

# The Tender Fruit Grape Vine

VOLUME 15, ISSUE 6

JULY/AUGUST 2011

## So long to you too....Ken Slingerland



Ken Slingerland needs no introduction. Everyone reading this article either knew him, or knew of him, but a few of you might not know he retired back in April. Everyone also knows Ken loves a party, so on May 25<sup>th</sup> we held just the kind of retirement party we knew Ken would like....lots of friends, lots of family, lots of co-workers, lots of laughter, lots of good food and even lots of good Ontario wine.

The party started with a round of golf at the Grand Niagara Golf Club near Niagara Falls, with about 20 of Ken's family, friends, and co-workers. There were plenty of lost balls, excuses, gimmes, jibes, and laughter....and that was just from Ken.

The party continued at Grand Niagara with a large crowd of 140 present. After a cocktail hour, everyone enjoyed an excellent meal prepared by Chef Mark Hand of 'Hospitality on Hand' and wine donated by 'Pillitteri Estates Winery'. Hugh Fraser gave a powerpoint presentation chronicling Ken's life from when he was a child, through to retirement, focusing on family, sports, career, and community involvement. Joe Pillitteri of Lakeview Vineyard Equipment, as only he can, gave a stand up comedy routine about Ken, who now works for him in retirement.

On behalf of the OMAFRA organizing committee of Kim Reep, Carolyn Prieur, and myself, I'd like to thank everyone who attended this fun event and Donna Speranzini for taking pictures throughout the night. If you were present at the party, you will perhaps remember why Ken had a playing card stuck to his forehead....if not, it was as a result of a joke told by Ken's friend Harold, who spoke about playing poker with Ken at their Kinsmen Club....so long to you too, Ken.



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## AAFC Vineland Research Station Celebrates 100 years of Agricultural Research (1911-2011)

You are invited to attend an Open House on Saturday, September 10, 2011 from 11:30 am to 4:30 pm as a part of Agriculture and Agri-Food Canada's Vineland Research Station's 100<sup>th</sup> anniversary. The Open House will start with lunch, an official opening ceremony and conclude with lab and farm tours. Details to follow

## COMING EVENTS

THE Tender Fruit Grape Vine is brought to you by the following staff of the Ontario Ministry of Agriculture, Food and Rural Affairs:

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ALL QUERIES, COMMENTS, QUESTIONS AND REQUESTS CAN BE DIRECTED TO THE ABOVE.

For a complete list of Crop Technology Staff visit the OMAFRA web site at:  
[www.ontario.ca/crops](http://www.ontario.ca/crops)

August 24, 25, **Trigg International Premium Vinifera Lecture Series.** For more information visit:  
<http://www.brocku.ca/brock-news/?p=10844>

September 1-3, **Canada's Fruit & Veg Tech X-Change**, St. Williams (Norfolk). For more info email [info@fruitvegtechxchange.com](mailto:info@fruitvegtechxchange.com) or visit the website at <http://www.fruitvegtechxchange.com>

September 8, **Sustainable Workshop**, Malivoire Wine Co., 4260 King Street East, Beamsville, 9:00—2:30 p.m. For more information, visit [www.brocku.ca/ccovi/](http://www.brocku.ca/ccovi/) Click on Continuing Education, then Course Listing

February 22, 23, 2012, **Ontario Fruit & Vegetable Convention**, Niagara Falls. <http://www.ofvc.ca>

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## Weather Information

| Location                       | Maximum °C |          | Minimum °C |         | Precipitation (mm) |                |
|--------------------------------|------------|----------|------------|---------|--------------------|----------------|
|                                | May        | June     | May        | June    | May                | June           |
| <b>Vineland</b><br>(85 yr ave) | 31.5 31st  | 32.6 8th | 4.2 3rd    | 8.1 3rd | 152.7<br>(70.3)    | 54.9<br>(76.1) |
| <b>Harrow</b>                  | 31.2 31st  | 34.7 8th | 0.4 4th    | 9.3 3rd | 176.8              | 72.5           |
| <b>Simcoe</b>                  | na         | na       | na         | na      | na                 | na             |

## Post-hail fungicides for grapes and stone fruit

Wendy McFadden-Smith, Tender Fruit & Grape IPM Specialist

With the severe weather that has been experienced recently in Ontario, growers of both grapes and tender fruit should be vigilant about maintaining protection of fruit, especially if severe weather is accompanied by hail. In the case of Botrytis, research in New York has shown that a lot of soil moisture will also increase the activation of latent infections.

