EB0845
COLLEGE OF AGRICULTURE & HOME ECONOMICS

1998

CRANBERRY INSECT, DISEASE, & WEED CONTROL PROGRAM

By

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SPRAY COMPATIBILITY (ABILITY TO MIX) CHART FOR FUNGICIDES AND INSECTICIDES

Combining Chemicals

It may be to your advantage to control several problems with a single spray application by combining several chemicals. Read the label and follow the manufacturer's directions when making these mixtures. This compatibility chart is provided to help you in preliminary planning only. Compatibilities can vary from those indicated on this chart because of change in solvents and emulsifying agents, etc. It is a good idea before making a tank mixture to mix the chemicals in a jar of water at approximately the recommended dilution rate and look for any reactions that would cause solids to form and separate out of the solution. Some mixtures may be phytotoxic (cause plant injury). To determine if a combination is phytotoxic spray a small area and then evaluate 3 to 7 days later for visual effects. Agitation is recommended when mixing and using mixtures of pesticides.

	Sevin	Orthene	Mancozeb	malathion	Lorsban	Kocide	Guthion	ferbam	diazinon	Bravo**	Bordeaux
Bordeaux	2	2	C	2	X		2	C	2		
**Bravo					C		1				
diazinon		C				2					2
ferbam					?	C					C
Guthion		X				2				1	2
Kocide	2	2	C	2	X		2	C	2		
Lorsban			C			X		?		C	X
malathion						2					2
Mancozeb					C	C					C
Orthene						2	X		C		2
Sevin						2					2

Blank = Normally compatible; however, most recent compatibility charts suggest not to mix unless approved by manufacturer.
C = Caution, may be incompatible or compatibility unknown.
X = Incompatible
1 = Use wettable or soluble powder forms
2 = Do not combine Bordeaux mixture or Kocide with an insecticide
3 = Use EC formulation
? = Compatibility profile unknown
** Do not use a spreader-sticker with Bravo

1998 Cranberry Insect, Disease, and Weed Control Program

NOTE: WSU recommendations are based on the latest available information. However, occasionally they may differ from a label. If so, the label instructions supercede WSU instructions. Always check the label before using the chemical.

Insect and Disease Control

The following information lists and describes chemical control measures suggested for the more common insect and disease pests of cranberries. The recommendations are based on research by Washington State University, the USDA, and other agencies. The materials suggested are considered safe to use (when directions on the label are followed carefully) and are known to be effective.

In many cases, additional information may be desired on description of these pests, their damage, their life cycle, and their control. If your problem goes beyond the scope of this discussion, you can get additional help from your county extension agent or by contacting one of the authors listed (e.g., Kim Patten 360-642-2031; e-mail: pattenk@coopext.cahe.wsu.edu).

PRECAUTIONS IN USING PESTICIDES

Before using any pesticide, you must have the product label in your possession. READ and FOLLOW all directions and precautions on the label. **Cranberries must be listed on the label of the material you use. Occasionally they will be on the label of one brand or formulation but not on another.**

Pesticides are poisonous to humans and animals. Use them only when needed and handle them with care.

Keep pesticides in closed containers in a dry place. Avoid freezing temperatures. Store them where they will not contaminate food, feed, or water sources; and preferably in locked storage where children and animals cannot reach them. Keep pesticides in their original containers.

Be certain that the pesticide label permits chemigation of cranberries before applying it through the sprinkler system.

Avoid contact with pesticides. If any is spilled on skin or clothing, wash it off the skin thoroughly with soap and water and change clothing immediately.

Avoid inhaling pesticide dusts or mists.

When handling pesticides, wear clean, dry clothing.

Wear rubber gloves, approved for use with pesticides.

Wash your hands and face immediately after completing pesticide application.

Do not eat, chew gum, smoke, or use chewing tobacco while handling pesticides or before washing.

To protect fish and wildlife, do not contaminate lakes, streams, or ponds with pesticide. Do not clean spraying equipment or dump excess spray material near water.

