Fungicides/Bactericides Registered for Use on Saskatoon Berries in Michigan - 2017

The pesticide product descriptions that follow are modified excerpts from the 2017 Michigan Fruit Management Guide, Extension Bulletin E-154, with additional information from product labels. Numbers in parentheses ( ) after product names correspond to the numbering system used for recommendation tables in the E-154 bulletin. Brand names are provided only for reference, and no endorsement of specific products is implied.

There have been no studies to determine the efficacy of these products against the diseases of saskatoons in Michigan. The products listed here were chosen based on their known performance in the control of related disease organisms of other fruit crops.

Some products listed in this document may be of interest to organic growers or growers who wish to use a more environmentally friendly approach to fruit production. A "reduced-risk" (RR) designation indicates that the product has relatively low toxicity to mammals. Products listed by the Organic Materials Review Institute (OMRI) for use in organic production are noted. Restricted Use Pesticides (RUP), which are generally more hazardous to applicators or to the environment are also noted.

Several alternative products with equivalent active ingredients may be available; only common or representative products are given for the sake of brevity. Be sure to check all product labels carefully before purchase to verify their legality for use on saskatoons in Michigan (if Juneberry is listed on the label the product may be used on saskatoons) and possible differences in application rates.

Abound (12)
Azoxystrobin Group 11 RR REI 4 hours PHI 0 days
6-15.5 fl.oz./acre/application, max. 46 fl.oz./acre/year

Abound is a broad-spectrum strobilurin fungicide registered for control of multiple diseases. Abound is systemic and has some post-infection activity. Abound is extremely phytotoxic to some apple varieties, especially McIntosh and its relatives, causing damage from either spray drift or residue left in the tank. Growers should not use the same equipment to spray Abound and apples and avoid drift to susceptible apple varieties. Because of their unique mode of action, strobilurins are excellent products to use in rotation with SI fungicides but are prone to resistance development. To limit the potential for resistance development, make no more than 2 sequential applications of Abound. The use of all azoxystrobin-containing products is limited to 0.75 lb a.i./acre/season. Abound is a reduced-risk product, but it is toxic to fish and other aquatic animals.

Alternative products with the same active ingredient: Aframe, AzoxyStar, Equation SC, Satori, Willowood Azoxy 2SC.

Actinovate AG
***Streptomyces lydicus* WYEC108) OMRI REI 1 hour PHI 0 days**
3-12 oz./acre/application, 7 day min. interval

Actinovate is a protectant biofungicide that can be used as a soil drench, in-furrow or foliar application. The label lists suppression or control of *Pythium, Rhizoctonia, Phytophthora, Verticillium* and *Fusarium* as well as powdery and downy mildew, *Botrytis, Monilinia* and *Alternaria.* Actinovate is OMRI-listed.

Cannonball WG
Fludioxonil Group 12 REI 12 hours PHI 0 days
1-2 pts. in 100 gallons, applied at 1-2 pts./plant; maximum of 7 oz./acre

Cannonball is a soil-applied systemic fungicide for the control of root zone diseases. It is also available in a wettable powder formulation. There is no specific efficacy data for saskatoon root diseases.

Elevate (65)
Fenhexamid Group 17 RR REI 12 hours PHI 0 days
1.5 lb./acre/application, max. 6 lb /acre/year

Elevate is a protectant fungicide with locally systemic properties. Diseases listed on the label are Botrytis gray mold and brown rot. Elevate has a unique chemistry that makes it useful for fungicide resistance management. Avoid making more than 2 consecutive applications before switching to a fungicide with a different mode of action. Elevate is a reduced-risk fungicide.

Inspire Super (79)
difenoconozole and cyprodinil Group 3 & 9 REI 12 hours PHI 7 days
16-20 fl.oz./acre/application, max. 80 fl.oz./acre/year; no more than 2 sequential applications

Inspire Super is a systemic, broad-spectrum fungicide. Combining Inspire Super with foliar fertilizers or adjuvants can increase the risk of leaf burning.

