Washington State University • Long Beach
Cooperative Extension
2907 Pioneer Road
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CRANBERRY VINE

May 1999

MEETINGS

Cranberry Pollination: So what have we learned in the past 10 years? May 10, 7:00 p.m. at the North Beach Grange in Grayland; May 11, 7:00 p.m. at the Ocean Spray Receiving Station in Long Beach. Pesticide credits will be given.

Cranberry Field Day. Monday, July 26, 8:30 - 2:30, at the PCCRF on Pioneer Road in Long Beach. Pesticide credits will be given.

Long Beach Cranberry Growers' Bog Tours. The May bog tour will be held at Dan and Jo Heasley's on the 27th, in Seaview off of Highway 101. The June tour will be on the 25th at Bob Hamilton's bog on Highway 101 in Seaview.

North American Cranberry Research and Extension Workers Conference. September 30 to October 2, Long Beach. Washington is hosting the Conference this year. I know it is a busy time for all, but we would enjoy having growers at some of the sessions. A full agenda will be posted later, but keep it in mind. The website for the conference is: http://ext.wsu.edu/nacrew/

BOG MANAGEMENT

Fireworm Control. We have received our first new registration for a new generation insecticide. The EPA has issued a Section 3 for Confirm for blackheaded fireworm control. Apply at first hatch (80% egg hatch) and expect it to last 20 days. However, new growth will not be protected; therefore, a section application may be needed in 10 days. Confirm will not affect beneficial insects or pollinators so it can be applied during bloom, provided 2nd generation larvae have begun to hatch. Follow label instructions (copy attached). Pesticides based on *B.t.s* (insect parasitic bacteria) are also worth considering for first generation larvae and should also be applied at 80% egg hatch. Two applications 5-7 days apart are necessary. A sticker should be applied with both materials. *B.t.*s are sensitive to ultraviolet light, so should be applied at dusk or when skies are very overcast. Note that fireworm hatch is very spread out, often lasting a month. This makes control with a single application and careful monitoring by visual observations or sweep nets very important.

Girdler Control. Growers who have had a persistent problem or who have had high trap counts in the past should consider one of the following controls: 1) summer flooding; 2) winter sanding; 3) insect parasitic nematodes; or 4) Diazinon 24-G. Debbie Henderson recommends treatment of beds every 3 years with one of the above. This prevention program should keep populations at low levels. If severe infestation is already occurring, additional measures are warranted. We are still looking for good girdler sites; let us know if you have really high flight counts this summer.

Vole Control. Voles can be a problem on cranberry farms since nothing is registered for vole control within the beds. One breeding pair can equal 300 new voles by the end of summer. Look for runs in the beds to help identify the problem.

There are four non-chemical approaches to control. This consists of 1) frequent mowing of your ditch bank to reduce food and protective habitat for the voles, 2) maintaining "mouser cats", 3) encouraging raptors, and 4) flooding.

With the chemical approach for vole control, there are several options but NO poisons/baits are registered for on-bog use. They must be used only off the bog. The acute toxicant zinc phosphide (ZP Rodent bait) is a fast-acting, single dose stomach poison. Bait usually comes soaked on milo grain. Zinc-phosphide baits should not be reapplied within 90 days of a previous application because voles become bait shy due to its fast action. The anticoagulant baits (chlorophacinone, trade name Rozal, and diphacinone, trade name Ramak brown and green) kill after 3-5 days of continuous feeding. More than a single feeding is usually necessary with anticoagulants. All baits are attractive to domestic pets and also kill non-target birds and other wildlife. It is very important to avoid injury to non-target animals. Do not pile the bait, pick up all spills, avoid treating areas

where there is little or no vegetation, and do not apply to bare soil. All these baits are on the "may affect" pesticide list for endangered species--please treat them with appropriate caution.

Best control with all baits will occur with applications in the fall, rather than spring or summer. Place bait in their holes or in a feeding station protected from rain/sprinklers. There are several types of stations. 1 to 1.75 inch PVC pipe constructed in an L-shape or upside down T-shape makes an excellent bait station. The horizontal pipe should be at least 12 inches long so that bait does not spill out the end and so that it will stay dry. Old tires cut longitudinally also work. Fill the tube with bait. Remove uneaten bait from stations.

It is difficult to know what degree of control you are getting. One easy way is to put ¼ apple section in runs and monitor the number of munches left after 12 hours before you put out baits. Then follow up with more apple sections a week or two after you put out the bait.