If a **Botrytis bunch rot** spray was applied on grapes at veraison, within a week of a hail event, you will have protection from activation of **Botrytis** infections that may have occurred at bloom. If you have not yet applied a botryticide (**Rovral, Elevate, Scala/Vanguard**), then you should get in and make a thorough fruiting zone application as soon as possible. All of these products have post-infection as well as protective activity. Serenade is a protectant so it will have to be reapplied in order to continue providing protection. Lance and Pristine are not labelled at a rate high enough to provide botrytis control so do not rely on these at this time, although they will supplement any activity of botryticides applied. Make sure to rotate among fungicide families: Scala and Vanguard are from the same fungicide family so should not be used as rotational partners.

Given the wet bloom conditions of 2011, it is very likely that some **stone fruit** will have been infected by **brown rot** at the bloom through shuck fall period but not show symptoms yet. Like bunch rot, brown rot infections can be activated by wounding of the fruit so if you have not applied a locally systemic fungicide (**Elevate, Indar/Mission/Topas, Lance, Pristine or Vanguard**) in the past week you should do so as soon as possible. Continue to monitor the crop for signs of brown rot and go back in with another fungicide should you happen to see symptoms developing.

## Grapevine disease management from bunch close to pre-harvest

Wendy McFadden-Smith, Tender Fruit & Grape IPM Specialist, OMAFRA

The spread of **downy mildew** has decreased with hot dry weather; however the late “flush” of downy mildew that we usually see in August has been explained by research in Europe and New York that shows that the overwintering bodies of the downy mildew fungus can release spores throughout the growing season. When it cools off a little and we get some rain, new downy mildew infections can occur on young leaves. Don't be lulled into a sense of false security – this disease can re-emerge with a vengeance with milder weather. Keep foliage covered with a protectant such as captan (Supra captan/ Maestro), Folpan, Polyram or Dikar (or copper if that's your preference).

Foliar infections of **powdery mildew** are increasing on upper and lower leaf surfaces. Fruit are no longer susceptible to infections of downy or powdery mildew or black rot. However infections of powdery mildew and black rot that were initiated near the end of the fruit susceptibility period will continue to show up for the next week or so.

The focus for control of powdery and downy mildew now switches to keeping the foliage as healthy as possible to make sure sufficient sugar is produced to ripen fruit and allow vines to properly harden off for maximum winter hardiness. We can tolerate some foliar infection by downy or powdery mildew so spray intervals can be stretched to 14 days, especially while dry weather continues.

Protectant products such as Dikar and sulphur (Kumulus, Microscopic Sulphur, Microthiol) will provide protection for developing leaves. Sulphur has also been shown to reduce sporulation on existing lesions on grape leaves in greenhouse trials. Repeated use of sulphur can lead to mite flare-ups especially under high temperatures so it is wise to alternate with another powdery mildew product.

Milstop eradicates powdery mildew; however, this product is in short supply this year. Several growers have inquired about substituting sodium bicarbonate (baking soda) for Milstop. The bicarbonate part of these products is what works against powdery mildew so both will be effective; however, the sodium component of baking soda has been known to cause burning of foliage so beware of slow drying conditions if you choose to use this product.

Spray oil 13E was registered this year for powdery mildew and mite suppression. In New York, this product is not used after bloom as research at Geneva showed that as few as 2 applications applied 2 weeks before veraison and at veraison delayed fruit maturity in a French hybrid variety. We are investigating post-bloom applications and their impact on Brix accumulation in Niagara this season and will report on the results in a future newsletter.

*Con't on pg 4*

**Botrytis** sprays should have been applied prior to bunch closure to ensure that berries are well covered with fungicide. This is especially critical this year when post-bloom infections are more likely to have occurred since the post-bloom period was very wet. The next key period for Botrytis sprays is veraison. Dr. Wayne Wilcox of Cornell University showed that when berries were inoculated with Botrytis at post-bloom then treated with Rovral, Elevate or Vangard at veraison, bunch rot was controlled. This must be qualified: these were clusters that were sprayed by hand so coverage was absolutely complete. Make sure that your sprayer is well calibrated to deliver excellent coverage of all sides of the cluster in order to achieve good control. The long term forecast for the pre-harvest period is for unsettled weather. Good fungicide coverage at veraison is cheap insurance! These products are all prone to resistance development so make sure to rotate among fungicide families. Remember that Vangard and Scala are from the same fungicide family so switching between these two is not a good rotation strategy. Serenade will provide protection from Botrytis infection and is organically acceptable.

