

## Suggestions for Anthracnose Management in Strawberries, 2020

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These guidelines were developed to address the presence of anthracnose resistance to group 11 fungicides in Ontario, and the limited products available to growers. This includes the recent changes to the captan label for berry growers including a 6-day REI and a maximum of 6 applications.

In Ontario, strawberry anthracnose has been confirmed resistant to pyraclostrobin (FRAC group 11), the active ingredient in Cabrio and one of the active ingredients in Pristine. The number of farms with strawberry anthracnose resistance to pyraclostrobin (group 11) is unknown but presumed to be widespread. Multiple studies have shown cross resistance between the group 11 fungicides. To avoid the further development of fungicide resistance to group 11, do not apply sequential applications of products in the same FRAC group 11 (Cabrio, Pristine, Quadris Top, Luna Sensation). Please see the [Fungicide Resistance Action Committee \(FRAC\) guidelines](#) for group 11 resistance management. If you suspect resistance to a group 11 product in your field, contact Erica Pate or Katie Goldenhar, OMAFRA (contact information below). Wherever possible, include a group M fungicide in your program to expand the spectrum of disease control. See *Managing Resistance to Fungicides*, Publication 360, Fruit Crop Protection Guide, Berries, for more information on managing resistance.

### **Integrated Management of Anthracnose Guidelines:**

Anthracnose will be challenging to control in day-neutral strawberries with fungicides alone. Include other integrated anthracnose management practices.

- Apply Bravo or captan before bloom for botrytis control.
- As much as possible apply broad spectrum fungicides (group M) during bloom.
- During harvest your options are more limited because of the longer REI and PHI intervals. Options include Switch, Diplomat, Quadris Top.
- Do not rely on group 11 products alone.
- Clean up diseased fruit and remove from field.

- Nitrogen management is very important. Avoid over-application of nitrogen.
  - The source of nitrogen can also have an effect; avoid ammonium forms of nitrogen.
- Don't let the plant canopy get too thick.
- Sanitize between fields (eg. equipment, tools, hands).
- Start new fields with clean plants from an accredited program. Plug plants from field-grown tips carry a higher risk.
- Work in older fields, and/or diseased fields last.
- Some new cultivars (eg. Keepsake) have tolerance or resistance to anthracnose – try these out on your farm.

**Examples of fungicide programs are below:**

### **June Bearing Strawberries**

*Pre-bloom:* 2 applications of Bravo (M) for Botrytis control.

*Bloom:* Captan (M), Switch (12 + 9), Captan (M).

*Harvest:* Spraying for anthracnose after bloom or during harvest is only needed if warm, wet weather conditions continue, particularly on susceptible cultivars (Mira, Annapolis, Orleans, St Laurent). Rotate between captan and Switch.

Other options include Diplomat (19), Quadris Top (11+ 3), Luna Sensation (11+ 7), Pristine (11 + 7) and Cabrio (11). If applying a group 11 fungicide make sure to include another product with efficacy on anthracnose. Do not apply a group 11 if resistance is suspected.

## **Day-Neutral Strawberries**

A disease prediction model can be used to potentially reduce the number of sprays when disease conditions are not favourable for anthracnose development.

In situations where pressure is high and a lot of anthracnose damage is present workers should strip off any diseased blooms or berries (see pictures below), spray captan, and begin harvest again in 6 days.

### **Overwintered day-neutrals**

**Overwintered day-neutrals often have the highest disease pressure, compared to spring-planted, because the disease overwinters on the plants.**

*Pre-bloom:* 2 applications of Bravo (M) for Botrytis control.

*Bloom – 6 days pre-harvest:* Captan (M) alone. Use up to 4 applications at this timing and save 2 applications for the gap before the summer crop if continuing to harvest. Maximum of 6 applications of captan per year.

*Harvest:* Rotate between Switch (12 + 9), Diplomat (19), and Quadris Top (11 + 3). Keep resistance management in mind. Use Switch during periods when conditions are highly favourable for anthracnose infection. Note there is a maximum of 3 applications of Switch per year.

Add a fungicide to Quadris Top for Botrytis control.

Diplomat is registered for suppression rather than control of Botrytis and powdery mildew. Tank mix Diplomat with compatible fungicides for additional botrytis and powdery mildew control.

Apply captan during a gap in production.

### **Spring planted day-neutrals**

*Pre-bloom:* 2 Applications of Bravo (M) for Botrytis control.

*Bloom – 6 days pre-harvest:* Captan (M) alone. Use up to 4 applications at this timing and save 2 applications for gaps in production or heavy anthracnose pressure. Maximum of 6 applications of captan per year.

*Harvest:* Rotate between Switch (12 + 9), Diplomat (19), and Quadris Top (11 + 3). Keep resistance management in mind. Use Switch during periods when conditions are highly favourable for anthracnose infection. Note there is a maximum of 3 applications of Switch per year.