Dispose of pesticide containers so they do not pose a threat to human beings or the environment. Rinse empty containers at least three times and pour the rinse water into the spray tank. Unless containers can be returned to the manufacturer or sold to a commercial salvage firm, puncture, crush, or break them (except for aerosol cans) so they **cannot** be used for other purposes. They can then be taken to a sanitary landfill dump or other site approved by the local health department. Landfills currently accepting such containers are located in Aberdeen (360) 249-4222, and Long Beach (360) 642-2541. Call to verify hours and conditions first. Burning empty pesticide containers can produce toxic fumes; such burning is prohibited by state air quality regulations. Dispose of pesticides no longer registered for use on cranberries. The time to do this is now. Inventory pesticides you have which fall into this category. Transfer product to producers of other crops that are still on the label. (Your distributor may be able to assist in the transfer.) Return product to the manufacturer for disposal where possible. Order only the amount of pesticides that you will use during the year. Use older material first. Contact your Cooperative Extension agent for Hazardous Waste Disposal Events and other options.

HEALTH HAZARDS

All pesticides are poisonous; *some are toxic in very small amount and may be absorbed through the skin or inhaled in quantities that endanger the health or even the life of the operator.* The degree of danger and the necessary precautions are indicated on pesticide container labels. *Read the manufacturer's label carefully and follow the instructions on it.*

WORKER PROTECTION STANDARD

The federal Worker Protection Standard (WPS) requires agricultural employers to protect their worker and handler employees from exposure to pesticides. This standard is comprehensive and complex. A "How to Comply" manual

developed by EPA is available from a number of sources including county Extension offices.

REENTRY TIMES

No one may enter a pesticide-treated field without wearing personal protective equipment specified on the label until the assigned reentry time has elapsed. **Check the pesticide label for reentry times.** Assigned times may range from 24 hours to several days. If the reentry time is longer than 24 hours, the field must be posted against reentry. Call the Washington Labor & Industry Office (360) 902-5426 for details on protective clothing and on posting rules as new requirements are pending.

RESTRICTED USE PESTICIDES

Certain pesticides are designated "restricted use." Only certified applicators may purchase and apply them. Check with your Cooperative Extension agent for a list of cranberry pesticides that carry restricted use designation, and ask how you can become certified.

APPLICATION OF PESTICIDES THROUGH A CHEMIGATION SYSTEM

Most growers rely upon chemigation for the application of their fungicides and insecticides. Several precautions must be observed for this use:

- The product must have a label allowing chemigation.
- The irrigation system should be well designed and have a uniform application rate across the entire field. Crop injury, lack of effectiveness or illegal pesticide residues in the crop can result from uneven distribution.
- Apply during calm periods to avoid drift and uneven application.
- The chemigation equipment must be calibrated to inject the desired quantity of chemical. Be sure to agitate the spray mixture in the supply tank at all times to avoid settling and uneven application.
- Apply the right amount of water to avoid runoff, drift or deep percolation. Pesticides must dry on the plant to be effective. The practical minimum application time is 1) the time required for the plant surface to become covered plus 2) the time required for the material to reach the extreme end of the system.

USING SPREADER-STICKER

Most modern insecticides and fungicides contain a spreader-sticker. It is often inadvisable and sometimes even dangerous to add a spreader-sticker to such formulations. (Check the label.) For example, do not add wetting agents or spreader-stickers to Bravo products. Also avoid using stickers with other pesticides and fertilizers 2 weeks before and 4 weeks after the last Bravo application, if possible. If a spreader-sticker is recommended, after all other materials have been added to the spray tank, add the spreader-sticker according to directions on the spreader-sticker label, a little at a time. *Test the amount by dipping cranberry tips in spray mixture.* If enough spreader sticker has been added, the leaves will wet evenly and thoroughly on both sides. If not, the spray mixture will draw up in beads and drops. However, too much will cause the spray to run off the leaves and reduce the effectiveness of the pesticides.