Leaf removal is an important way to manage bunch rot. Enough leaves should be removed to allow good air movement and spray penetration but the fruiting zone does not have to be completely stripped of leaves. In fact, research has indicated that overheating of clusters can be counter productive with respect to some key compounds. So leave some leaves!

The table below provides options for fungicide selection for the bunch closure through pre-harvest period. Make sure to confirm pre-harvest intervals for your processor.

| Growth stage                            | Disease         | captan, Folpan (M) | Polyram (M) | Dikar (M) | Ferbam (M) | copper (M) | Revus (4Q) | Ridomil Gold Mz (4 + M) | Sulphur (M) | Nova\Inspire (3) | Flint\Sovran (11) | Pristine (11 + 7) | Lance (7) | Millstop (M) | Yivando | Rovral (2) | Vangard\Scala (9) | Elevate (17) | Serenade (44) |   |
|-----------------------------------------|-----------------|--------------------|-------------|-----------|------------|------------|------------|-------------------------|-------------|------------------|-------------------|-------------------|-----------|--------------|---------|------------|-------------------|--------------|---------------|---|
| Berry touch                             | Powdery mildew  |                    |             | +         |            |            |            |                         | +           | +                | +                 | +                 | +         | +            | +       |            |                   |              |               | s |
|                                         | Downy mildew    | +                  | +           | +         | +          | +          | +          | +                       |             |                  | s                 | +                 |           |              |         |            |                   |              |               |   |
|                                         | <b>Botrytis</b> |                    |             |           |            |            |            |                         |             |                  |                   | <b>s</b>          |           |              |         | +          | +                 | +            | +             |   |
| Veraison to early Sept.                 | Powdery mildew  |                    |             | +         |            |            |            |                         | +           |                  |                   | +                 |           | +            |         |            |                   |              |               | s |
|                                         | Downy mildew    | +                  | +           | +         | +          | +          |            |                         |             |                  |                   | +                 |           |              |         |            |                   |              |               |   |
|                                         | <b>Botrytis</b> |                    |             |           |            |            |            |                         |             |                  |                   | s                 |           |              |         |            |                   | +            | +             | + |
| Early Sept. to harvest                  | <b>Botrytis</b> |                    |             |           |            |            |            |                         |             |                  |                   |                   |           |              |         |            | +                 | +            | +             |   |
| Re-entry interval (hr unless specified) |                 | 72                 |             | 48        |            |            | 12         | 12                      |             |                  | 5d/48             | 21d               | 4         | 4            | 12      | 12         | 48/24             | 4            |               |   |
| Pre-harvest interval (days)             |                 | 7                  | 45          | 30        | 7          |            | 14         | 66                      | 21          | 14               | 14                | 14                | 14        | 0            | 7       | 14         | 7                 | 7            | 0             |   |

## Coping with powdery mildew on clusters

Wendy McFadden-Smith, Tender Fruit & Grape IPM Specialist

Fruit infections of powdery mildew have developed in full force in the past week or two. Clusters that previously looked clean have developed that dreaded greyish cast. What happened?

In Niagara, *V. vinifera* bloom started the week of June 20-25 and continued through the first week of July. Berries are susceptible to infection from when the cap falls through 4 weeks post-bloom. The extended bloom period meant that there were susceptible berries present for longer than usual with the last-set berries still susceptible to powdery mildew infection the first week of August.

During the week of June 20, it rained for 4 consecutive days throughout Niagara. Extreme heat through most of July (19/23 days with ambient high temperatures over 28 C) made it difficult to find days when it was cool enough to spray.

The optimum temperature range for growth and sporulation of the powdery mildew fungus is 23-30° C. At temperatures over 35°C, spore germination is inhibited and superficial mycelium is not killed until it is exposed to at least 10 hr at 36°C or 6 hr at 39°C. While powdery mildew development is favoured by high humidity (optimum 85%), disease has been shown to continue to develop (granted at half the rate) at RH as low as 40% at 25°C. So, although many July days were too hot for spraying, it wasn't too hot for powdery mildew. In fact, conditions were ideal for its spread, especially in canopies where it was shaded from the sun.

