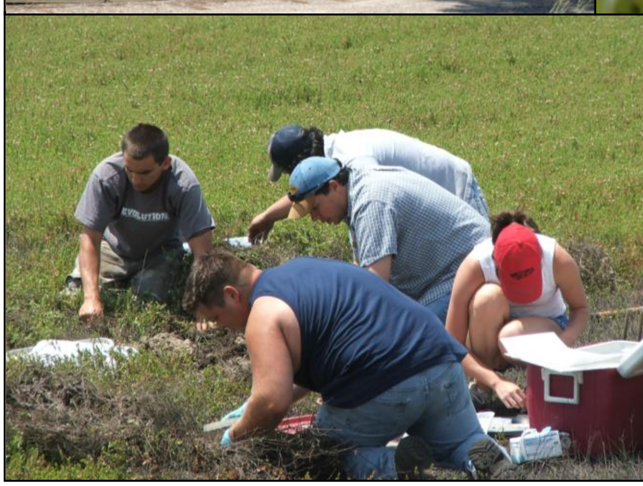
2008 Annual Summer Meeting of the American Cranberry Growers Association

American Cranberry Growers association

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

Thursday, August 21, 2008


Presentation Summaries

2008 Annual Summer ACGA Meeting
Thursday August 21, 2008
P.E. Marucci Center for Blueberry & Cranberry Research & Extension,
Chatsworth, NJ, Rutgers University

Parking will be available at the Center's shop (across cranberry bogs).
Limited transportation for tours will be provided at the Center.

CRANBERRY BOGS:
8:00–8:30 Coffee & Donuts (Bog 4)

8:30–8:40 Opening remarks, *Steve Lee IV*, President, ACGA

8:40-9:10 Maintaining cultivar purity (Bogs 4&5)
Dr. Jennifer Johnson-Cicalese, Research Associate, *Dr. Nicholi Vorsa*, Extension Specialist, Rutgers University

9:10–9:30 Chemical treatments to inhibit flowering and enhance establishment in new cranberry beds (Bog 6)
Dr. James Polashock, Research Plant Pathologist, USDA-ARS, *Dr. Peter Oudemans*, Extension Specialist, Rutgers University

9:30–10:00 Plant pathology research 2008 (Bog 11)
Dr. Peter Oudemans, Extension Specialist, Rutgers University

10:00–10:30 Introduction to the HOBO U30 System for remote monitoring, alarm notification and control (Bog 11)
Paul Gannett, Product Marketing Manager, Onset

CONFERENCE ROOM:
10:40–11:10 Callisto use in cranberry bog establishment
Dr. Bradley Majek, Extension Specialist, Rutgers University

11:10-11:40 New insecticides for controlling cranberry insect pests
Dr. Cesar Ramiro Rodriguez-Saona, Extension Specialist, Rutgers University

11:40–12:00 Crop pollination by native bees in New Jersey and prospect for studies of cranberry
Rachel Winfree, Assistant Professor, Department of Entomology, Rutgers University

12:00–1:00 LUNCH (POLE BARN)

1:00–1:30 Pesticide Applicator Safety
Mr. Ray Samulis, Cooperative Extension Agent, Burlington County Extension, Rutgers University

1:30–1:45 ACGA PUBLIC RELATIONS COMMITTEE UPDATE/VIDEO PRESENTATION

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. The challenge with any treatment is to minimize negative impact on normal vegetative growth.

Treatments

We selected three different sources of material. The first source is a 2-year old bed of rooted cuttings of 'Crimson Queen' and 'Stevens'. The second source is an established bed of 'Stevens'. The third source was flowering rooted uprights of both cultivars in flats. This will allow the collection of quantitative data. The treatments were as follows: 1) Ethephon, 2) ProGibb, 3) Induce, 4) Ammonium Thiosulfate (ATS), and 5) Sulforix. The first year (2007) of data suggested that ATS effectively burned the flowers. This year, flowers were still burned by ATS, but phytotoxicity was noted. Ethephon reduced flower number, but effectiveness was variable. In duce and Sulforix were ineffective at the concentrations used. ProGibb was applied late in the season to prevent flowering the following year. This year, those treated with ProGibb in 2007 were nearly completely devoid of any flowers. In addition, this treatment induced extensive vegetative growth of the runners in ‘Crimson Queen’. The effect on vegetative growth was evident, but less dramatic in ‘Stevens’.

