments at PE Marucci Center- Several of the newer insecticides with various modes of action offer effective management to above- and below-ground insect pests. The following experiments were conducted in 2007 to test efficacy of these insecticides:

a) **Objective 1 - Screening new insecticides against gypsy moth, *Sparganothis* fruitworm, and spotted fireworm**. Laboratory bioassays were conducted with 1st instars of gypsy moth, spotted fireworm, and *Sparganothis* fruitworm. Colonies of these insects are maintained on artificial diets throughout the year at the PE Marucci Center, Entomology laboratory. This test was conducted with foliage from an 'Early Black' field, located at the PE Marucci Center. Eight different insecticides were tested for efficacy against each pest species and compared to untreated controls. Plots were 2-by-2 feet each, replicated 3-4 times in a randomized complete design. Each plot was separated by a 2 feet buffer. Five cranberry uprights from treated plots were placed in individual water picks with 3-5 larvae each. Plants and insects were placed in the laboratory at approx. 25 °C. Mortality was assessed 6 days after transfer. Number of larvae alive, dead, or missing was recorded.

b) **Objective 2 - Evaluation of entomopathogenic nematodes and new insecticides against *Phyllophaga* grubs**. The efficacy of entomopathogenic nematodes was evaluated against white grubs in the greenhouse in potted cranberry plants. Three species of entomopathogenic nematodes: the newly identified *Steinerma scarabaei* and *Heterorhabditis bacteriophora* and *H. zelandica* were evaluated against 2^{nd} and 3^{rd} instars of *Phyllophaga georgiana* and compared to untreated controls. Eight white grubs, collected from commercial cranberry bogs, were placed in individual 7-inch pots containing approx. ten cranberry rooted vines each. Mortality was assessed 3 weeks after treatment.

c) **Objective 3 - Evaluation of Actara against blunt-nosed leafhoppers**. In 2006, Actara was tested against blunt-nosed leafhoppers under laboratory conditions. Actara (thiamethoxam, Syngenta) is a new neonicotinoid insecticide currently registered in cranberries for cranberry weevil and cranberry flea beetle. This insecticide was very effective against blunt-nosed leafhopper in laboratory trials conducted at the PE Marucci Center. Our results led to a label change for 2007 to allow the use of Actara for blunt-nosed leafhopper control in cranberries. In 2007, Actara was tested against leafhoppers under field conditions. This study was conducted in a commercial cranberry bog with prior history of high leafhopper populations. Nymphal densities were assessed before and after insecticide applications by sweepnet sampling.

Results from these experiments will be presented at the meeting.

Acknowledgement: We thank William Cutts, Joe Darlington, William Haines, and Abbott Lee. We thank support from EPA Region 2, Cranberry Institute, and Blueberry/Cranberry Council.

Weed Control in Newly planted Cranberries - 2004

B. A. Majek

Location: Haines Cranberry Farm
Plot Size: 5 ft x 20 ft
Replication Number: 4 (rep 1 has signs)
Herbicide Rates: reported in active ingredient (ai), not as product.

Objectives: Evaluate labeled and new potential cranberry herbicides under bog conditions on newly planted cranberries. The first treatments were applied in the spring of 2004, about one month after the bog was planted and the vines had "rooted". The same treatments have been applied to the same plots annually since 2004. Crop injury and yield has been monitored annually since the experiment was initiated. The experiment will be terminated after the 2007 season.

Observations:
Devrinol, BAS 514, and ZA 1296 did not injure cranberries in any year or at any time of application during the experiment.

DPX 6025 injured cranberries in 2004, when the application followed an extended period of cloudy, humid weather with frequent showers. This can cause the wax layer (cuticle) on the leaves to be thin. Injury from DPX 6025 applied to established cranberries in other bogs during the same period also injured those cranberries.

Devrinol alone did not provide acceptable weed control.

BAS 514 provided acceptable weed control when applied in the spring each year, but was less effective when application was delayed until July. Control of grasses and broadleaf weeds was good, but sedge and rush control was not as good.

ZA 1296 provided acceptable weed control when applied in the spring each year, but was less effective when application was delayed until July. Control of grasses and broadleaf weeds was good, and sedge and rush control was also acceptable.

The best weed control was obtained when ZA 1296 was applied twice per year, in May and in July (treatment 11).

Note: ZA 1296 was available for use in cranberries in certain states under a Section 18 Emergency Exemption in 2007, and a full label is expected in time for use in 2008.