

Cranberry Insect, Disease and Weed Control Program

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

Insect and Disease Control

The following material 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 the Departments of Entomology or Plant Pathology, Washington State University, Pullman.

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.

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. Store them where they will not contaminate food or feed, and preferably in locked storage where children and animals cannot reach them. Keep pesticides in their original containers.

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 inhalation of pesticide dusts or mists.

When handling pesticides, wear clean, dry clothing.

Wear rubber gloves.

Wash your hands and face immediately after completing pesticide application.

Do not eat or smoke 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 such 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, they should be punctured, crushed, or broken (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. Small containers, such as those in the home and garden trade, can be handled by local trash disposal services. Open burning of large quantities of combustible containers is prohibited by the Environmental Protection Agency. However, small quantities not exceeding 50 pounds or the quantity emptied in a single work day, whichever is less, may be burned in open fields *provided* the wind direction is away from population centers, humans or domestic animals, surface water supplies, and crops that are susceptible to damage. Such open burning must be consistent with local ordinances and label directions.

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.*

REENTRY TIMES

No one may enter a pesticide-treated field without wearing protective clothing until the spray has dried or the dust has settled. In some cases, a longer reentry time has been assigned to a chemical, meaning that no one may enter a field before the assigned time has elapsed. 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. Check the pesticide label for reentry time. Call the Washington Labor and Industry Office (206) 586-8029 for details on protective clothing and on posting rules.

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.

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. 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 tip 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 or 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.*

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 appear. For 'Stevens' this will be about May 1

(rough neck stage); and for 'McFarlin' and other cultivars, 1 to 2 weeks later. Repeat at 14-day intervals until growths wither (shriveled/dry up), but do not use more than three applications.

ROOT WEEVIL AND GRUB CONTROL

Strawberry Root and Black Vine Weevil Control. Black vine weevil is the most common species. Apply 20 pounds of Furadan 10G or 13.3 pounds of Furadan 15G per acre. Spread granules evenly over the soil surface with a granule applicator. Apply between June 15 and 25 and repeat one month later. Follow application by sprinkler irrigation. Use only on bogs that are not flooded for irrigation, harvest, or any other purpose. Do not apply within 60 days of harvest.

Application of Furadan to soil causes microorganisms that degrade Furadan to increase in number. This results in faster breakdown of the chemical in subsequent years. Furadan may be of limited or little use in some bogs where this insecticide was applied in previous years. The problem exists in some cranberry bogs that have histories of Furadan use.

Adult weevils may be controlled by sprays of Orthene.* Apply 1 1/2 lb. of Orthene 75S per acre at night when the weevils are most active. It may be used in late April to early May to control overwintered adults. Be sure to note 90-day preharvest interval. Do not apply to blooming cranberries.

Insect-parasitic nematodes may be applied in May or September to control root weevil larvae. Application through irrigation sprinklers has been more satisfactory than by sprayers. Follow the nematode producer's instructions as to rates and methods.

Woods Weevil and Obscure Weevil Control. These two weevils are seldom a problem.

Apply 1 1/2 pounds Orthene 75S or 1 1/2 pints parathion 48% EC or 4 pints diazinon EC AG 500 per acre. Apply as close to June 15 as possible but before blossoms appear. If woods weevil is a problem, make another application of parathion or diazinon in early August after blossom drop. Use only if one of these species has been identified as a problem.

CUTWORMS AND OTHER CATERPILLARS

Apply 3 pints of Lorsban 4E per acre as a foliar spray when the caterpillars are present in damaging numbers. Use at least 100 gallons of water per acre when using ground equipment. Do not apply if bogs are flooded. Do not make more than two applications per year or apply within 60 days of harvest. Do not apply when cranberries are in bloom.

FROST AND SCALD CONTROL

Frost. Sprinkle during every frost period after buds have started to swell. During severe freezes, occasional sprinkling may not give complete protection. Coating with ice will help prevent desiccation.

Scald. Sprinkle during periods of high temperatures and low relative humidity. Turn sprinklers on before the temperature reaches 80°F.