8-8-100 BORDEAUX MIXTURE FORMULA

Ingredients. Use 8 pounds bluestone (copper sulfate) for each 100 gallons of water. Instant bluestone may be used directly from the container; crystalline bluestone must be dissolved in water first to form a stock solution. Use 8 pounds of freshly hydrated or slaked lime for each 100 gallons of water. Mix the lime with enough water to form a thin paste, strain through a 20-mesh screen to remove lumps.

Mixing. Fill spray tank about two-thirds full with water. Then pour the bluestone slowly into the spray tank while the agitator is running. After the bluestone has been added, put in the lime. Then add more water to fill the tank and add spreader-sticker. *Do not combine Bordeaux mixture or Kocide with an insecticide.*

PHYTOPHTHORA ROOT ROT CONTROL

This fungal disease is usually most severe in low or poorly drained areas. The disease can be controlled by improving drainage and stimulating root growth. Improve drainage by digging new lateral ditches, maintaining existing ditches, or adding drain tile or pipe. Promote new root growth by sanding and fertilizing plants, especially those at the margins of the weak areas. Soil applications of the fungicide Ridomil have been beneficial when combined with modified soil drainage. Before using Ridomil, confirm that the Phytophthora fungus is present (check with the Extension Agent). Use liquid formulation of Ridomil for broadcast or chemigation treatment and granular formulations for spot treatment. When spot treating apply Ridomil 10 feet into healthy vines. Apply granules when foliage is dry so granules fall through the canopy. Irrigate following application to move Ridomil into the soil. Retard spread of the pathogen by harvesting infected beds last, and by using vines free of the pathogen when planting new beds or renovating sections of established beds.

Note: The active ingredient in formulations Ridomil Gold are more concentrated; therefore, less product will be used per acre. Be sure to read the product label carefully.

ROSE BLOOM CONTROL

Protect new upright and runner growth from spores produced on the surface of the pink fleshy growths. Effective control will reduce disease incidence (the number of rose bloom growths) the following spring. Start fungicidal protection when the growths first begin to take on a whitish cast; this marks the onset of spore production. For 'Stevens' this will be in early May (rough neck stage); and for 'McFarlin' and other cultivars, about 1 to 2 weeks later. Repeat at 14-day intervals until the growths wither (shrivel/dry up), but do not make more than three applications. Chemicals applied earlier in the spring do not cause the fleshy growths to wither before spores are produced.

UPRIGHT DIEBACK

Symptoms first appear in spring with a general yellowing of leaves. This is usually followed by an orangish brown coloration or bronzing. Eventually affected uprights turn brown and die. Infected uprights can be scattered among healthy uprights or in patches. Dying uprights often occur on the same runner as healthy uprights. Roots on runners with dead uprights are unaffected. Only one of two fungi associated with upright dieback occurs in Pacific Northwest beds. *Phomopsis vaccinii* also causes the fruit disease known as viscid rot. Recent research found that *P. vaccinii* is frequently recovered from symptomless stems of uprights and runners. Fungicides applied during the growing season reduced the frequency of recovery. *P. vaccinii* has not been associated with dead uprights. At this time it is not known if *P. vaccinii* or other fungi cause uprights to die in this growing region.

TWIG BLIGHT CONTROL

The onset of infection and need for fungicidal protection are linked to spore development. An IPM (integrated pest management) scout will monitor the spores and notify growers when to make the first applications. Repeat at 14-day intervals for a total of three applications. Effective control will reduce disease incidence (the number of blighted uprights) the following spring. Protect newly planted beds if infected beds grow nearby, as spores of the fungus are carried in wind currents. For chemigated beds, additional hand spraying may be necessary to achieve control in areas where sprinkler coverage is poor.

FRESH FRUIT KEEPING QUALITY

Fungicide use is only a part of the program to assure good keeping quality. Control of weeds and vine overgrowth, careful handling of the fruit, and avoiding irrigation during mid-day are also essential.

ROOT WEEVIL AND GRUB CONTROL

Strawberry Root* and Black Vine Weevil Control.

Mature larvae may be suppressed during May or September using nematodes, provided soil temperatures are above 53°F. Follow the producer's instructions as to rates and methods. Cryolite has a 24(c) label for weevil control. User must possess the Washington Special Local Needs label for legal application. Root weevils usually are not a problem in water-harvested beds. If they do occur there, hold the flood water 4 to 7 days after harvest. Mid-winter flooding is generally less effective.