Product selection and timing and canopy management were all important in 2011. In my research block of Chardonnay that has very high disease pressure, powdery mildew blew up rapidly in the untreated plots, causing severe infections of both fruit and leaves. However, in adjacent sprayed plots within the same row, there is very little powdery mildew. Here is our powdery mildew spray program:

| Date           | Growth stage                          | Spray (rate/ha)        |
|----------------|---------------------------------------|------------------------|
| June 1         | 3-6 flat leaves, 5-10 cm shoot growth | sulphur (6 kg)         |
| June 8         | 7-10 flat leaves, 15-25 cm growth     | sulphur (6 kg)         |
| June 15        | Pre-bloom                             | sulphur (6 kg)         |
| <b>June 25</b> | <b>Trace bloom</b>                    | <b>Lance (315 g)</b>   |
| <b>July 5</b>  | <b>Post-bloom</b>                     | <b>Lance (315 g)</b>   |
| <b>July 13</b> | <b>Shot to Pea-sized berry</b>        | <b>Inspire (292 g)</b> |
| <b>July 20</b> | <b>Pea-sized berry to bunch close</b> | <b>Quintec (300 g)</b> |
| August 3       | Bunch close                           | sulphur (12.6 kg)      |



Untreated check plot  
August 4, 2011



Adjacent sprayed plot  
August 4, 2011

During the critical period for fruit infection, products with locally systemic and some post-infection activity were used. Please note that use of specific products during the fruit susceptibility period in the rotation above is not an endorsement of those products over others, just a reflection of what I had in my spray cupboard.

Treatments were applied in 500 L/ha until trace bloom and then in 1000 L/ha with either a backpack sprayer or a hooded boom sprayer with no air assist. Vines were shoot thinned pre-bloom (June 13-17), shoot positioned the last week of June and leaf removal was done by hand in late June in some plots and mid-July in others. Powdery mildew was first found on the foliage in untreated plots on July 5 and on fruit on July 15. The incidence and severity of disease had increased significantly by July 19.

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So what can you do now?

Sulphur is not the material of choice as an eradicant if you reach the “Omigod!” stage. Research in Israel, Australia and the US has demonstrated that petroleum-based oils, inorganic salts (e.g., potassium bicarbonate, monopotassium phosphate) and hydrogen peroxide are effective eradicants. These products rely on direct contact with the fungus and, therefore complete spray coverage is very important. Caution is warranted when using oil: in a trial in NY with hybrids, Brix was decreased by 0.5 with 2 sprays of oil, one 2 weeks before veraison and a second at veraison. We’re looking into the effect of a single oil spray at either of these timings on Brix in a trial on Vidal in Niagara this year.

The fruit are no longer susceptible to infection so powdery mildew will not spread to cause new infections. If fruit are infected, applications of some topical fungicides will kill the superficial fungus but the injury to fruit has already been done. Quoting from Dr. Wayne Wilcox’s Grape Disease Control, 2011: *Once the leaf or berry cells beneath a well-established mildew colony have been sucked dry by the fungus, nothing’s going to bring them back to life even if the mildew is eradicated. The best that an eradicant spray can do is to keep things from getting much worse, it can’t raise the dead.* If you exceed the tolerance of your processor for powdery mildew infection, it may be necessary to drop some of the affected clusters to meet threshold.

The most important thing? Communicate with your processor. Find out how much powdery mildew and which products are acceptable.

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## If you suspect herbicide resistant weeds get them tested!

Kristen Callow, Weed Management Program Lead - Horticulture

Information from: [www.plant.uoguelph.ca/resistant-weeds/](http://www.plant.uoguelph.ca/resistant-weeds/)

You may have a resistant weed if you have found:

- effective control on all other weeds except the suspected species
- effective control at other locations with the same herbicide program
- escaped weeds appear in rows (tire tracks) or near a field entrance (indicating contamination from other sources)

Proper sample collection for resistance testing is critical to ensure an accurate screening process. Collect multiple suspected plants and/or adequate seed volume to ensure a good test.

### Here are a few sampling strategies:

**Are you planning a rescue treatment?** If so, once suspected plants have been located, you may proceed immediately by carefully digging plants from the field and putting them into plastic or clay pots. Water the plants well before digging out of the ground. Do not allow soil to be removed from the root zone by working around the entire plant so that the soil/root mass roughly fits the container. Once transferred into the pot, water again and firm the soil lightly and place in a protected spot out of the sun until ready to transport. Plants must be healthy so they can be grown to maturity for harvestable seed.

**Are the suspected plants mature?** If so, collect mature seeds from 20-40 plants by clipping the seed heads from individual plants and placing in separate containers to air dry (paper bags or envelopes are sufficient). Generally, seeds are mature and viable if they have a hardened seed coat that is typically brown or black. Once dried, secure in individual containers with adequate labelling.

In addition, please go to [www.plant.uoguelph.ca/resistant-weeds/](http://www.plant.uoguelph.ca/resistant-weeds/) and print and fill in the submission form to send along with your sample.