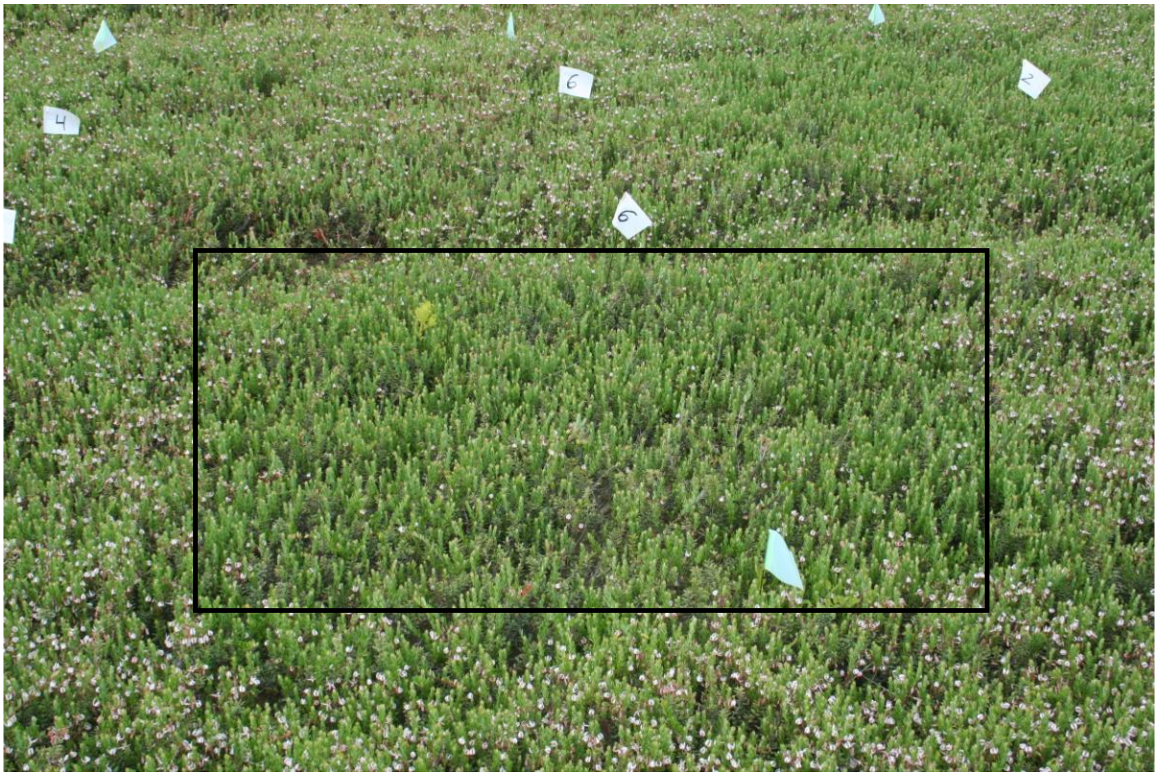


Figure 1. ProGibb Treatment of ‘Crimson Queen’ (boxed area). Note the absence of flowers and increased runner growth.

Conclusion

Based on two years of data, only the gibberellic acid (ProGibb) treatment has the potential to safely accomplish the objective. Additional data are required to determine how long the effects of treatment last (i.e. when does flowering resume) and to determine if the increased vegetative growth has any negative effects (such as susceptibility to winter damage).

CALLISTO USE IN CRANBERRY BOG ESTABLISHMENT

B. A. Majek

Studies were established in bogs planted in April of 2003 and 2004 with cranberry cuttings. Herbicides were applied in late spring, about three four weeks after planting, or in the summer, two to three months after planting. Weed growth was heavy in both establishment years, creating a canopy over the cranberry vines by mid summer. The most prevalent weeds were false nutsedge, slender rush, blackgrass, marsh St. Johnswort, large crabgrass, and meadow beauty. When applied in late spring, Devrinol 50DF suppressed or controlled false nutsedge, slender rush, and large crabgrass, but did not control blackgrass or meadow beauty. Callisto, applied with nonionic surfactant in late spring, controlled all the weeds except marsh St. Johnswort when applied four weeks after planting. Callisto applications that were delayed until two to three months after planting were less effective.

The studies were treated annually for three years, until a measurable yield could be harvested from at least some treatments. No injury to the cranberries was observed from the application of Devrinol or Callisto at either of the application timings in any year. The bog planted in 2003 was harvested in 2005 and in 2006. The bog planted in 2004 was harvested in 2006 and in 2007. Devrinol and Callisto applied in late spring each year improved cranberry growth and vigor, but overall weed control with Devrinol was not acceptable, and Devrinol did not increase yield. The weed control observed when Callisto was applied in late spring each year was acceptable, and resulted in yields that were significantly higher than the control in both the 2003 and the 2004 planting. The highest yields in the studies were observed in cranberries treated annually for three years with Callisto at 0.25 lb ai/A in late spring (May), and Callisto applied twice, in late spring (May) and in the summer (July).