Pollination. In the Pacific Northwest, pollination is always a spin of the dice. It seems that every year is a new challenge in getting a good fruit set. In order not to make the same mistake twice, it is important to tracking your pollination history. To determine if poor yield was due to pollination problems, growers should examine previous cropping records in relation to their neighbor's, the state averages, and the weather. They should also record yearly observations of normal bumble bee populations on the beds. If crops on beds with good flowering upright density have been poor, despite good bloom and weather, if other farmers in the area have obtained good yields, and if there are low bumble bee densities, pollination probably is a significant limiting factor of yield.

It is also prudent to assess the strength of your bee hives. Weak colonies or queenless colonies are useless for pollination purposes A strong hive must have an actively laying queen, which creates a high demand for pollen by the hive to feed the larvae. One colony of 30,000 bees may pollinate one and a half times more than two colonies of 15,000 bees. Growers should have confidence in the beekeeper and frequently check the entry/exit forage numbers of each colony. A good pollinating colony should have 100 incoming bees per minute during ideal weather (>65°F and little wind). On average, one-fourth to one-third of incoming bees should have pollen sacks on their legs. If few or none do, the colony maybe queenless. Washington State standards for rental hives are: six frames, two-thirds covered with bees at a temperature of 65°F. Growers should not attempt to conduct in-hive inspections without the beekeeper's permission. Hives with little consistent activity, especially during good foraging weather, should be suspect and the beekeeper notified. Too many hive swarmings can also diminish forage force.

Honey bees are very susceptible to insecticides. They can be killed through direct application or through contacting insecticides during foraging. This can diminish hive quality or even kill off hives entirely. Spraying of nearby fields or contaminated water sources can also lead to hive decline. In addition to bee kill, some insecticides can interfere with pollination by repelling bees. The length of residue hazard can vary from hours to days (see Washington State Department of Agriculture's "Pollinator Protection Update for Small Fruit" for more information). Use caution; however, there is no definitive evidence to date that prebloom sprays of insecticides such as Orthene have been a significant factor in poor pollination. We are putting out plots this year to collect data on this concern.

An additional consideration is protection of native pollinators. Bumble bees are likely to forage on early and late blooming cranberry flowers during the time of insecticide use, in which case, there may be severe long-term damage to their populations. Therefore, it is important that pesticide applications be made at night even after honey bee colonies have been removed to avoid direct contact to bumble bees.

Since honey bees usually prefer foraging on flowers other than cranberries, colony density must be adequate to saturate forage resources at least ½ mile from the farm. For example, if the only resource within miles is gorse, no additional hives may be needed. If acres of wild blackberries are blooming adjacent to cranberry beds, several extra colonies per acre will be required. One way to determine the amount of forage competition is by examining the color of the pollen. Cranberry pollen is a very light tan color. If most incoming bees are carrying different colored pollen, then competition from surrounding resources is a problem. This should be evaluated several times during the season (from the safety of a car window). Based on five years of pollen trap data from bee colonies in Oregon, Washington and British Columbia, the major competitors of cranberries for pollen resources are blackberry, clovers, and false dandelion. Growers with surrounding floral habitat that

is favored by honey bees need to bring in enough bees to saturate both the surrounding flora and the cranberries.

Cottonball. (A few tips on managing cottonball adapted by Patty McManus, University of Wisconsin.)

Control moss and avoid having areas of saturated sand in the spring when mummies germinate. Mummies germinate through sand, so you cannot "bury" last year's problems.

Under "low disease pressure," skip shoot elongation sprays and spray only during bloom. "Low disease pressure" is a subjective term that will vary among growers. If coming into the season you know you want to treat for cottonball but don't think it is bad enough to justify all four sprays, consider it "low disease pressure."

Just before bloom, scout for primary (shoot) infections so you can decide whether or not to spray during bloom. Look especially closely along ditches, wet areas, and where frost may have occurred.

Two sprays are permitted during bloom. Be certain that the first one goes on at 10-20% bloom. These early flowers are the ones most likely to set fruit and, therefore, are the most important to protect.

To the extent possible, spray a variety according to its developmental stage, rather than treating early and late varieties at the same time.

A Section 18 request for Orbit is still under review by the US EPA. A special notice will go out to growers in the Long Beach area if approval is granted.