*These pests are not on the label. However this use is legal when label directions and precautions are followed.

FIREWORM CONTROL

Insecticides should target recently hatched larvae before they become enclosed in the developing bud. This can be done only by visual inspection or sweeping. For moderate infestations, target first generation larvae in mid-May. For severe infestations, two insecticide applications 10 to 14 days apart during the first generation hatch in May will improve control. Control of the second generation is essential to prevent damage to vines and the crop. Pheromone trap-catches of first generation adults and sweep net samples can be used to predict emergence of second generation larvae. Optimal timing for spraying with traditional insecticides for second generation often occurs during bloom. Avoid bee kill by not applying toxic insecticides during bloom. However, spraying after the bees are removed may be too late for control of second generations. Consider using Pyrenone or *B.t.* products to suppress larval populations until a postbloom spray or other insecticides can be used. Both compounds are nontoxic to bees. Pyrenone and *B.t.* products work only at the early instar stage (<1/8" long) of the larvae. Applications made to larvae populations that are 1/4" long will give very poor control. Pyrenone and *B.t.* formulations have short residuals. Two applications should be made 7 to 14 days apart, depending on heat dependent rate of egg hatch. *B.t.* based compounds are sensitive to ultra-violet sunlight and should be applied in mix with a sticker at dusk.

CRANBERRY GIRDLER

Several control options for girdler control exist, none of which are ideal. Diazinon 14G should be considered as a last resort, after the following practices have been tried. Temporary flooding (24 to 48 hours) during late July to

INSECT AND DISEASE CONTROL IN CRANBERRIES

Time of application	Insect or disease	Materials*	Amt. formulation Per acre** Use 300 gal./acre	Tolerance in ppm	††PHI	Remarks
Late dormant stage (March 1 to 15)	Stem and leaf blight	Bordeaux mixture 8-8-100	24 lbs.	Exempt	None	**Do not** use Bordeaux mixture in combination with any insecticide.
When buds break dormancy	Stem and leaf blight	Use any fungicide at proper rate listed for the late dormant stage.				
Rough neck (approx. May 1)	Rose bloom****	Bordeaux mixtures 8-8-100 Kocide 101 Kocide 2000	24 lbs. 8 lbs. 6 lbs.	Exempt Exempt Exempt	[None Listed]	See Rose Bloom Control text.
Late April to early May	Black vine weevil	Entomopathogenic nematodes		Exempt		Apply in accordance with manufacturer's directions when soil temperatures exceed 53°F.
	Phytophthora root rot	Ridomil 5G, Ridomil GR, or Ridomil 2E Ridomil Gold EC, or Ridomil Gold WSP	20-35 lbs. 4-7 pts. 1-1 3/4 pts. 1-1 1/2 lbs.	4 4 4 4	45 days 45 days 45 days 45 days	See phytophthora root rot control on pages 4-5.
Late hook (about May 15 ± 5 days). Avoid application of toxic insecticides after first blossoms appear. Killing bee pollinators will reduce yields.	Rose bloom,**** stem and leaf blight	Use any fungicide at proper rate listed for the late dormant stage.				**Do not** use Bordeaux mixture in combination with any insecticide.
	Fireworm, Tip-worm, and Fruitworm (Tipworm and fruitworm are very rare)	Diazinon 4 lb./gal. EC, or Diazinon 50WP, or Guthion 50WP, or Guthion 2EC, or Lorsban 4 lbs./gal. EC, or	2-4 pts. 4 lbs. 2 lbs. 4 pts. 3 pts.	0.5 0.5 2 2 1	7 days 7 days 21 days 21 days 60 days	Apply as soon as worms are found in vines or tips. Lorsban may only be applied two times per year.
		†Orthene 75S, or	1.3 lbs.	0.5	75 days	Orthene may be applied only twice per season, and only once post bloom.
		Sevin XLR Plus	4 pts.	10	7 days	**Do not** apply Sevin XLR Plus during bloom.
Bloom	Fireworm	Pyrenone Crymax Dipel	See label for use 1.5 lbs. 1 lb.		 (4h REI) (12h REI)	Pyrenone and *B.t.* products provide temporary suppression of early infestations of second generation larvae.
	Black vine weevil	†Cryolite	See label for use	7	30 days	