Callisto 4SC has received a full section 3 label for cranberries, and is recommended for application to newly planted or bearing cranberries to suppress or control rushes, sedges, and many annual broadleaf weeds. Apply 8 fl. oz. per acre (0.25 lb ai/A) in late spring (May) before bloom. Treat newly planted bogs after cuttings have rooted, but before weeds have become established. Repeat the application in early summer (July) after bloom. Add NIS (nonionic surfactant) to be 0.25% of the spray solution or oil concentrate to be 1% of the spray solution. Choose NIS when cranberries are growing rapidly and warm cloud humid weather encourages thin cuticle (wax layer) formation on cranberry leaf surfaces. Use oil concentrate when growth has "hardened off" or when hot dry sunny weather encourages a thick cuticle to form on cranberry leaf surfaces. Typically, use nonionic surfactant for the spring (May) application and oil concentrate for the summer (July) application. Follow the precautions listed below.

Do NOT apply Callisto within 45 days of harvest or flooding of the bog.
Do NOT apply more than 16 fl. oz. pr acre per year (0.5 lb ai/A/yr)
Do NOT apply within 10 feet of surface water.
Do NOT spray to "run off".
Do NOT apply through the irrigation system.
Do NOT apply within 48 hours of irrigation for frost protection.

Callisto is active through foliage and root absorption in susceptible plants. Optimum performance can be obtained by ensuring an 8 to 12 hour rain-free period after application, followed by a light irrigation to move the herbicide into the root zone. Heavy irrigation, such as for frost protection, can move the herbicide below the root zone of target weeds and may result in reduced weed control or weed control failure. Time the spring application to precede a period of mild weather when irrigation for frost protection will not be needed.

Cranberries have an excellent degree of tolerance to Callisto. Most applications do NOT result in any observable response to the herbicide in cranberries, but weather conditions before, during, and after application can cause a temporary crop response. When a response is observed, recovery is rapid and there are no long term affects on the crop.

Callisto controls weeds by inhibiting carotenoid synthesis in susceptible plants (weeds). Carotenoids protect chlorophyll from damage by sunlight. Chlorophyll is the molecule in plants that captures light energy for conversion to transportable and storable chemical energy (sugars). Completely synthesized chlorophyll gives plants their green color. The result of carotenoid synthesis inhibition is damage to the chlorophyll molecule by sunlight, which typically appears as bleaching (whitening) of the stems and foliage of susceptible plants. Affected plants will appear white, red or purple. Occasionally cranberries may "flash" with temporary whitening in the growing tips of rapidly growing shoots. Tolerant plants, including cranberries, rapidly detoxify Callisto using enzyme systems in the plant. Repair of damage to chlorophyll by sunlight is a normal and constant ongoing activity in all plants.

Warm, cloudy, humid weather and plentiful moisture result in plants that grow rapidly without developing a normal cuticle, or wax layer on leaf surfaces. Growers frequently refer to these as "soft" plants or "soft" growing conditions. "Soft" growing conditions before and during a Callisto application can result in increased herbicide absorption by plant foliage through the thinner than normal protective wax layer on the leaves.

Callisto is rapidly metabolized and detoxified in tolerant plants by enzymes. All enzyme activity in plants is temperature dependant. Cold weather slows all enzyme action, including Callisto detoxification, but damage to chlorophyll by sunlight is a light reaction which is not temperature dependant. "Soft" growing conditions prior to and during a Callisto application followed by bright sunny cold weather after the application increases the possibility of observing the temporary "flash" in the crop. When observed, the cranberries recover with no long term affects on the crop.

NEW INSECTICIDES FOR CONTROLLING CRANBERRY INSECT PESTS

Cesar Rodriguez-Saona, Elizabeth Bender, and Robert Holdcraft

Introduction

Since implementation of the Food Quality Protection Act in 1996, the cranberry industry has been investing significant resources towards the registration of new insecticides. Within the last year three new insecticides, Avaunt, Delegate, and Assail have been registered for use in cranberries.

Avaunt (Indoxacarb, DuPont): This insecticide became registered in cranberries in 2007. Avaunt belongs to a new class of insecticides called the oxidiazines. It works by inhibiting sodium ion entry into the nerve cells that results in paralysis and death of the targeted pest**.** Avaunt has broad-spectrum activity, with an excellent safety record against non-target organisms. This insecticide has been granted a "reduced-risk" status.

Delegate (Spinoteram, Dow AgroSciences) is derived from fermentation of *Saccharopolyspora spinosa* (bacteria). It has both contact and stomach activity. Delegate is highly effective against lepidopteran pests. Our 2007 studies showed Delegate to be highly effective against gypsy moth, spotted fireworm, and *Sparganothis* fruitworm under laboratory conditions.