JMS Stylet Oil (66)
paraffinic oil RR (one formulation is OMRI) REI 4 hours PHI 0 days
3-6 qt./acre/application, per 100 gal. water

JMS Stylet-Oil is a contact protectant registered for disease and insect control. Applications made on a 10- to 14-day schedule and good spray coverage is necessary for effective control. Do not spray JMS Stylet Oil on sensitive varieties - it can burn the foliage. An organic formulation of JMS Stylet Oil is OMRI listed. JMS Stylet Oil is a reduced-risk product. JMS Stylet Oil is an effective eradicant of powdery mildew when applied after the appearance of symptoms and also helps reduce formation of cleistothecia.

Kaligreen
potassium bicarbonate **OMRI** **REI 4 hours** **PHI 1 day**
2.5-3 lb/acre/application

Kaligreen is a contact fungicide labeled for powdery mildew control. Kaligreen may also be applied postharvest to decrease overwintering inoculum. Do not add acidifying agents - these may reduce the efficacy of Kaligreen. Kaligreen eradicates powdery mildew colonies and can help reduce formation of cleistothecia. Kaligreen is a reduced-risk product and is OMRI-approved for organic fruit production.

Omega (33)
fluazinam **Group 29** **RR** **REI 3days** **PHI 30 days**
1.25 pt./acre/application, max. 7.5 pt. /acre/year

Omega is a broad-spectrum protectant fungicide and classified as a reduced-risk product. Thorough coverage is essential for good control. Since Omega is in a new chemical class, it is a good option for fungicide resistance management. Diseases on the label include Phomopsis twig blight and fruit rot, anthracnose, and Botrytis fruit rot. Omega may cause allergic skin reactions in a small number of sensitive individuals.

Oso
polyoxin D zinc salt **Group 19** **REI 4 hours** **PHI 0 days**
3.75-13 fl.oz.acre/application, max. 78 fl.oz. /acre/year

Oso is a new fungicide labeled for use against powdery mildew and leaf-spotting fungi. Due to the potential for resistance development, consecutive sprays of Oso should be avoided.

Alternative product with the same active ingredient: Tavano.

Pristine (70)
pyraclostrobin + boscalid, Group 7 + 11 **REI 12 hours** **PHI 0 days**
18.5-23 oz./acre/application, max. 4 app./year, max. 92 oz. /acre/year, 7 day min. int.

Pristine is a mixture of a locally systemic (pyraclostrobin) and a systemic (boscalid) fungicide. It is labeled for control of multiple diseases. Pristine has some post-infection activity. No more than two consecutive applications should be made without switching to materials with different modes of action. Pristine is not for use in greenhouse or transplant production. *Pristine cannot be tank-mixed with any other products, only water.*

Proline (74)
Prothioconazole Group 3 REI 12 hours PHI 7 days
5.7 fl.oz./ace/application, limit of 2 applications/year and 11.4 fl.oz./acre/year

Proline is a new, broad-spectrum systemic fungicide. This product has a high potential for runoff for several months or more after application. Drift and runoff are hazardous to aquatic organisms.

Purespray Green
Mineral oil OMRI REI 4 hours PHI 0 days
1.5- 3.0 gal/acre

Labeled for use against powdery mildew and rust, but no efficacy data is available. Should be applied with a minimum of 50 gal. water per acre at 200 psi for disease control.

Quadris Top (35)
Azoxystrobin + Difenconazole Group 3 + 11 REI 12 hours PHI 7 days
12-14 fl.oz./acre/application, 7 day min. interval, max. of 56 fl.oz./acre/year

Quadris Top is a broad-spectrum, systemic fungicide labeled for numerous diseases. The active ingredient azoxystrobin is extremely phytotoxic to some apple varieties, especially McIntosh and its relatives, causing damage from either spray drift or residue left in the tank. Growers should not use the same equipment to spray Abound and apples and avoid drift to susceptible apple varieties. No more than two sequential applications of Quadris Top are allowed before switching to a product with a different mode of action (non from group 3 or 11). Combined use of azoxystrobin-containing products must not exceed 0.75 lb. a.i./acre/year; combined use of difenoconazole-containing products must not exceed 0.46 lb. a.i./acre/year.