Fruit rot. (Adapted from Peter Oudemans, Rutgers University.) The timing of fruit infections that lead to fruit rot show considerable variation depending on the fungal species in question. In field experiments conducted over three years in New Jersey, the timing of fungal infections leading to fruit rot was found to be concentrated around the period immediately following bloom. Fungicide applications initiated during early fruit set, which corresponds to late bloom, showed the greatest efficacy. Treatments initiated after this time showed progressively less effect on disease control. These results suggest that infection must occur within a short window of time in order for fruit rot to occur. Infections occurring later have less chance of developing into field rot; however, those infections may result in storage rot. Based on these results, the effect of delaying fungicide applications will, after a certain point, result in a loss of control. This emphasizes the importance of timely applications for maximum benefit. The results of the trials in New Jersey agree with those conducted in Massachusetts a few years ago.

Fungicides useful for controlling fruit rot are listed in Table 1. These fungicides are registered; however, in planning a fruit rot management program, one should always observe the preharvest intervals as well as recommendations made by a particular handler. The fungicides chlorothalonil and mancozeb have the greatest effect on cranberry fruit rot control. Ferbam and copper containing compounds tend to be less effective. There is little difference among the different formulations of chlorothalonil and formulation should reflect an individual preference with regard to ease of handling and cost.

Table 1. Fungicides effective for cranberry fruit rot control.

Fungicide	Formulations	Effectiveness	Phytotoxicity
Chlorothalonil	Bravo, terranil and several others	Very effective under high disease pressure	At high temps. (>90°F) blossom damage can occur. Fruit scarring has been noted
Ferbam	Ferbam	Effective	None reported. Can leave a black residue.
Mancozeb	Dithane, Manzate	Very effective	Reduces color development
Copper	Champ, Kocide	Effective under low disease pressure	None reported on cranberry. Can cause scarring on fruit at high rates.

Phytotoxicity. Fungicides useful for cranberry fruit rot control are broad-spectrum materials. These fungicides will damage plants if they can enter the plant cell. However, these materials are formulated so that they do not cross the cuticle and enter the cell; therefore, mixing pesticides and using additives should be done carefully because this can alter the characteristics of the formulation and result in phytotoxicity. In particular, some of the newer insecticides contain additives to enhance uptake. Mixtures of those insecticides and current fungicides will result in phytotoxicity. Two fungicides--chlorothalonil and mancozeb--can have phytotoxic effects but when used properly these effects can be minimized and fruit rot can be held in check.

Rules for avoiding phytotoxicity:

Rule 1. Chlorothalonil should be used after the majority of cranberry fruit are set.

Rule 2. Do not mix chlorothalonil with compounds designed to enhance uptake. Do not use any spreader sticker with chlorothalonil.

Rule 3. Do not use mancozeb after fruit are over 1/4 inch in diameter.

MISCELLANEOUS

E-mail. Several years ago I surveyed growers to see who had e-mail and found that only 10-15% of growers did. That should have changed by now. Please e-mail me at pattenk@cahe.wsu.edu. I would like to send The Cranberry Vine, and IPM newsletters by e-mail, but that works only if a large majority of growers receive it.

A Useful Website. The following is another helpful website; it has a plethora of information on cranberry. http://www.geocities.com/~cranberrybogs/links.html.

WEATHER

	Rainfall (Inches)					Growing Degree Days				
Month	1999	1998	1997	1996	20 yr av.	1999	1998	1997	1996	10 yr av.
January	15.5	18.5	14.9	9.8	10.8	14	58	43	51	51
February	21.2	11.4	5.6	13.1	9.3	10	69	21	86	61
March	12.0	10.2	16.2	3.4	9.5	36	97	38	108	87
April	3.6	3.0	6.5	12.9	5.6	87	99	91	190	134
May		3.8	4.7	4.3	3.8		265	344	231	216
June		1.8	5.1	1.8	2.8		350	362	315	323
July		1.1	1.2	1.6	1.9		476	476	460	421
August		0.2	2.7	1.0	1.7		484	543	440	440
September		0.7	6.9	2.7	4.1		369	477	385	363
October		6.2	15.6	11.5	6.5		244	229	245	217
November		19.6	6.5	14.2	11.4		99	144	67	99
December		20.3	9.0	18.4	12.6		34	38	20	41
TOTAL		96.8	94.7	94.7	80.5		2644	2806	2598	2463

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DIRECTIONS FOR USE IN CRANBERRIES

NOTICE: Before using this product, read the entire Precautionary Statements, Conditions of Sale and Warranty, Directions for Use, Use Restrictions and Storage and Disposal Instructions on the container labeling. If the Conditions of Sale and Warranty are not acceptable, return the product unopened within thirty days of purchase to the place of purchase.