Assail (Acetamiprid, Cerexagri-Nisso) is a new neonicotinoid insecticide with broad-spectrum activity. Our 2007 results showed Assail to have high toxicity against gypsy moth, and moderate-high toxicity against spotted fireworm and *Sparganothis* fruitworm in laboratory assays.

Objectives and Approach

1. *Determine the effects of Avaunt, Delegate, and Assail for lepidopteran pest control under large-scale field conditions*. These experiments determined the effects of Avaunt, Delegate, and Assail for lepidopteran pest control under large-scale field conditions. Field efficacy trials were conducted pre-bloom against gypsy moth, and post-bloom against *Sparganothis* fruitworm. This study was conducted in commercial cranberry bogs with previous history of high lepidopteran populations. An entire bog will be sprayed with either Avaunt (6 fl oz/A), Delegate (6 fl oz/A), or Assail (6 fl oz/A). In pre-bloom trials, larval densities were assessed by sweepnet sampling before and after insecticide application. In post-bloom trials, insect damage to berries was assessed after insecticide application.

2. *Evaluate low and high rates of Avaunt, Delegate, and Assail on gypsy moth, spotted fireworm, and Sparganothis fruitworm in medium-scale field plots*. These experiments evaluated low and high rates of Avaunt, Delegate, and Assail against gypsy moth. Eight treatments were tested in medium-size plots (70 ft x 100 ft) in a commercial cranberry

bog. Treatments included: Avaunt Low (4 fl oz/A), Avaunt High (6 fl oz/A), Delegate Low (3 fl oz/A), Delegate High (6 fl oz/A), Assail Low (3 fl oz/A), Assail High (5 fl oz/A), Intrepid (16 fl oz/A) (grower standard), and control. Treatments were applied pre-bloom and each treatment was replicated 3 times in a randomized complete design. Each plot was separated by a 20 ft buffer zone. Larval densities will be assessed by sweepnet sampling, before and 14 days after insecticide application.

3. *Determine residual toxicity employing foliage bioassays in the laboratory*. These experiments determined residual toxicity employing foliage bioassays in the laboratory. Residual toxicity of Avaunt, Delegate, and Assail of field application rates was evaluated by placing neonate gypsy moth, spotted fireworm, and *Sparganothis fruitworm* on field-weathered foliage residues collected 7, 14, and 21 days after treatment. On each of these sampling dates, five insecticide-treated uprights were inserted in florists' water picks, enclosed in a ventilated 40-dram plastic vial, and secured in Styrofoam trays. Each replicate consisted of a total of 10 vials per treatment. Five neonates were placed individually in a vial. Plants and insects were placed in the laboratory at approx. 25 °C. Mortality was assessed 7 days after transfer. Number of larvae alive, dead, or missing was recorded.

CROP POLLINATION BY NATIVE BEES IN NEW JERSEY AND PROSPECTS FOR STUDIES OF CRANBERRY

Dr. Rachael Winfree
Assistant Professor
Department of Entomology
Rutgers University
New Brunswick, NJ 08901

I have studied the pollination of several row crops (watermelon, cherry tomato, muskmelon, bell pepper) by native bees in New Jersey and Pennsylvania for several years. I will provide an overview of the results of these studies which have found that (1) native, wild bees can fully pollinate watermelon crops at many farms, and (2) native bees are more frequent visitors to crop flowers than are honey bees for several crops [1,2]. These results contrast with studies of native bee pollination from more intensively agricultural regions, such as California's Central Valley [3-5]. I will discuss possible reasons for the high levels of native bee pollination found in New Jersey in terms of farm management practices and land use. Lastly, I will present preliminary plans (at the grant proposal stage) for studies of native bee pollination of cranberry. I am seeking grower collaboration on habitat restoration experiments near and within cranberry bogs to determine whether native bee pollination can be increased by local habitat management, and seek to discuss this opportunity with interested growers. The costs of the restoration could potentially be partially defrayed by NRCS.

Literature Cited

1. Winfree, R., et al., Native bees provide insurance against ongoing honey bee losses. Ecology Letters, 2007. 10(11): p. 1105-1113.
2. Winfree, R., et al., Wild pollinators provide the majority of crop visitation across land use gradients in New Jersey and Pennsylvania. Journal of Applied Ecology, 2008. 45: p. XX.
3. Kremen, C., N.M. Williams, and R.W. Thorp, Crop pollination from native bees at risk from agricultural intensification. Proceedings of the National Academy of Sciences, 2002. 99: p. 16812-16816.
4. Kremen, C., et al., The area requirements of an ecosystem service: crop pollination by native bee communities in California. Ecology Letters, 2004. 7: p. 1109-1119.
5. Greenleaf, S.S. and C. Kremen, Wild bee species increase tomato production but respond differently to surrounding land use in Northern California. Biological Conservation, 2006. 133: p. 81-87.