

# DOs and DON'Ts of Fungicide Use on Cranberry in Wisconsin

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Most processing market cranberry growers in Wisconsin do not use fungicides on a regular basis, unless spraying for cottonball control. However, many growers spray from time to time to control upright dieback, *Phytophthora* root and runner rot, fruit rot, and problems for which the cause is not known. When the price received for cranberries is high, the cost of spraying fungicides on a sporadic basis is negligible compared to profits. In the current economic environment, however, every expense counts. Fortunately, in Wisconsin, cranberries can be produced without fungicides. Growers should use this period of low profitability to minimize fungicide use, and test just what is and isn't needed to manage diseases.

**Fungicides don't always work!** A great problem in trying to control cranberry diseases is the limited efficacy of fungicides. Research in Wisconsin has shown that Orbit, the fungicide that has been available by Section 18 registration for cottonball, has provided good (but not excellent) control. Control of other diseases with fungicides has been poor to fair. The following sections will review cranberry diseases and summarize basic DOs and DON'Ts to help you reduce fungicide inputs. Note that most of these diseases were discussed in the 1999 Wisconsin Cranberry School Proceedings (1999 WCSP). Please refer to the cited articles for further details.

**Cottonball.** See pages 5-11 in 1999 WCSP. Data from several years' research in Wisconsin indicate that bloom sprays are more important for cottonball control than are sprays during budbreak and shoot elongation. In fact, under low to moderate disease pressure, spraying only during bloom controls cottonball as well as spraying during budbreak *and* during bloom. There are no clear-cut, research-based definitions of low, moderate and high disease pressure, but Table 1 provides some working guidelines for determining how to spray for cottonball control. In all cases, it is important to monitor and record cottonball levels at harvest to plan for the following year.

**Fruit rot.** See pages 25-28 in 1999 WCSP. Fruit rot is usually classified as either field rot or storage rot. There is significant overlap among the many fungi that cause field rot and those that cause storage rot. With both field and storage rots, the environment is a major factor in disease development. Also critical is time—how long are the berries in the field? How long are the berries stored? In 1998 many growers in Wisconsin experienced field rot problems. This was probably in part due to the warm, early spring which made for a long growing season (plants were in bloom 2-3 weeks ahead of normal, but harvest took place at the usual time).

**Table 1.** Guidelines for determining how to spray for cottonball control

<i>Disease Pressure</i>	<i>Working definition</i>	<i>Recommended DOs and DON'Ts</i>
Low	<ul style="list-style-type: none"> <li>• Cottonball never or only rarely detected in the bed; OR</li> <li>• During early bloom, primary cottonball (tip blight) not found after 10-15 minute search.</li> </ul>	<ol style="list-style-type: none"> <li>1. Don't spray.</li> <li>2. Do monitor cottonball berries at harvest.</li> </ol>
Moderate	<ul style="list-style-type: none"> <li>• Bed has a history of cottonball (1-10%); OR</li> <li>• During early bloom, primary cottonball (tip blight) found after 5-10 minute search.</li> </ul>	<ol style="list-style-type: none"> <li>1. Do spray 1-2 times during bloom; if only 1 spray, make it at 10-20% bloom.</li> <li>2. Do monitor cottonball berries at harvest.</li> </ol>
High	<ul style="list-style-type: none"> <li>• Bed has a history of severe cottonball (greater than 10%); OR</li> <li>• During early bloom, you can easily find primary cottonball (tip blight) within the first few minutes.</li> </ul>	<ol style="list-style-type: none"> <li>1. Do spray 2 times during bloom and 2 times during budbreak the following year at the higher rate.</li> <li>2. Do monitor cottonball berries at harvest.</li> </ol>

**Field rot** in Wisconsin is typically 4-7% (by number of berries, not weight) in the field before any sorting. During harvest, some of the rot is sorted out, so that by the time fruit is at the receiving station, rot is less than 4-7%. Research in all major cranberry growing areas shows that even with fungicides (Bravo, Ferbam, or Dithane), rot incidence is typically around 3-5%. Trials in Wisconsin in the late 1980s and in 1999 showed no difference in fruit rot control between sprayed plots and unsprayed plots (Table 2). Bravo applied during early and mid bloom reduced fruit set. This sometimes, but not always, resulted in reduced yield. Dithane reduced fruit color slightly. The bottom line is, *fungicides probably do not reduce fruit rot in Wisconsin, and they can actually harm the crop.*

**Table 2.** 1999 Fruit rot fungicide trial, Wisconsin Rapids, WI

<i>Treatment (rate/acre)</i>	<i>Schedule</i>	<i>% Rot</i>	<i>% Fruit set</i>
Dithane (6 lb)	early, mid, late bloom	5.9	55
Dithane (6 lb)	late bloom, 10 days later, 10 days later	4.9	54
Bravo (5.5 pt)	early, mid, late bloom	5.6	35*
Bravo (5.5 pt)	late bloom, 10 days later, 10 days later	5.2	60
Unsprayed	---	5.3	52

\*Value is statistically significantly different from the unsprayed control and from other fungicide treatments.