Quash (75)
metconazole Group 3 REI 12 hours PHI 7 days
2.5 oz./acre/application, max. 3 app./year, max. 7.5 oz. /acre/year

Quash is an SI fungicide. Even though it is a systemic product, it is best used as a protectant. Quash is rainfast 2 hours after application. No more than two sequential applications. Do not apply with an adjuvant.

Quilt Xcel (28)
azoxystrobin + propiconazole, Group 3 + 11 REI 12 hours PHI 30 days
14-21 fl.oz./acre/application, max. 3 app./year, max. 82 fl.oz./acre/year

Quilt Xcel is a "pre-mix", broad-spectrum fungicide with systemic and curative properties for fruit crops. Do not apply more than two consecutive Quilt sprays (or other products containing group 11 fungicides); use no more than 3 applications of group 11 products per year. In addition to these restrictions, the use of Quilt Xcel contributes toward the

maximum allowable 0.84 lb a.i./acre/season of propiconazole and 0.75 lb a.i./acre of azoxystrobin. Quilt Xcel is extremely phytotoxic to certain apple varieties (due to the azoxystrobin component) and may be phytotoxic to other crops when tank-mixed with products formulated as ECs or with silicone adjuvants. Drift and runoff may be hazardous to aquatic organisms.

Alternative product with the same active ingredient: Willowood Azoxyprop Xtra.

Regalia (82)
extract of *Reynoutria sachalinensis* **OMRI** **REI 4 hours** **PHI 0 days**
1-4 qts./acre/application (0.5-1.0 qt./acre if aerially applied)

Regalia is a plant extract-based biofungicide that can be used in organic production. The proposed mode of action is by increasing the plant's natural defenses. This induced resistance is not systemic, but there is some translaminar protection. The resistance reaction takes 1 to 2 days to develop. Light is required for best results. Regalia should

therefore be used as a preventive treatment. Applications have to be repeated every 7 to14 days to protect new growth. Avoid sprays during the pre-bloom and bloom period.

Ridomil Gold SL (61)
mefenoxam **Group 4** **REI 48 hours** **PHI**
Max. 3.6 lb a.i./acre/year

Ridolil Gold SL is a systemic fungicide with excellent activity against oomycetes *(Pythium, Phytophthora, Plasmopara).* See the label for timing information for Ridomil Gold application to fruit plantings. Ridomil Gold will not revitalize plants showing moderate to severe root rot symptoms.

Alternative product with the same active ingredient: Ultra Flourish.

Serenade Opti (29)
QST 713 Bacillus subtilis **Group 44** **OMRI** **REI 4 hours** **PHI 0 days**
2-6 qt./acre/application

Serenade is a bacterial biocontrol product registered for control of multiple diseases. Serenade may be alternated or tank-mixed with other registered fungicides to enhance disease control. Serenade is strictly a protectant, so thorough coverage is important for control. A number of formulations are available. Adding an adjuvant like Nu-Film enhances disease control. Serenade is OMRI listed for organic production.

SuffOil-X
Mineral Oil **OMRI** **REI 4 hours** **PHI 0 days**
1-2 gallons/acre in a minimum of 100 gal. water/acre

SuffOil-X is registered as a fungicide, insecticide and miticide. No efficacy data is available for saskatoon berry diseases.

Switch (67)
cyprodinil + fludioxonil **Group 9 + 12** **REI 12 hours** **PHI 0 days**
11-14 oz./acre/application, max. 2 app./year, max. 56 oz./acre/year

Switch is a mixture of active ingredients with systemic (cyprodinil) and protectant (fludioxinil) properties. It is registered for control of multiple diseases. It is particularly effective against Botrytis gray mold. To avoid resistance development, make no more than 2 sequential applications before using a fungicide with a different mode of action. Do not use an adjuvant with Switch.

Tilt (7)
propiconazole **Group 3** **REI 12 hours** **PHI 30 days**
6 fl.oz/acre/application, max. 30 fl.oz. /acre/year

Tilt is a systemic SI fungicide labeled for a wide range of diseases. This product has replaced Orbit in the fungicide market. The use of all propiconazole-containing products is limited to 0.84 lb a.i./acre/season.

Alternative products with the same active ingredient: AmTide Propiconazole, Bumper, Fitness, Orbit, Propicure, Propi-Star, Topaz and Willowood Propicon.

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