# Raspberry Cane and Fruit Rot Fungicides

As we approach the start of raspberry bloom it is worthwhile to review the fungicides available for cane and fruit rot management in commercial raspberry production. I have listed these fungicides below, grouping them by their mode of action (e.g. protectants, translaminar, systemic, etc.) and have noted their chemical family, resistance development risk, and application rate, diseases they are labeled to control, application timing, and cost. To simplify this further I have prepared a table at the end of the list which summarizes the fungicides and the timings for their use. The yellow columns represent the timings when a registered fungicide is applied for cane disease control. The blue columns apply to the timings when the registered fungicides are applied primarily for fruit rot management. A checked box indicates that a given fungicide is registered for the indicated timing.

As indicated in the timing table, the best times to control fruit rot are during bloom and pre-harvest. We have always felt that if there has been good protection over this period fruit rot infections would be minimal; however, some growers have had problems with in-harvest fruit rot (particularly in wet years) and have asked if any of the fungicides could be legally applied through harvest. Examining the labels, I can see no reason why Lance or Serenade couldn't be used in harvest - both have 0 day pre-harvest intervals (PHI's) and there is nothing on their labels to suggest they can't be used during harvest. Having said this, I don't think in most years they would be necessary if a good bloom and pre-harvest protection program were employed.

On a final note, many of the fungicides are a high risk of resistance development with consecutive applications so please rotate with other chemistries. Also, make sure you read the labels carefully as there may be warnings, cautions and possible discrepancies with the presented information. In the end, you are responsible for the pesticide applications made on your farm.

**Registered cane and fruit rot fungicides in raspberries:**

A. **<u>Protectants</u>:**
   1. **Lime sulfur** (calcium polysulphide)
      - Group M fungicide
      - Low resistance risk
      - 3.5 L/100L (delayed dormant)
      - Spur blight, cane blight, rust
      - Apply 1000-1500 L/ha (run-off). Apply as a delayed dormant (1 cm green tip)
      - $119/acre
   2. **Ferbam** (ferbam)
      - Group M fungicide

- Low resistance risk
- 4.0 kg/ha – do not apply after berry begin to form
- Anthracnose, rust, and spur blight
- Apply when new canes are 25-30 cm tall, before bloom, and after harvest
- $44/acre

3. **Captan/Maestro** (captan)
    - Group M fungicide
    - Low resistance risk
    - 2.5 kg/ha (2 day PHI)
    - Fruit rot, spur blight
    - Apply when blossoms first appear and then at 7-10 day intervals until harvest
    - $26/acre

**B. <u>Protectants (with some locally systemic activity)</u>:**

1. **Rovral** (iprodione)
    - Group 2 fungicide
    - Medium to high resistance risk
    - 2.0 kg/ha (1 day PHI)
    - Botrytis fruit rot
    - Apply when flower buds visible and repeat at 7-10 day intervals. Alternate with other fungicides. Maximum 8 applications per year.
    - $79/acre
2. **Elevate** (fenhexamid) (Group 17)
    - Group 17 fungicide
    - Low to medium resistance risk
    - 1.7 kg/ha (1 day PHI)
    - Botrytis gray mold
    - Begin applications at 10% bloom and continue up to 1 day before harvest. Applications should be made at 7-10 day intervals or when conditions favour disease. Maximum 4 per year. Avoid more than 2 consecutive applications.
    - $125/acre

**C. <u>Systemic/Translaminar Fungicides</u>:**

1. **Lance** (boscalid – translaminar and locally systemic)
    - Gr. 7 fungicide
    - Medium to high resistance risk
    - 560 g/ha (0 days PHI)
    - Botrytis gray mold

- Apply prior to disease development and continue on a 14 day schedule. Avoid consecutive applications of Lance or other Gr.7 fungicides. Maximum of 4 apps/yr
- $51/acre

2. **Pristine** (boscalid – translaminar and locally systemic + pyraclostrobin - translaminar)
    - Gr. 7 + Gr. 11 fungicide
    - Medium to high + high resistance risk
    - 1.3-1.6 kg/ha (0 days PHI)
    - Botrytis gray mold and anthracnose
    - Apply prior to disease development and continue on a 7-14 day schedule. Avoid consecutive applications of Pristine or other Gr.7 or 11 fungicides. Maximum of 4 apps/yr
    - $86-$106/acre
3. **Switch** (cyprodnil –systemic + fludioxonil - protectant)
    - Gr. 9 + Gr. 12 fungicide
    - Medium + low to medium resistance risk
    - 775-975 g/ha (1 days PHI)
    - Botrytis fruit rot
    - Make first application during early bloom, a second 7-10 days later, a third can be made if conditions favour disease. Avoid more than 2 consecutive applications of Switch or other Gr.9 or 12 fungicides.
    - $76-$96/acre
4. **Senator** (thiophanate methyl - systemic)
    - Gr. 1 fungicide
    - High resistance risk
    - 1.1 kg/ha (1 days PHI)
    - Powdery mildew and fruit rots
    - Apply during bloom and repeat at 7-10 day intervals as necessary. Rotate with fungicides from different chemical groups.
    - $51/acre
5. **Tanos** (famoxadone – protectant + cymoxanil - translaminar)
    - Gr. 11 + Gr. 27 fungicide
    - High + low to medium resistance risk
    - 840 g/ha (0 days PHI)
    - Spur blight, cane botrytis, anthracnose, pre-harvest botrytis
    - Apply to foliage and fruit on 7 day intervals. Alternate with other fungicides from different chemical groups. Maximum 6 apps/yr
    - **$29/acre**
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D. **Biofungicides:**

1. **Serenade** (*Bacillus subtilis*)
    - Gr. 44 fungicide
    - Low resistance risk
    - 3.0-6.0 kg/ha (0 days PHI for Botrytis)
    - 1.0-3.0 kg/ha (for bacterial blight (Pseudomonas)
    - Botrytis gray mold and bacterial blight
    - Apply at first sign of disease and then at 7-10 day intervals.
    - $69 - $137/acre

**Raspberry fungicide timings:**

| Fungicide[1] | Timing | | | | |
|---|---|---|---|---|---|
| | Delayed dormancy | New canes 25-30 cm + pre-bloom | Bloom | Pre-harvest | Post-harvest |
| Lime sulphur (Gr. M) | ✓ | | | | |
| Ferbam (Gr. M) | | ✓ | | | ✓ |
| Captan/Maestro (Gr. M; 2 day PHI) | | | ✓ | ✓ | |
| Rovral (Gr.2; 1 day PHI) | | | ✓ | ✓ | |
| Elevate (Gr.17; 1 day PHI) | | | ✓ | ✓ | |
| Lance (Gr.7; 0 day PHI) | | | ✓ | ✓ | ✓ |
| Pristine (Gr.7+11; 0 day PHI) | | ✓ | ✓ | ✓ | ✓ |
| Switch (Gr.9+12; 1 day PHI) | | | ✓ | ✓ | |
| Senator (Gr.1; 1 day PHI) | | | ✓ | ✓ | |
| Tanos (Gr.11; 0 day PHI) | | ✓ | ✓ | ✓ | ✓ |
| Serenade (Gr.44; 0 day PHI) | | | ✓ | ✓ | ✓ |

[1] Read labels carefully in case there are discrepancies with below information.

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