Add a fungicide to Quadris Top for Botrytis control.

Diplomat is registered for suppression rather than control of Botrytis and powdery mildew. Tank mix Diplomat with compatible fungicides for additional botrytis and powdery mildew control.

### **Crop Tolerance Notes:**

If applying Agri-mek make sure to keep a 10-14 day gap between Agri-mek applications and chlorothalonil (Bravo or Echo) or captan applications

Do not apply captan within 14 days on an oil application. Do not apply chlorothalonil within 10 days of an oil application.

**List of registered products for anthracnose control:**

Please note: this is a reference sheet and does not replace the labels. Continue to check the product labels for more specific instructions and uses.

<b>Product</b>	<b>Rate</b>	<b>Preharvest Interval</b>	<b>Restricted Entry Interval</b>	<b>Max # applications/year</b>	<b>Re-treatment interval</b>	<b>Comments</b>	<b>Also registered for:</b>
<b>Diplomat 5SC</b> Polyoxin D zine salt 5% Group 19 Reg. # 32918	463-926 mL/ha	0 days	When dry	2.77 L/ha	7-10 day	Use high rate under conditions of high disease pressure	Botrytis grey mould (suppression only) Powdery mildew (suppression only)
<b>Pristine WG</b> Boscalid + pyraclostrobin Group 7 + 11 Reg. #27985	1.3-1.6 kg/ha	1 day	When dry (general re-entry)/24 hours (hand harvest)	5	7-14 day	Use higher rate and/or shorter intervals when disease pressure is high. Do not tank-mix or make sequential applications with Exirel.	Leaf spot Powdery mildew Botrytis grey mould
<b>Switch 62.5 WG</b> Cyprodinil + fludioxonil Group 9+12 Reg. #28189	775-975 g/ha	1 day	12 hours	3	7-10 days	Maximum 2 sequential applications before rotating to a different fungicide group.	Botrytis grey mould Powdery mildew (suppression only)
<b>Cabrio EG</b> Pyraclostrobin	1 kg/ha	1 day	12 hours	5	7-14 days	Use higher rate under conditions of	--

<i>Group 11 Reg. #27323</i>						high disease pressure. Do not tank-mix or make sequential applications with Exirel.	
<b>Quadris Top</b> <i>Azoxystrobin + Difenoconazole Group 11 + 3 Reg. # 30518</i>	.870- 1L/ha	1 day	12 hours	3	7-14 days	Maximum 2 sequential applications before rotating to a different fungicide group.	Powdery mildew
<b>Luna Sensation</b> <i>Fluopyram + trifloxystrobin Group 7 + 11 Reg# 32107</i>	500-600 ml/ha	0 days	12 hours	1980mL/ha	7-10 days	Maximum 2 sequential applications before rotating to a different fungicide group.	Botrytis grey mould  Powdery Mildew
<b>Botector*</b> <i>Aureobasidium pullalans Group NC Reg. #31248</i>	1 kg/ha in 500-2000 L water/ha	0 days	4 hours	6	7-10 days	<b>Suppression only.</b>	Botrytis grey mould (suppression only)
<b>Actinovate SP*</b> <i>Streptomyces lydicus Group NC Reg. #28672</i>	425 g/ha in 1100 L/water/ha	–	1 hour	–	7-14 days	<b>May reduce symptoms but does not provide control or suppression.</b> Do not combine with other pesticides (especially bactericides), adjuvants, surfactants or foliar fertilizers.	Botrytis grey mould (suppression only)  Powdery mildew (suppression only)

\*Potentially organic. Check with certifying body. Botector and Actinovate are registered for suppression or a reduction of symptoms only. Anthracnose Fruit Rot is a serious disease in Ontario, and suppression products may not provide adequate control. There is limited experience with these products in Ontario and limited efficacy data is available.

**Anthracnose fruit rot on berries and blooms.**

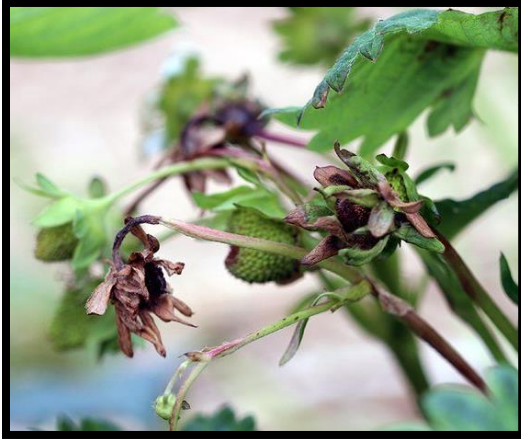


Photo: Dr. Tim Elkner, Penn State Extension



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Photo: Frank Louws, NC State

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