Time of application	Insect or disease	Materials*	Amt. formulation Per acre** Use 300 gal./acre	Tolerance in ppm	††PHI	Remarks
Late bloom (when 80% of blossoms have dropped). To protect bee pollinators **do not** apply insecticide during blossoming. Remove bees before spraying with insecticides.	Fireworm	Use same insecticide control as in the late hook stage, **except do not apply Orthene if it was used at late hook stage.**				Use insecticides only when necessary. Apply as soon as second generation larvae are seen (about July 5 ± 5 days). See Twig Blight Control text on other side.
	Fruit rot, Storage rot Twig blight*** (Lophodermium)	Bravo 500, or	6–10 pts.	5	50 days	These fungicides help to reduce fruit rot plus protect vines from twig blight. Repeat at 10- to 14-day intervals. Do *not* apply Bravo products more than three times per season. **Do not** combine Bravo with surfactants or Dipel. Do not apply ferbam later than 28 days after mid-bloom.‡‡‡ **Do not** use Kocide in combination with any insecticide.
		Bravo 720, or	4–7 pts.	5	50 days	
		Bravo 90DG, or	3.5-5.75 lbs.	5	50 days	
		Bravo Ultrex	3.8–6,3 lbs.	5	50 days	
		Carbamate (ferbam) 76WDG, or	6 lbs.	7	See remarks‡‡‡	
		Kocide 101, or	8 lbs.	Exempt	None listed	
		Kocide 606, or	10 pts.	Exempt	None listed	
		Kocide 2000	6 lbs.	Exempt	None listed	
		Mancozeb 80WP, or	3–6 lbs.	7	30 days‡‡‡	
		Dithane F-45, or	2.4–4.8 qts.	7	30 days‡‡‡	
		Mancozeb DF	3–6 lbs.	7	30 days‡‡‡	
July 1–15	Fruit rot, Storage rot Twig blight (Lophodermium)	Any fungicide and its rate listed for late bloom.				
(Approximately) July 1–7	Cranberry girdler	†Diazinon 14G	21 lbs.	0.5	7 days	For a single application 14 to 21 days after peak flight (mid-July). For severe infestations, apply at peak flight and 14 days later (mid- to late June and mid-July).
		Entomopathogenic nematodes Best to apply nematodes no earlier than 14 days following peak moth flight. Follow manufacturer's recommendations for application timing and irrigation requirements.		Exempt		

(continued)

INSECT AND DISEASE CONTROL IN CRANBERRIES (Continued)

Time of application	Insect or disease	Materials*	Amt. formulation Per acre** Use 300 gal./acre	Tolerance in ppm	††PHI	Remarks
July 25 to August 10	Fruit rot, Storage rot Twig blight (Lophodermium)	Any fungicide at proper rate listed for late bloom **except** Carbamate.				Insecticides may be combined with fungicides if insect control is necessary. It is **not** advisable to use more than one of each in the tank at any given time. Check the label of each product to be combined for special mixing instructions. Use diazinon or malathion if scale insects are a problem. Spray for fireworm only if third generation larvae are seen.
	Fireworm, Fruitworm, Lecanium scale	Use any insecticide, **except** Orthene (unless you have only used it once during the current season) at proper rate listed for the late hook stage. Only one postbloom use of Orthene is allow—up to 75 dyas before harvest. Use Lorsban only if it will be applied at least 60 days before harvest.				
	Phytophthora root rot	See Ridomil under late April to early May.				
August 20 to 25	Fruit rot, Storage rot Twig blight (Lophodermium)	Any fungicide at proper rate listed for late bloom **except** Bravo, and Carbamate.				Helpful for control of storage rots and twig blight if severe.
Mid- to late September	Black vine weevil	Entomopathogenic nematodes	See label for instructions	Exempt		Apply in accordance with manufacturer's directions regarding irrigation requirements and when soil temperatures exceed 53°F. Make a single application in spring or fall when larvae are present.
October	See remarks on flood-water control for weevils under root weevil section.					
	Phytopthora root rot	See Ridomil under late April to early May.				