ENVIRONMENTAL HAZARDS

This product is toxic to birds and aquatic invertebrates. Drift and runoff may be hazardous to aquatic organisms in neighboring areas. Drift from applications of this pesticide Is likely to result in damage to sensitive aquatic invertebrates in water bodies adjacent to the treatment area.

For terrestrial uses, do not apply directly to water or to areas where surface water is present or to inter-tidal areas below the mean high water mark, except under forest canopy when aerially applied to control forest pests. Do not contaminate water when disposing of equipment wash-waters and rinsate. Do not apply when weather conditions favor drift or runoff from areas treated.

This pesticide demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

GENERAL INFORMATION

CONFIRM 2F Agricultural Insecticide mimics the action of the natural insect hormone 20-hydroxyecdysone, the physiological inducer of the molting and metamorphosis process in insects. CONFIRM 2F is highly active against most lepidopterous larvae while having practically no activity at typical use-rates against other orders of insects. The selectivity of CONFIRM 2F allows for the maintenance of the populations of beneficial and predatory insects which is a key element in integrated pest management programs. CONFIRM 2F controls lepidopterous larvae through a novel mode-of-action by the induction of a premature lethal molt which initiates within hours of ingestion of treated crop surfaces. Contact activity has also been observed in some insects. Actual death of the larvae will take several days to occur although feeding by the insects generally ceases within 24 hours of ingestion.

USE RATE DETERMINATION

Carefully read, understand and follow label use rates, recommendations and restrictions. Apply the amount specified in the following table with properly calibrated aerial or ground spray equipment. The low rates may be used for light infestations of the target lepidopterous species and the higher rates for moderate to heavy infestations. CONFIRM 2F may be applied in either dilute or concentrate sprays so long as the application equipment is calibrated and adjusted to deliver thorough, uniform coverage. Use the specified amount of CONFIRM 2F per acre regardless of spray volume used. Prepare only the amount of spray solution required to treat the measured acreage.

MIXING AND COMPATIBILITY

Fill the spray tank one-third to one-half full of clean water and slowly pour CONFIRM 2F Agricultural Insecticide into the spray tank. Maintain agitation in the spray tank during mixing, loading and application. Triple-rinse empty container and add rinsate to spray tank.

CONFIRM 2F Agricultural Insecticide is believed to be compatible with most commonly used agricultural fungicides, insecticides, growth regulators, foliar fertilizers and spray adjuvants. If in doubt, mix proportional amounts of all spray ingredients in a test vessel. Shake the mixture vigorously and allow it to stand for fifteen minutes. Rapid precipitation of the ingredients and failure to re-suspend when shaken indicates that the mixture is incompatible and should not be applied.

APPLICATION TIMING

The activity of CONFIRM 2F Insecticide is expressed primarily through ingestion by the target larvae. Consequently, the timing of application is dependent on the feeding behavior of the target pest. For internal feeding larvae, application must be made prior to the time that surface feeding occurs. For foliar or surface feeding larvae, application made while active feeding is occurring will be effective. Re-application may be required to protect new flushes of foliage or rapidly expanding fruit. The re-application interval will vary depending on how rapidly the crop is growing and the generation time of the target pest. While CONFIRM 2F Insecticide is essentially equally effective against all instars, it is generally good practice to make applications to early instars to avoid the heavy damage that can be inflicted by later instar larvae. For best results, begin applications when first signs of feeding damage or when threshold levels of moths, eggs or larvae occur. Consult the Cooperative Extension Service, or other qualified professional authorities to determine the appropriate threshold for application in your area.

APPLICATION INSTRUCTIONS

Because CONFIRM 2F Insecticide must be ingested, application must be in a manner that assures uniform and thorough coverage. Higher water volume and increased spray pressure generally provide better coverage. Avoid application under conditions when uniform coverage cannot be assured or when excessive spray drift may occur.

A minimum of six hours drying time is required between completion of application and the onset of precipitation to ensure retention of the spray deposit.