Forward sample(s) via courier, regular mail or personal transportation to:

Attn: Peter J. Smith

University of Guelph, Department of Plant Agriculture

Guelph, ON N1G 2W1

Phone: 519-824-4120 x. 58372

Fax: 519-763-8933

E-mail: [psmith@uoguelph.ca](mailto:psmith@uoguelph.ca)

# First detection of brown marmorated stink bug confirmed in Ontario

Hannah Fraser, Entomology Program Lead (Hort) and Denise Beaton, Crop Protection Program Lead,

If you've been reading our newsletters and attending our conferences and workshops, you've already been warned to be on the lookout for a potential new pest – the brown marmorated stink bug (BMSB).

BMSB is an agricultural pest with a wide host range that includes tree fruit (e.g. peach, pear, apple, plum), grapes, berry crops (e.g. raspberry, blueberry), soybeans, edible beans, corn, tomatoes, and ornamental trees and shrubs. It overwinters as an adult in protected areas, such as outbuildings and homes, and can be a significant nuisance pest to homeowners.

The BMSB was introduced to North America about 15 years ago with its first detection in Pennsylvania. Since that time, it has spread and has now been reported in 33 states (and counting). In Canada, the BMSB has not been found in any crops; however, this pest has been intercepted in some shipments of imported goods coming into several provinces including Ontario. The BMSB is an excellent hitchhiker and is readily moved over great distances in cargo and vehicles.

We've stressed that it is likely only a matter of time before this insect shows up in the field. Unfortunately, that time may be sooner than we'd hope, as a sample submitted by a homeowner in early June has been confirmed as the BMSB. It was discovered in a home, within an urban area, not the outdoors. We don't know where this insect originally came from. It may have moved in with cargo or vehicles, or it may have overwintered here, indicating a small and as yet undetected population has established itself in Ontario.

## What are we doing about BMSB in 2011?

OMAFRA specialists and program leads are working with consultants, growers, the University of Guelph and other agencies to conduct a monitoring program in representative host crops through trapping and field surveying in 2011/12. Funding to purchase trapping equipment has been generously provided by the Niagara Peninsula Fruit & Vegetable Growers Association, Hort Crop Ontario, and the Northeastern IPM Centre (Great Lakes Vegetable Working Group).

BMSB was identified by numerous commodity groups as a pest of significance during the 2011 Canadian Minor Use Pesticide Priority Setting Conference. OMAFRA and other provincial agricultural ministries, Agriculture and Agri-Food Canada, Pest Management Centre and United States counterparts (U.S. IR-4 minor use program) are working together to find pest management solutions for BMSB, in anticipation that this pest could become an agricultural nuisance following its establishment.

## How can you help?

We need to know where BMSB may be in Ontario. There is a network of people monitoring for this pest; however, we have a better chance of finding pockets of small BMSB populations with more eyes on the lookout. This is crucial for learning more about this pest under Ontario's conditions. There is currently no management strategy for this pest as we are still in detection mode. Based on the US' experience, it typically takes a few years before BMSB populations build to a level where it is considered a crop pest or a nuisance to homeowners.

## Features of the BMSB

Stink bugs are shield-shaped insects with piercing-sucking mouthparts. The BMSB has several features that can help you distinguish it from other common stink bugs:

- two white bands on dark antennae (Figure 1)
- smooth edge along pronotum or "shoulders" (behind the head) (Figure 2)
- white triangles alternating with dark areas at the edge of the abdomen



Figure 1: Adult BMSB. Note the two white bands on the antennae and the white triangles on the margin of the abdomen. Source: Purdue University



Figure 2: Adult BMSB. The margins of the pronotum (shoulders) are smooth, not serrated.



Figure 3: BMSB nymphs also have obvious white bands on antennae. There is white banding on their legs. The white triangles on the abdomen are not as pronounced at this life stage. Photo credit: Gary Bernon, APHIS-USDA)

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Older nymphs (immatures) have the same banding patterns on the antennae as the adults (Figure 3).

If you find suspect stink bugs, collect a sample and call the Agricultural Information Contact Centre at 1-877-424-1300 for details on where to send it. Place the insect in a leak proof container, and kill it by freezing or adding it to rubbing alcohol or vinegar.

### **BMSB Updates**

Please visit OMAFRA's website at [www.ontario.ca/stinkbug](http://www.ontario.ca/stinkbug) for updates on the BMSB.

