Insect and Disease Control

The following material lists and describes chemical control methods recommended for the common pests and diseases 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, 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. If you have problems or questions about the use of a chemical, your Cranberry producer 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. Avoid freezing temperatures. 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.

Use 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. Rinsed empty pesticide containers can be 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 dustbin or other site approved by the local health department. Landfills currently accepting such containers are located in Aberdeen (206) 249-4222, Long Beach (206) 642-2541 and Royal Heights (206) 942-3661. Call to verify their hours and conditions of use.

Burning empty pesticide containers can be more effective at reducing the effectiveness of the pesticides. Triton products are indicated on pesticide container labels. For example: Triton B-1956 will be Latron B-1956). Designations for these products will remain the same (for example: Triton B-1956 will be Latron B-1956).

If not, the spray mixture will draw up in beads and drops. If so, the spray mixture will draw up in beads and drops.

The degree of danger and the necessary precautions are site specific. Use pesticides in accordance with the pest control label and the manufacturer's label carefully and follow the instructions on it.

REENTRY TIMES

No one may enter a pesticide-treated field without wearing personal protective equipment specified on the label until the spray has dried or the dust has settled. A long reentry may have been assigned to a product so that no one may enter a field before the assigned 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 Lake & Industry Office (206) 956-5246 for details on protective clothing and on posting rules as new requirements will be in effect beginning in April 1993.

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 inadvertent 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 wetting agents or spreader-stickers on older tables to control weeds and fertilizers 2 weeks before and 4 weeks after last Bravo applications. (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 a 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 drip up in heads and drops. However, too much will cause the spray to run off the leaves and reduce the effectiveness of the pesticides. Triton products are now sold under the Latron trade name. All letter-number designations for these products will remain the same (for example: Triton B-1956 will be Latron B-1956).

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, crystaline 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 fromSpore spreaders produced on the surface of the pink fungal growths. Effective control will reduce disease incidence (the number of rose bloom growths) the following spring. Start fungicidal treatment 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 (roughly stage); and for 'McFarlin' and other cultivars, about 1 to 2 weeks later. Repeat at 14-day intervals until the growth reaches 80° to 85°F. Do not use on roses in bloom.

Spray Compatibility (Ability to Mix) Chart for Fungicides and Insecticides

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

NOTE: WSU recommendations are based on the latest available information. However, occasionally they may differ from label. If so, the label instructions supersede WSU instructions. Always check the label before using the chemical.
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. Compatibility 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. Agitation is recommended when mixing and using mixtures of pesticides.

<table>
<thead>
<tr>
<th>Spun</th>
<th>Orthene</th>
<th>Mancozeb</th>
<th>malathion</th>
<th>Lorsban</th>
<th>Kocide</th>
<th>Guthion</th>
<th>ferbam</th>
<th>diameter</th>
<th>Bordeaux</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>2</td>
<td>2</td>
<td>X</td>
<td>2</td>
<td>?</td>
<td>C</td>
<td>2</td>
<td>?</td>
<td>2</td>
</tr>
<tr>
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<td>X</td>
<td>?</td>
<td>?</td>
<td>3</td>
<td>?</td>
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<td>C</td>
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<tr>
<td>C</td>
<td>?</td>
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<td>2</td>
<td>X</td>
<td>?</td>
<td>?</td>
<td>X</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sevin</td>
<td>2</td>
<td>2</td>
<td>?</td>
<td>?</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 or Funginex

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 in cranberries when carefully used according to directions.

<table>
<thead>
<tr>
<th>SWAB TREATMENTS</th>
<th>Tall weeds on bogs.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Glyfosate (Roundup)</td>
<td>10% to 20% solution swabbed on weeds extending at least 6 inches above cranberry vines.</td>
<td></td>
</tr>
</tbody>
</table>

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 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 may also reduce effectiveness. Adding 2,4-D to Roundup may improve control against some broadleaf weeds. Weed control also may be enhanced by adding 6 Tbsp. of ammonium sulfate and 2 Tbsp. of non-ionic surfactant to 1 gal. of Roundup mixture.

- 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 Weedol 64. Special local needs registration is No. 880088. The label study is 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.

- Sodium (Touchdown) – 25% solution for wick wipers. Can only be used on nonbrowning vines. Apply to target weeds, avoiding contact with vines.