*Pesticides are listed in alphabetical order and not necessarily in order of effectiveness. Products having the same active ingredient may be available under other trade names.
**Do not exceed the amount indicated on product label.
***If twig blight is present, Bravo or Mancozeb are recommended over other products.
****This pest is not on the label. However, this use is legal when label directions and precautions are followed.
†Washington State SLN Registration. A copy of the state label must be in the grower's possession when applying this pesticide.
††PHI stands for preharvest interval or the minimum number of days from last application to harvest.
Abbreviations: WP-wettable powder; EC-emulsifiable concentrate; G-granules; F-flowable; S-soluble powder; DG-dispersible granules; WDG-water dispersible granules; WSP-wettable powders in water soluble pouch.
‡‡‡Certain processors are requesting that growers voluntarily maintain a 60-day preharvest interval for EBDC fungicides (for example, mancozeb and ferbam).

late August may suppress recently hatched larvae, but may need to be repeated several times. To prevent fruit scald, flooding should be started at night to be above the tips by mid-morning. Entomopathogenic nematodes, applied during August against mid to late instar larvae may be helpful. Severely infested patches should be sanded or renovated. Significant levels of sand are needed to prevent damage.

FROST AND SCALD CONTROL

Frost. Sprinkle during every frost period after buds have started to swell. Overuse of sprinkler irrigation for frost protection too early in the season, prior to bud swell, can result in reduced control of weed with herbicides. During severe freezes, occasional sprinkling may not give complete protection. Coating with ice will help prevent desiccation. Do not turn off sprinklers until ice on the vines has melted.

Scald. Sprinkle during periods of high temperatures and low relative humidity. Turn sprinklers on before the temperature reaches 80° to 85°F. Beds with weak vines (e.g., herbicide, weevil, or disease damaged) are most susceptible to scald damage.

Weed Control

Herbicide use in cranberry beds is often more difficult than in other crops and cropping situations. The root system of cranberries consists of a mass of fine, fibrous roots. Most of the roots are in the upper 4 to 6 inches of soil, making herbicide injury more likely. Furthermore, cranberry beds are acidic and usually high in organic matter; both conditions affect herbicide action. If higher herbicide rates are used to gain weed control, chances for cranberry injury are increased. Under most conditions, the chemical weed control practices outlined have proved to be effective and selective to cranberries when carefully used according to directions. Soil pH management can be an important tool in controlling weeds. Soil pH's above 5.0 will encourage some species of weeds. Gradually lowering pH with elemental sulfur when combined with a good herbicide program is an effective means to control some leguminous weeds. Avoid use of any elemental sulfur in areas that are poorly drained.

SWAB TREATMENTS

Tall weeds on beds

- Glyphosate (Roundup)—Use solutions as directed by product label, swabbed on weeds extending at least 6 inches above cranberry vines.

  Do not allow solution to drip or touch cranberry vines. Apply no later than 30 days before harvest. Repeat treatment may be necessary; wipe in both directions to improve results; use a recommended dye to observe coverage patterns. Do not use, mix, or store in galvanized pipe or container. Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Poor growing conditions such as stress, disease or insect damage also may reduce effectiveness. Adding 2,4-D to Roundup may improve control against some broadleaf weeds. Do not mix these two products together without diluting one first, or they may solidify.

  Roundup also may be applied as a stump treatment or injection and frill application. Use for woody brush control in and around cranberry beds. Apply after fruit set and no later than 30 days before harvest.

- 2,4-D amine—10% to 33% solution swabbed on weeds extending above cranberry vines.

  The only 2,4-D amine formulation registered for this use is sold under the trade name Weedar 64. Special local need registration is No. WA800081. The label must be in the grower's possession at the time of application.