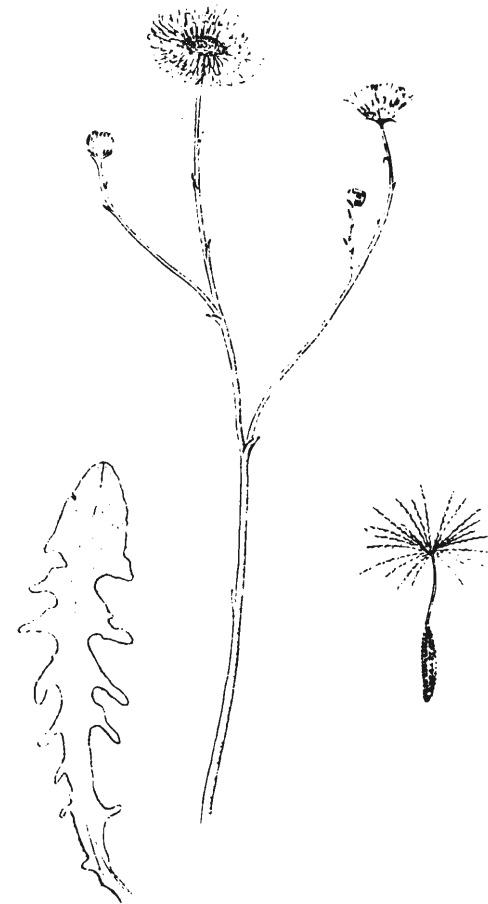
*These weevils are not on the label. However, this use is legal when label directions and precautions are followed.

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

Combining Chemicals

It may be to your advantage to control several problems with one spray 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 create phytotoxicity problems (plant injury), so unless a label specifies otherwise, either experiment on a few plants or avoid doing it.

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

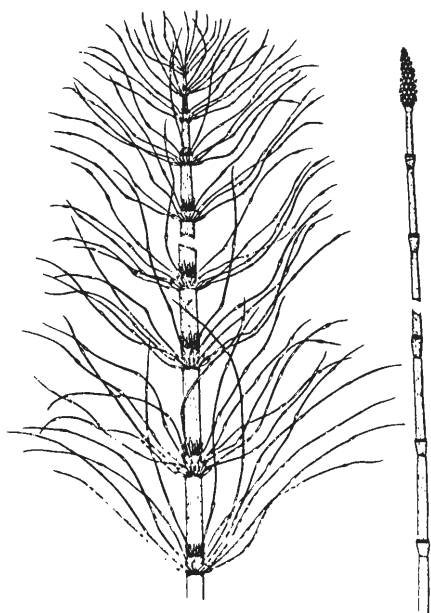
* This material is very dangerous to the applicator and should be handled with extreme caution.

** Do not use a spreader-sticker with Bravo

Weed Control

Herbicide use in cranberry bogs 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 bogs are acid 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.

In cranberry bogs, different weed species usually occur in various combinations, and these weed "complexes" will vary according to the season of the year. The following herbicide uses are presented according to weed combinations that commonly can occur at the same time of the year.



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.

The law requires that pesticides be used as the label directs. Uses against pests not named on the label and low application rates are permissible exceptions. If there is any apparent conflict between label directions and the pesticide uses suggested in this publication, consult your county Extension Agent.

SWAB TREATMENTS

Fireweed, birdsfoot trefoil, buck brush, loosestrife, purple aster, willow, field horsetail.

- 2,4-D amine—33% solution swabbed on weeds extending above cranberry vines (1 part 2,4-D amine to 2 parts water).

Only the 2,4-D amine formulation sold under the trade name of "Weedar 64" is registered for this use. This is a special local needs registration No. WA 800081.

Do not allow solution to drip or touch cranberry vines.
Apply only once per year.

Annual and perennial grasses, annual and perennial broadleaf weeds, rushes, sedges, willow, buck brush.

- Glyphosate (Roundup)—10% solution swabbed on weeds extending above cranberry vines (one pint Roundup in 1 gallon water).

Do not allow solution to drip or touch cranberry vines.
Apply after fruit set and no later than 30 days before harvest (July-August).

Repeat treatment may be necessary; wipe both sides of dense infestations to improve results.