By Arthur Antonelli, Ph. D., Extension Entomologist, WSU Puyallup Research and Extension Center; Kim Patten, Ph. D., Research and Extension Horticulturist, WSU Long Beach; Peter R. Bristow, Ph. D., Research Plant Pathologist, WSU Puyallup Research and Extension Center; and Peter R. Bristow, Ph. D., Research Entomologist, WSU Vancouver Research and Extension Unit.

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### INSECT AND DISEASE CONTROL IN CRANBERRIES

<table>
<thead>
<tr>
<th>Time of application</th>
<th>Insect or disease</th>
<th>Materials*</th>
<th>Amt. formulation</th>
<th>Per acre**</th>
<th>Tolerance in ppm</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late dormant stage</td>
<td>Stem and leaf blight</td>
<td>Bordeaux mixture</td>
<td>8-6-100</td>
<td>24 lb.</td>
<td>Exempt</td>
<td>None</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Do not use Bordeaux mixture in combination with any insecticide.</td>
</tr>
<tr>
<td>When buds break dormancy</td>
<td>Stem and leaf blight</td>
<td>Use any fungicide and its rate listed for the late dormant stage.</td>
<td></td>
<td>1 1/2 pt.</td>
<td>0.1</td>
<td>60 days</td>
</tr>
<tr>
<td></td>
<td>Cottonball</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Repeat Funginex application in 7-10 days. Do not combine Funginex with surfactants. Do not let spray mixture stand in tank overnight. Chemigation is NOT recommended. Do not apply Funginex more than 4 times per season.</td>
</tr>
<tr>
<td>Rough neck (approx. May 1)</td>
<td>Rose bloom****</td>
<td>Use any fungicide and its rate listed for the late dormant stage.</td>
<td></td>
<td></td>
<td></td>
<td>See Rose Bloom Control text on other side.</td>
</tr>
<tr>
<td>Late April to early May</td>
<td>Black vine weevil</td>
<td>Entomogenous nematodes</td>
<td></td>
<td>Exempt</td>
<td></td>
<td>Apply in accordance with manufacturer’s directions when soil temperatures exceed 53°F.</td>
</tr>
<tr>
<td>Late hook (about May 15 ± 5 days)</td>
<td>Rose bloom,****</td>
<td>Use any fungicide and its rate listed for the late dormant stage.</td>
<td></td>
<td></td>
<td></td>
<td>Do not use Bordeaux mixture in combination with any insecticide as soon as worms are found in vines or tips.</td>
</tr>
<tr>
<td></td>
<td>Fireworm, Tipworm, and Fruitworm</td>
<td>Diazion 4 lb./gal. EC, or Guthion 50 WP, or Loban 4 lb./gal. EC, or *Malathion 8 lb./gal. EC, or Orthene 75S</td>
<td></td>
<td>4 pt.</td>
<td>0.5</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sevin XLR Plus</td>
<td></td>
<td>6 pt.</td>
<td>10</td>
<td>1 day</td>
</tr>
<tr>
<td>Late Bloom (when 80% of blossoms have dropped)</td>
<td>Fireworm</td>
<td>Fruitworm (Application for these pests also controls tipworms)</td>
<td>Use same insecticide control as in the late hook stage, except do not apply Orthene if it was used at late hook stage.</td>
<td></td>
<td></td>
<td>Use insecticides only when necessary. Apply as soon as second generation larvae are seen (about July 5 ± 5 days).</td>
</tr>
<tr>
<td>Early Bloom</td>
<td>Cottonball</td>
<td>Funginex</td>
<td>1 1/2 pt.</td>
<td>0.1</td>
<td>60 days</td>
<td>See remarks for Funginex above.</td>
</tr>
<tr>
<td>Late Bloom</td>
<td>Fireworm</td>
<td>Fruitworm</td>
<td></td>
<td></td>
<td></td>
<td>Use insecticides only when necessary. Apply as soon as second generation larvae are seen (about July 5 ± 5 days).</td>
</tr>
<tr>
<td>(Approximately) July 1-7</td>
<td>Cranberry grodder</td>
<td><a href="#">Diazion 14G</a></td>
<td>3 lb. active ingredient (21 lbs. of 14% G)</td>
<td>Exempt</td>
<td>0.5</td>
<td>7 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Entomogenous nematodes</td>
<td></td>
<td></td>
<td></td>
<td>Apply to bogs about July 1-7 and again 14 days later. Do not discharge water from bogs within 7 days of application. Insecticides are 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.</td>
</tr>
<tr>
<td>July 25 to August 10</td>
<td>Fireworm, Fruitworm, Lecanium scale</td>
<td>Use any insecticide, except Orthene, and its rate listed for the late hook stage. Use Loranb only if it will be applied at least 60 days before harvest.</td>
<td></td>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>August 20 to 25</td>
<td>Black vine weevil</td>
<td>Entomogenous nematodes</td>
<td>See label for instructions</td>
<td>Exempt</td>
<td></td>
<td>Helpful for control of storage rots and twig blight if severe.</td>
</tr>
</tbody>
</table>