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## **Spotted winged drosophila update**

We continue to monitor for Spotted Wing Drosophila (SWD) in Ontario fruit crops, but have not found any in agricultural fields. Some traps are being maintained in crops that have been harvested, but the focus is now on late peaches, blueberries and fall-bearing fruit. Traps have also been placed in tomatoes. Blueberries and fall-fruiting raspberries are probably most at risk right now. Watch for fruit that is prematurely soft or decaying.

See this link for photos of damage: <http://www.omafra.gov.on.ca/english/crops/facts/pest-alert-swd.htm#dam>.

**Quebec:** No captures have been reported.

**Michigan:** Widespread monitoring in commercial fruit farms by Michigan State University has so far detected SWD at only a small proportion of the sites where traps have been deployed. However, the catches are picking up, and growers are being encouraged to maintain monitoring if fields are still ripening. Information on the patterns of activity and the importance of wild hosts, as well as insecticide efficacy trials, can be found at: [http://news.msue.msu.edu/news/article/spotted\\_wing\\_drosophila\\_catches\\_are\\_picking\\_up\\_maintain\\_monitoring\\_if\\_field](http://news.msue.msu.edu/news/article/spotted_wing_drosophila_catches_are_picking_up_maintain_monitoring_if_field)

**British Columbia:** Trap captures remain low but continue to increase.

**Nova Scotia:** One male captured the week of August 9th. The find occurred in a commercial fruit crop. This is the first capture of SWD in the province for 2011

See this link for information on SWD. [www.omafra.gov.on.ca/english/crops/insects/drosophila.html](http://www.omafra.gov.on.ca/english/crops/insects/drosophila.html)

Cultural controls are important components of SWD management. Removal of over-ripe or dropped fruit, timely harvest, and removal of wild hosts will help reduce populations. Composting is not a reliable way to destroy eggs and larvae in fruit. All culled fruit should be buried (30 cm or more) or disposed of in a sealed container.

There are 4 insecticides registered on the Berry Crop Group and Stone Fruit Group for spotted wing drosophila control in 2011: Delegate WG, Entrust 80 W, Malathion 85 EC, and Ripcord 400 EC. **Insecticides are not recommended unless SWD has been detected in crops in your region;** but keep posted for updates.

Growers and consultants are encouraged to monitor for SWD on their own farms and let us know if you find anything suspicious.

OMAFRA site that will be live this week: <http://www.omafra.gov.on.ca/english/crops/insects/drosophila.html>

Make your own traps for monitoring adults: [http://www.al.gov.bc.ca/cropprot/swd\\_monitoring.pdf](http://www.al.gov.bc.ca/cropprot/swd_monitoring.pdf)  
<http://www.ipm.msu.edu/SWD/SWD-monitor.htm>. We use apple cider vinegar bait, changed weekly.

Identification key for SWD [http://www.oregon.gov/ODA/PLANT/docs/pdf/ippm\\_d\\_suzukii\\_id\\_guide10.pdf?ga=t](http://www.oregon.gov/ODA/PLANT/docs/pdf/ippm_d_suzukii_id_guide10.pdf?ga=t)

Suspect flies can be sent to the Pest Diagnostic Clinic or contact OMAFRA for assistance with identification.

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# Pesticide rainfastness characteristics

John Wise, MSU Extension

Pesticide wash-off from precipitation is a major factor for the loss of insecticide residual activity on fruit crop pests, and can result in additional sprays to maintain crop protection. Michigan's spring production season regularly receives 10-15 inches of rainfall, precipitation patterns varying in their intensity, duration, and total amount of rain per event.

In 2006 the Michigan Agriculture Experiment Station provided funds to purchase and install a state-of-the-art rainfall simulation chamber at the MSU Trevor Nichols Research Complex. Since then we have conducted simulated rainfall studies to predict the amount of pesticides that are lost under precipitation events, and the resulting impact on pest control. Based on the results from these studies the following charts have been developed to serve as a guide for general rainfastness characteristics and re-application recommendations for certain insect pests. Note that these recommendations should not supersede farm-level knowledge based on site-specific pest scouting, but rather are meant to compliment a comprehensive pest management decision-making process.