  Do not allow the solution to drip or touch cranberry vines. Apply only once per year. 2,4-D is volatile. Application during hot weather will injure vines and flowers.

- Sulfosate (Touchdown)—25% solution for wick wipers. Add nonionic surfactant at 1% V/V. Touchdown can only be used on nonbearing vines. Apply to target weeds, avoiding contact with vines.

NEW PLANTING PREPARATION

Preplant weed eradication of perennial weeds prior to planting is critical. Fumigation or multiple spraying of new and established weeds with Roundup in the summer prior to planting a new bed or renovating a weedy bed is highly recommended. If sand is used on new plantings make sure it is free of weed seeds. Sand 3 to 4 inches deep is needed to prevent weeds from emerging through the layer. To avoid introducing new weed seeds, use vines that are taken from beds free of weeds..

Pre-emergent Weed Control

- Norflurazon (Evital) at 1-2.5 lb active ingredient per A (20-50 lb product). Use lower rates (15-20 lb. product) on 'Stevens,' 'Crowley,' or 'Pilgrim' varieties on sandy soils. Injury may occur in areas where water puddles. Erratic results occur when grasses are stressed from lack of vigor, drought, high temperature, low fertility, grass stage growth, and unknown environmental factors.

Plants that are not true grasses resist treatment. For fescues and annual bluegrass control use clethodim. Some growers have reported slight phytotoxicity from the crop oil concentrate used with grass herbicides. Damage is avoidable if products are not applied to runoff.

- Napropamide (Devrinol) at 5 lb active ingredient per A (50 lb product). Use split applications of lower rates on sandy soils. Combinations of both Devrinol and Evital at low rates (20 to 30 lb product each) may improve weed control on new plantings.

Post-emergent Grass Control

- Sethoxydim (Poast) at 0.5-1.5% solution (4 tsp-4 tbsp + 8 tsp crop oil/gal water).

- Fluazifop (Fusilade) DX at 0.5-1.0% solution (4-8 tsp to 4 tsp crop oil or 1 tbsp nonionic surfactant/gal water). Do not apply within 1 year of harvest.

- Clethodim (Prism) at 0.5-1.0% solution (4-8 tsp to 4 tsp crop oil/gal water). Do not apply within 1 year of harvest.

  Apply to actively growing grasses listed on label at the 4- to 5-leaf stage (6 to 12 inches tall).

  Apply to obtain thorough coverage but not to runoff. Repeat treatment if necessary as often as three times (June, July, and August).

  Split applications of low rates will improve weed control on sandy beds.

GRASS CONTROL ON BEARING BEDS

- Sethoxydim (Poast) at 0.5% to 1.55% solution (4 tsp to 4 tbsp and 8 tsp crop oil/gal water). Use the higher rates for perennial grass control. Repeated applications may also be necessary. Do not exceeed 5 pints per acre per season. Do not apply within 60 days of harvest.

PERENNIAL BROADLEAF CONTROL ON BEARING BEDS

Perennial weeds such as silverleaf, purple aster, and lotus are difficult to control without damaging vines. Eradicate at the first stage of infestation. For severely infested plantings, consider split applications of Casoron. Make the first application (50 lb product) when the shoots first emerge in the spring (early March) and one month later. Supplemental Devrinol @ 70 to 120 lb product applied between mid-March and mid-April has improved control of perennials. For lotus and buttercup control, spot treatment in early February with high rates of Devrinol will provide satisfactory control if followed by a split application of Casoron. Weed control on poorly drained beds is likely to be erratic.

Resources:

Caruso, F.L. and D.C. Ramsdell. 1995. Compendium of Blueberry and Cranberry Diseases. APS Press, Minneapolis, MN. 87 pages.

Cranberry Production in the Pacific Northwest. PNW 247. 50pp.