NEW PLANTING

- Norflurazon (Everal) at 1-2.5 lb active ingredient per A (50 lb product). Use lower rates on 'Stevens' or 'Crowley' varieties on sandy soils. Injury may occur in areas where water puddles.
- Napropamide (Devrinol) at 5 lb active ingredient per A (50 lb product). Use only on bogs established at least 1 year.

Use granular formulations.

Apply to newly planted bogs after weed emergence.

- Sethoxydim (Poast) at 0.5% solution (2 qt product/100 gal water). Do not apply within 1 year of harvest.

- Fluazifop (Fusilade) at 0.3% solution (1.5 qt product/100 gal water).

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

Add 2 qt crop oil to Poast.

Add 1 gal crop oil to Fusilade.

Apply to obtain thorough coverage but not to run-off.

Repeat treatment if necessary as often as three times (June, July, and August).

Erratic results often occur when grasses are stressed from lack of vigor, drought, high temperature, low fertility, grass stage of growth, and unknown environmental factors. Fescues and annual bluegrasses resist treatment.

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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 lb.	Exempt	None	Do not use Bordeaux mixture in combination with any insecticide.
When buds break dormancy	Stem and leaf blight, cottonball	Use any fungicide and its rate listed for the late dormant stage.				
Rough neck (approx. May 1)	Rose bloom****	Use any fungicide and its rate listed for the late dormant stage.				
Late hook (about May 15 ± 5 days). Avoid application of insecticides after first blossoms appear. Killing bee pollinators will reduce yields.	Rose bloom, stem and leaf blight Fireworm, Tipworm, and Fruitworm	Use any fungicide and its rate listed for the late dormant stage.				Do not use Bordeaux mixture in combination with any insecticide as soon as worms are found in vines or tips.
		Diazinon 4 lb./gal. EC, or Guthion 50 WP, or	4 pt. 2 lb.	0.5 2	7 days 21 days	
		Lorsban 4 lb./gal. EC, or Malathion 5 lb./gal. EC, or	3 pt. 1½ pt.	1 8	60 days 3 days	Lorsban may only be applied two times per year.
		Malathion 8 lb./gal. EC, or Orthene 75S	1 pt. 1½ lb.	8 0.5	3 days 90 days	Orthene may be applied once per season.
		Parathion 4 lb./gal. EC†, or Parathion 8 lb./gal. EC, or	1½ pt. ¾ pt.	1 1	15 days 15 days	
		Sevin XLR	6 pt.	10	1 day	Do not apply Sevin XLR during bloom.
Late April to early May	Black vine weevil	Entomogenous nematodes		Exempt		Apply in accordance with manufacturer's directions when soil temperatures exceed 53°.
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 Fruitworm (Application for these pests also controls tipworms) Fruit rot, Storage rot Twig blight*** (Lophodermium)	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).
		Bravo 500, or Bravo 720, or Bravo 90DG, or Carbamate (ferbam) 76WDG, or Kocide 101	6-10 pt. 4-7 pt. 3½-5¾ lb. 6 lb. 8 lb.	5 5 5 7 Exempt	50 days 50 days 50 days See remarks None	These fungicides help to reduce fruit rot plus protect vines from twig blight. Repeat at 10-14 day intervals. Do <i>not</i> apply Bravo products more than 3 times per season.
		Kocide 606	10⅔ pt.	Exempt	None	
		Mancozeb 80WP, or Mancozeb 4F, or Mancozeb DG	3-6 lb. 2½-5 qt. 3-6 lb.	7 7 7	30 days 30 days 30 days	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.
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	3 lb. active ingredient (21 lbs. of 14% G)	0.5	7 days	Apply to bogs about July 1-7 and again 14 days later. Do not discharge water from bogs within 3 days of application. If pheromone traps are used, apply diazinon at peak flight of moths, and again 2 weeks later if there was a season's accumulative total of 25 moths per trap before peak flight. Otherwise, apply when season's accumulative total reaches 25 moths per trap.
July 25 to August 10	Fruit rot, Storage rot Twig blight (Lophodermium) Fireworm, Fruitworm, Lecanium scale	Any fungicide and its 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, malathion, or parathion if scale insects are a problem. Spray for fireworm only if third generation larvae are seen.
		Use any insecticide, except Orthene, and its rate listed for the late hook stage. Use Lorsban only if it will be applied at least 60 days before harvest.				
August 20 to 25	Fruit rot, Storage rot Twig blight (Lophodermium)	Any fungicide and its rate listed for late bloom except Bravo, and Carbamate.				Helpful for control of storage rots and twig blight if severe.
Late September	Black vine weevil	Entomogenous nematodes		Exempt		Apply in accordance with manufacturer's directions when soil temperatures exceed 53°.