**Notes:**
- **March 1 to 15** blight 8-8-100 24 lb. Exempt None combination with any insecticide.
- **March 1 to 15** dormancy blight listed for the late dormant stage. 7-10 days. Do not combine Fun-ginex application in 7-10 days. Do not combine Funginex with surfactants. Do not let spray mixture stand in tank overnight. Chemigation is NOT recommended. Do not apply Funginex more than 4 times per season.
- **Late dormant stage** Stem and leaf Bordeaux mixture 8-6-100 24 lb. Exempt None combination with any insecticide.
- **Late hook (about May 15 ± 5 days)** Avoid application of insecticides after blight as soon as worms are found in vines or tips. Killing bee pollinators will reduce yields.
- **Late hook (about May 15 ± 5 days)** Africanized Honey Bee (APIS) Use any insecticide, except 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.
- **Late hook (about May 15 ± 5 days)** Dogwood Fireworm, Lecanion scale Use any insecticide, except Orthene, and its rate listed for the late hook stage. Use Loranb only if it will be applied at least 60 days before harvest.
October
See remarks on floodwater control for weevils under root weevil section of first page.

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

**Do not exceed the amount indicated on product label.
***This pest is not on the label. However, this use is legal when label directions and precautions are followed.
**If the state label is in the grower's possession when applying this pesticide.
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### WEED CONTROL IN CRANBERRIES

#### Time of application Weed* Materials** Amt. formulation Tolerance PHI Remarks

**Dormant stage November-December**
- Cats-ear* or false dandelion, spikeweed, oniongrass*, cottontop*, rush*, broadleaf weeds
  - Casoron/Norosac, 19.2% ae G
  - 2,4-D low volatile ester
  - 19.2% ae G
  - 2,4-D low volatile ester
  - Norosac/Casoron, 4% G (dichlobenil)
  - Plus
  - 15 lb. 2,4-D
  - 25 lb. casoron
  - 15 lb. 2,4-D

**Purple aster**
- Norosac/Casoron, 4% G (dichlobenil)
- Plus
- 15 lb. 2,4-D
- 19.2% ae G
- 2,4-D low volatile ester

**January-March**
- Annual grass and broadleaf weeds
- Simazine, 4% G
- Simazine, 60WP
- 1.2-2.5 lb.
- 1.2-2.5 lb.
- 25-50 lb.
- 1.25 lb.

**February-early May**
- Clover, birdfoot trefoil (lotus*), buttercup*
- Devrinol, 10% G (Naproxamide)
- 75-150 lb.
- 7-10 lb.
- 0.15
- 0.25

**March to Mid-May**
- Rice cutgrass, povertygrass*, smokeweed, barnyard grass, needlegrass, spikeweed, nutsedge
- Devrinol, 10% G (Naproxamide)
- 50-100 lb.
- 1.25 lb.
- 0.1
- 0.25

- Annual broadleaf weeds, purple aster, loosestrife, rush, sedge, grass, Field mustard, silverleaf*
- Casoron/Norosac, 4% G (dichlobenil)
- 40-150 lb.
- 40-150 lb.
- 6-10 lb.
- 0.15

- Multiple species—severe infestation
- Casoron/Norosac, 4% G (dichlobenil)
- Plus
- 2,4-D 19.2% ae G
- 30-50 lb.
- 5-15 lb.
- 0.15
- 0.5

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

**Do not exceed the amount indicated on product label.
***This pest is not on the label. However, this use is legal when label directions and precautions are followed.
**If the state label is in the grower's possession when applying this pesticide.
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SWAB TREATMENTS AND "NEW PLANTING" HERBICIDE TREATMENTS ARE ON THE BACK OF THIS PAGE