Additional information is available on the Washington State Pesticide Home Page (http://www.wsu.edu:8000/~ramsay/)

Acute toxicity of pesticides

Product	Fish	Bees	Birds	Humans
Fungicides				
Bordeaux mixture	2			
Bravo	1			
Carbamate (ferbam)	2			
Kocide	2			
Mancozeb	2			
Insecticides				
Lorsban 4E	1	1		2
Furadan 4G			1	1
Diazinon 50W	2	1		2
Diazinon AG500/4EC	2	1		2
Diazinon 14G	2		1	2
Sevin (most formulations)		1		
Guthion (all formulations)	1	1		1
Omite	2			
Malathion	2			
Methoxychlor	1			
Pyrenone	2			
Orthene		1		

1 = Extremely toxic 2 = Moderately toxic

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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WEED CONTROL IN CRANBERRIES

Time of application	Weed*	Materials**	Amt. formulation per acre	Tolerance in ppm	Remarks
Dormant stage November–December	Cats-ear* or false dandelion, spikerush*, oniongrass*, cottontop*, rush*, broadleaf weeds	19.2% ae G 2,4-D low volatile ester	20 lbs.	0.5	Apply 2,4-D soon after weed emergence, while cranberries are completely dormant and dry. Use granular formulation. Do not use products with significant amounts of fine powder. Use only 2,4-D products registered for cranberries. 2,4-D provides only limited residual weed control.
February–late April	Birdsfoot trefoil (lotus*), buttercup*	Devrinol, 10% G †Devrinol 50DF (Napropamide)	75–150 lbs. 8–18 lbs.	0.1 0.1	Apply Devrinol before start of spring growth to dry vines. Rain or sprinkler irrigation of at least 1/4 inch after application is essential for weed control. A split application (75 lbs. late Feb. and 50 lbs. mid-April) will provide better lotus and general overall weed control than a single application in February–March. Better control is achieved in beds where soil pH is less than 5.0. Combining Devrinol with one or two applications of Casoron (50 lbs.) will provide additional lotus suppression. Do not exceed 150 lbs/A of Devrinol per year. Use lower rate on sand beds. Devrinol may lose effectiveness if repeatedly used at high rates in the same field for several years. For control of severe buttercup, use a single large application of Devrinol (100–150 lbs.) in January, combined with a split Casoron application in early March and April.
	Rice cutgrass, povertygrass*, smokegrass, barnyard grass, needlegrass, spikerush, nutsedge	Evital, 5% G (norflurazon)	50–160 lbs.	0.1	Do not apply after bud opening or more than once per year. Use lower rates on 'Stevens,' 'Crowley,' or 'Pilgrim' varieties, on sandy beds, or on beds having weak vines.

(continued)

WEED CONTROL IN CRANBERRIES (Continued)

Time of application	Weed*	Materials**	Amt. formulation per acre	Tolerance in ppm	Remarks
February–late April (continued)	Annual broadleaf weeds, purple aster, loosestrife, rush, sedge, grass, Field horsetail, silverleaf.*	Casoron/Norosac, 4% G (dichlobenil)	40–100 lbs.	0.15	Better weed control can be achieved by using two equal applications in the spring (50 lbs. each). Make second application 3 to 6 weeks after first. Do not apply at or after popcorn stage. Do not exceed 100 lbs. of product per year on producing beds. Higher rates will reduce yields. Avoid overapplication, which may result from overlapping during treatment period.
	Multiple species—severe infestation	Casoron/Norosac 4% G (dichlobenil)	30–50 lbs.	0.15	Better control of hard-to-kill weeds may be obtained by using these two herbicides in combination. Use granular formulations of these herbicides and follow all precautions and restrictions as given for each herbicide when used alone (see above). Do not apply at or beyond popcorn stage. May be used as a split application in late February and early to mid-April for more effective weed control.
		plus			
		2,4-D 19.2% ae G	5–15 lbs.	0.5	

Weeds not on product label: some suggested uses of pesticides in this publication are for weeds not listed on the label. These are indicated by the symbol. Such uses comply with the federal law (FIFRA) which says a use is consistent with label instructions provided the crop or site is on the label and directions concerning rates and interval before harvest are followed.
**Do not exceed the amount indicated on product label. ae means acid equivalent.

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EB0845