*Pesticides are listed in alphabetical order and not necessarily in order of effectiveness.

**Do not exceed the amount indicated on product label.

***If twig blight is present, Bravo or Mancozeb are recommended over other products.

****This disease 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.

WEED CONTROL IN CRANBERRIES

Time of application	Weed*	Materials**	Amt. formulation Per acre	Tolerance in ppm	PHI	Remarks
Dormant stage November-December	Cats-ear* or false dandelion, spike- rush*, oniongrass*, cottontop*, rush*, broadleaf weeds.	18.8% ae G 2,4-D low volatile ester	20 lb.	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.
	Purple aster	4% G Casoron or Norosac (dichlobenil) plus	85 lb. casoron plus	0.15	—	Use granular formulations of 2,4-D and dichlobenil. See precautions and directions listed under dichlobenil alone and 2,4-D alone.
		18.8% ae G 2,4-D low volatile ester	15 lb. 2,4-D	0.5		
Sheep sorrel*	5% G Evital (norflurazon)	120 lb.	0.1		Use granular norflurazon formulations. Apply it only to dry vines and not more than once per year. Use lower rates on 'Stevens' and 'Crowley' varieties, on sandy soils, or on bogs with weak vines.	
January-February	Annual grass and broadleaf weeds	Simazine, 4% G or	50 lb.	0.25	—	Use either wettable powder or granular formulations of Simazine. Simazine granular can be combined with dichlobenil G for broader spectrum weed control. Apply Simazine before grass and broadleaf weed emergence. Do not apply it after the start of cranberry growth.
		Simazine, 50% WP	2.5 lb.	0.25		
February-March	Clover, aster, birdsfoot trefoil, buttercup	Devrinol, 10% G (Napropamide)	150 lb.	0.1	—	Use granular napropamide. Apply it before start of spring growth to dry vines. Rain or sprinkler irrigation of at least ¼ inch after application is essential for weed control.

March to Mid-May	Rice cutgrass, sicklegrass, povertygrass*, smokegrass, barnyard grass, needlegrass, spikerush, nutsedge	Evital, 5% G (norflurazon)	120 lb.	0.1	—	Use granular norflurazon. Do not apply after bud opening or more than once per year. Use lower rates on 'Stevens' or 'Crowley' varieties, on sandy bogs or bogs with weak vines.
	Annual broadleaf weeds, purple aster, loosestrife, rush, sedge, grass, Field horsetail.	Casoron/Norosac, 4% G (dichlobenil)	100 lb. (can be increased to 150 lb. in fall)	0.15	—	Use granular dichlobenil. Can be applied as a split application in the spring using 50 lb. each time 3 to 6 weeks after first application. Do not apply at or after popcorn stage. Applications can be split. Be sure to follow label very carefully as to waiting periods between applications. On very weedy bogs or on bogs abandoned due to intensive weed competition use 150 lb. rate.
	Multiple species—severe infestation	Casoron/Norosac 4% G (dichlobenil) plus 2,4-D 18.8% ae G plus Simazine, 4% G	50 lb. 15 lb. 35 lb.	0.15 0.5 0.25	— — —	Use granular formulations of all these herbicides and follow all precautions and restrictions as given for each herbicide when used alone (see above). Better control of hard-to-kill weeds will be obtained when these 3 herbicides are used in combination. Do not apply at popcorn stage and apply prescribed amounts only as many times as product labels allow.

* 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.

† Washington State SLN registration. Copy of this label must be in the user's possession.

SWAB TREATMENTS AND "NEW PLANTING" HERBICIDE TREATMENTS ARE ON THE BACK OF THIS PAGE