USE DIRECTIONS FOR CRANBERRY

Ground Application: Make applications by conventional ground sprayers which are calibrated to deliver a minimum of 20 gallons per acre.

Aerial Application: Make applications of CONFIRM 2F in a minimum of 10 gpa.

Chemigation Application: For use only in solid-set sprinkler systems designed specifically for chemigation. Apply through a properly calibrated chemigation system that has the appropriate back flow prevention devises. See the 'MIXING' section of this labeling for specific mixing and dilution instructions. CONFIRM 2F should be applied in dedicated chemigation cycles only, not as a part of a regular irrigation cycle. Do not exceed 900 gallons of water per acre application volume. Minimum volume should be used for flush out to avoid diluting or rinsing off product. Washout time should not exceed six (6) minutes. Sprinkler heads should be set in a spacing not exceeding 50 feet by 60 feet and adjusted to provide 100% overlap. Crop injury, lack of effectiveness, or illegal pesticide residues can result from nonuniform distribution of treated water.

General Precautions for Applications Through Chemigation Systems

- Do not connect an irrigation system used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.
- Chemigation systems connected to public water systems must contain a functional reduced-pressure zone (RPZ), back flow preventer or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, the water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
- Systems not connected to a public water supply must contain a functional check valve, vacuum relief valve, and low-pressure drain appropriately located in the irrigation pipeline to prevent water source contamination from back flow.
- The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
- The pesticide injection pipeline must also contain a functional, normally closed solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
- The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
- The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected.
- Systems must use a positive displacement, metering injection pump (e.g. diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
- Do not apply when wind speed favors drift beyond the area intended for treatment.
- If you have questions about calibration, you should contact State Extension Service specialists, equipment manufacturers or other experts.

TARGET PESTS	APPLICATION RATE Fluid Ounces per acre	APPLICATION TIMING	RESTRICTIONS
Blackheaded fireworm	16.0 (0.25 lb. ai/acre)	**First generation:** Apply at first sign of larval infestation and make a second application 7 to 10 days following the first application. **Second generation:** Make the first application at 10-20% egg hatch (typically 8 to 12 days following biofix*) followed by a second application 7 to 10 days later.	Do not apply more than 64 oz of CONFIRM 2F per season Allow at least 30 days to elapse between final application and harvest.
Spotted fireworm	16.0 (0.25 lb. ai/acre)	**First generation:** Apply to small larvae before webbing occurs when threshold infestations are detected by sweep net sampling. Make a second application 7 to 10 days following the first application to heavy infestations or sustained moth flight. **Second generation:** Make the first application at 10-20% egg hatch (usually mid to late June) followed by a second application 7 to 10 days later.	
Sparganothis fruitworm	16.0 (0.25 lb. ai/acre)	**First generation:** Initiate applications as soon as larvae are detected by sweep net sampling. Make a second application in 7 to 14 days. **Summer generation:** Make the first application at 5-10% egg hatch (usually *10* to *14* days following biofix) followed by a second application 7 to 10 days later (about 60% egg hatch).	
Blossom worm False armyworm Gypsy moth	16.0 (0.25 lb. ai/acre)	Apply when larvae are in the 1st to 3rd instar and when action thresholds are reached based on local Extension Service recommendations.	
Spanworms	16.0 (0.25 lb. ai/acre)	Initiate applications when infestations reach threshold levels based on sweep net sampling. Additional applications at 10-14 day intervals may be required under high pressure or sustained moth flight.	

*Biofix is defined as first sustained adult catch in pheromone traps, typically, 5 moths in 3 traps within a seven-day period.

CONDITIONS OF SALE AND WARRANTY

Rohm and Haas warrants that the product conforms to its chemical description and is reasonably fit for the purpose stated on the label only when used in accordance with label directions under normal conditions of use. **ROHM AND HAAS MAKES NO OTHER EXPRESS OR IMPLIED WARRANTIES EITHER OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE.** Handling, storage and use of the product by Buyer or User are beyond the control of Rohm and Haas and Seller. Risks such as crop injury, ineffectiveness or other unintended consequences resulting from, but not limited to, weather or soil conditions, presence of other materials, disease, pest, drift to other crops or property or failure to follow label directions will be assumed by the Buyer or User. **IN NO CASE WILL ROHM AND HAAS OR SELLER BE HELD LIABLE FOR CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES RESULTING FROM THE HANDLING, STORAGE OR USE OF THIS PRODUCT.**

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