**Storage rot** is caused by fungi that infect in two ways: through wounds during harvest; or during the growing season but then remain dormant internally until after berries have been stored. It seems that internal, dormant fungi may be triggered into action when a fruit is wounded during harvest. Wounding breaks open fruit cells, making it easier for fungi to obtain sugars and other nutrients they need to grow. Fungicides are fair (Bravo) to poor (Dithane, copper) at controlling storage rot.

**Upright dieback.** See pages 29-31 of 1999 WCSP. The fungus *Phomopsis vaccinii* is believed to be a factor in the disease upright dieback. However, the term “upright dieback” is sometimes used as a catch-all phrase for any case of upright shoot death. This confusion of terms has resulted in misapplication of fungicides.

In recent years a fungicide has been available by special “24c” registration to control upright dieback. Watch industry newsletters for information on fungicide registration in 2000. Grower experience, our knowledge of *Phomopsis*, and limited research indicate that the time to apply the fungicide is in the spring when most shoots have about ½ inch of new growth. Waiting until bloom is too late. Spraying later in the season is useless, because *Phomopsis* is already safe inside the plant, out of reach of the protectant fungicide. Spraying fungicides during the summer also will not reduce *Phomopsis* inoculum the following year.

**Phytophthora root and runner rot.** See pages 1-4 in 1999 WCSP. The species of *Phytophthora* (*P. cinnamomi*) that causes root and runner rot on cranberry in Massachusetts and New Jersey is not found in Wisconsin. The most common species found on cranberry in Wisconsin are *P. cryptogea* and *P. megasperma* (Table 3). However, these species cause disease only if the soil is flooded. *P. megasperma* is not controlled by Ridomil; the effect of Ridomil on *P. cryptogea* is not known. Good soil drainage is the only way to control putative *Phytophthora* problems in Wisconsin.

**Table 3.** *Phytophthora* species on cranberry in Wisconsin

<i>Species of Phytophthora</i>	<i>Pathogen?</i>	<i>Controlled by Ridomil?</i>
<i>P. cryptogea</i>	Maybe, if flooded	?
<i>P. megasperma</i>	Yes, if below 60°F and flooded	No
<i>P. dreschleri</i>	?	?
Misc. <i>Phytophthora</i> species	?	?

**Miscellaneous problems.** In general, fungicides are not the answer to cranberry problems for which the cause is unknown. This would include large areas of dead or dying vines, stem canker (more accurately called stem gall; see pages 22-24 in 1999 WCSP), and uniform reddening at leaf margins. Likewise, fungicides are not recommended after hail, sun scald, or similar environmental or physical stresses.

## Summary

### DOs

- Do scout for cottonball tip blight (see Table 1).
- Do the math before spraying any fungicide to determine whether it will be economically beneficial. Fungicides typically do not reduce fruit rot to less than 3-4% of berries.
- Do scout for diseases and other problems by getting into the bed. It requires a close look to diagnose most problems.
- Do “drive-by” scouting to monitor patterns of disease development or other disorders.
- Do keep accurate notes of what you see for future reference.
- Do submit samples to your Extension service for a diagnosis rather than spraying fungicides to fix a problem for which the cause is not known.
- Do read past cranberry school proceedings. The 1999 school focused on cranberry diseases.

### DON'Ts

- Don't expect miracles from fungicides. Orbit for control of cottonball has generally been good, but fungicide performance against other diseases has ranged from fair to poor.
- Don't overdo it with nitrogen. Succulent tissue is generally more susceptible to disease. Dense, lush vines retain moisture that favors fungal growth.
- Don't go below the 4 oz. rate when using Orbit. Lower rates won't control disease and may ultimately lead to fungicide-resistant pathogen populations.
- Don't let a cottonball-infested bed go unharvested. It may not be profitable to harvest such a bed when the price of cranberries is low. But if cottonball mummies are allowed to accumulate, the bed will have severe problems in the future (when price of cranberries is high again).
- Don't mix Bravo with compounds designed to enhance uptake. Bravo can be phytotoxic (reduces fruit set, burns fruit) and uptake-enhancing compounds will make this worse.
- Don't use Bravo before late bloom as this may lead to reduced fruit set.
- Don't apply Bravo if bed temperatures are expected to reach 90°F on the day of application. This increases risk of phytotoxicity.
- Don't apply fungicides following hail, sun scald, or similar environmental and physical stresses.
- Don't apply fungicides to control stem canker (stem gall).