**Rainfastness Rating Chart: General Characteristics for Insecticide Chemical Classes**

| Insecticide Class | Rainfastness ≤ 0.5 inch |        | Rainfastness ≤ 1.0 inch |        | Rainfastness ≤ 2.0 inch |        |
|-------------------|-------------------------|--------|-------------------------|--------|-------------------------|--------|
|                   | Fruit                   | Leaves | Fruit                   | Leaves | Fruit                   | Leaves |
| Organophosphates  | L                       | M      | L                       | M      | L                       | L      |
| Pyrethroids       | M                       | M/H    | L                       | M      | L                       | L      |
| Carbamates        | M                       | M      | L                       | M      | L                       | L      |
| IGRs              | M                       | H      |                         |        |                         |        |
| Neonicotinoids    | M,S                     | H,S    | L,S                     | L,S    | L,S                     | L,S    |
| Spinosyns         | H                       | H      | H                       | M      | M                       | L      |
| Diamides          | H                       | H      | H                       | M      | M                       | L      |
| Avermectins       | M,S                     | H,S    | L,S                     | M,S    | L                       | L      |

\* H - highly rainfast (≤30% residue wash-off), M - moderately rainfast (≤50% residue wash-off), L - low rainfast (≤70% residue wash-off), S-systemic residues remain within plant tissue

**Apple Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected codling moth control in apples, based on each compound's inherent toxicity to CM larvae, maximum residual, and wash-off potential from rainfall.

| Insecticides | Rainfall = 0.5 inch |         | Rainfall = 1.0 inch |         | Rainfall = 2.0 inches |         |
|--------------|---------------------|---------|---------------------|---------|-----------------------|---------|
|              | *1 day              | *7 days | *1 day              | *7 days | *1 day                | *7 days |
| Guthion      |                     |         |                     | X       |                       | X       |
| Imidan       |                     |         |                     | X       |                       | X       |
| Asana        |                     | X       | X                   | X       | X                     | X       |
| Calypso      |                     |         |                     | X       | X                     | X       |
| Assail       |                     | X       | X                   | X       | X                     | X       |
| Proclaim     |                     | X       |                     | X       | X                     | X       |
| Delegate     |                     |         |                     |         |                       | X       |
| Altacor      |                     |         |                     |         |                       | X       |
| Belt         |                     |         |                     |         |                       | X       |

\* Number of days after insecticide application that the precipitation event occurred.  
 X - Insufficient insecticide residue remains to provide significant activity on the target pest, and thus an immediate re-application is recommended.  
 - An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

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**Grape Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected Japanese beetle control in grapes, based on each compound's inherent toxicity to JB adults, maximum residual, and wash-off potential from rainfall.

| Insecticides | Rainfall = 0.5 inch |         | Rainfall = 1.0 inch |         | Rainfall = 2.0 inches |         |
|--------------|---------------------|---------|---------------------|---------|-----------------------|---------|
|              | *1 day              | *7 days | *1 day              | *7 days | *1 day                | *7 days |
| Imidan       |                     | X       | X                   | X       | X                     | X       |
| Sevin        |                     |         | X                   | X       | X                     | X       |
| Capture      |                     | X       |                     | X       | X                     | X       |
| Actara       |                     | X       |                     | X       | X                     | X       |
| Avaunt       |                     | X       |                     | X       | X                     | X       |

\* Number of days after insecticide application that the precipitation event occurred.

X - Insufficient insecticide residue remains to provide significant activity on the target pest, and thus an immediate re-application is recommended. An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

**Blueberry Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected cranberry fruitworm control in blueberries, based on each compound's inherent toxicity to CBFW larvae, maximum residual, and wash-off potential from rainfall.

| Insecticides | Rainfall = 0.5 inch |         | Rainfall = 1.0 inch |         | Rainfall = 2.0 inches |         |
|--------------|---------------------|---------|---------------------|---------|-----------------------|---------|
|              | *1 day              | *7 days | *1 day              | *7 days | *1 day                | *7 days |
| Guthion      |                     | X       | X                   | X       | X                     | X       |
| Asana        |                     | X       | X                   | X       | X                     | X       |
| Intrepid     |                     | X       | X                   | X       | X                     | X       |
| Assail       |                     | X       |                     | X       | X                     | X       |
| Delegate     |                     | X       |                     | X       | X                     | X       |

\* Number of days after insecticide application that the precipitation event occurred.

X - Insufficient insecticide residue remains to provide significant activity on the target pest, and thus an immediate re-application is recommended. An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

## New Regulation 119/11—Produce, honey and maple products under the Food Safety and Quality Act, 2001

**For Ontario's Fruit, Vegetable, Nut, Peanut and Mushroom Industries—Replaces Regulations 378, 384, and 386**

### REGULATION 119/11 REPLACES, MODERNIZES AND CONSOLIDATES THREE REGULATIONS

On July 1, 2011, Ontario introduced a new regulation regarding fruit, vegetables, honey and maple products. Regulation 119/11 falls under the *Food Safety and Quality Act*, 2001. It replaces three regulations in the *Farm Products Grades and Sales Act*: Regulations 378 - Grades, Fruit and Vegetables, 384 - Honey and 386 - Maple Products which have been revoked.

Regulation 119/11 applies to fresh fruit and vegetables, honey and maple products. It also includes sprouts, fresh culinary herbs, in-shell nuts and peanuts and edible fungi, not subject to the federal *Canada Agricultural Products Act*. This provincial regulation reflects current industry needs and practices and removes barriers to innovation while promoting food safety.

Labelling requirements are in addition to any federal requirements that may apply under the *Consumer Packaging and Labelling Act* (Canada) and the *Food and Drugs Act* (Canada). Refer to federal government requirements to ensure compliance.

This document notes several important changes for farmers and packers. An official copy of the *Food Safety and Quality Act*, 2001 and Regulation 119/11 - Produce, Honey and Maple Products can be accessed on the Ontario government e-laws website, under Current Consolidated Law at <http://www.e-laws.gov.on.ca>.

### FRUITS AND VEGETABLES

#### What is Covered

- ✓ This regulation applies to any produce that can be commercially grown or harvested in Canada. This includes fresh fruit and vegetables and, for the first time, sprouts, fresh culinary herbs, nuts and peanuts in the shell, and edible fungi.

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✘ This regulation does not apply to:

- produce grown and harvested for personal use and consumption,
- minimally processed fruit or vegetable products, for example sliced mushrooms, fruit or vegetable trays or apple cider. Please refer to Regulation 119/11 for a comprehensive list because this is new,
- any produce imported from outside Canada that is not commercially grown or harvested anywhere in Canada
- any fruit or vegetable grown for the purpose of seed production,
- and for the first time, in-shell nuts and peanuts harvested for any purpose other than for human consumption. Please note this is new.

Regulation 119/11 prohibits harvesting, selling, packing or transporting contaminated produce.

### **Grade Standards**

Produce, other than potatoes, no longer needs to be sold by grade as of July 1, 2011—this is new in this regulation. As requested by industry, grade standards still apply to potatoes until July 1, 2016.

### **Packaging and Containers**

This regulation now allows produce, other than potatoes, to be packed in any suitable package of any size. Between July 1, 2011 and July 1, 2016 potatoes are required to be packed in the package sizes specified in the regulation.

### **Advertising and Display**

In the previous regulation, advertising rules applied to “print” materials only. Regulation 119/11 advertising and display guidelines apply to any “media” (for example: print, electronic, digital) after June 30, 2011. The regulation requires the product’s origin, the net quantity for packaged produce and in the case of potatoes, their grade.

To help consumers, signs are required for displays of produce at retail outlets and farmer’s markets. After June 30, 2011, the signs must include these elements:

- The origin of the produce.
- The price per unit of weight, if sold by weight.
- The word “sweet” or “hot” for peppers, as appropriate.

The print on a retail display sign must be readily discernible and of a size reasonable in proportion to the size of the sign.

### **Product Labelling**

Regulation 119/11 requires produce packages or master containers to be labelled with the packer’s name and full address (or that of the person for whom it is packed). The label must also identify the country or province of origin of the produce. The print size required is the same as that required under the *Fresh Fruit and Vegetables Regulations* under the *Canada Agricultural Products Act*.

- If labels on produce contained in master containers are easily and clearly discernable, the same information need not be applied to the master container.
- If the produce is packed in such a way that it is not readily visible, the common name of the produce must be indicated.
- If labels on previously used packages or master containers do not meet the new regulation’s labelling requirements, they must be completely removed or obliterated and replaced with new labels.
- Packages of nuts, peanuts and edible fungi must now comply with origin labelling requirements by July 1, 2013.
- Unlike the previous regulation, labelling is not required on field-packed packages of raspberries and strawberries that have a capacity of 1.14L (1 quart) or less.
- Packages of peppers need to state whether they are “hot” or “sweet”.
- Potato packages must be labelled with the grade of the potatoes (until July 1, 2016). Packages of yellow flesh potatoes are required to indicate that the contents are “yellow fleshed potatoes”.

Packages of apples, pears and Yukon Gold potatoes no longer need to be labelled with the varietal name.

### **Regulation Prohibits Misrepresentation**

Regulation 119/11 also protects farmers, packers and consumers from misrepresentation. The Regulation outlines specific requirements prohibiting false or misleading information on labels, packaging and containers, or master containers. In particular, it prohibits the misrepresentation of:

- the name and full address of the packer of any produce or the person for whom it was packed
- the place where produce was grown or harvested
- the amount of produce in a package
- any grade of potatoes established in the regulation.