

# The Tender Fruit Grape Vine

VOLUME 14, ISSUE 3

JAN/FEB 2010

## Updated Tools from Weather INnovations Inc.

Wayne Heinen, Weather INnovations Inc.

A new Weather INnovations Incorporated (WIN) website for grape and tender fruit growers and industry partners within the 3 grape growing appellations – Niagara, Prince Edward County and Lake Erie North Shore, is now available at [www.vineandtreefruitinnovations.com](http://www.vineandtreefruitinnovations.com). The new program provides all of the data previously found at [www.weatherinnovations.com](http://www.weatherinnovations.com) plus more maps, tools and information to **any user who creates an account and signs in**. Sample maps are available for the products that will be available for the 2010 growing season. A limited amount of information is available without signing in, so be sure to create your own personal account.

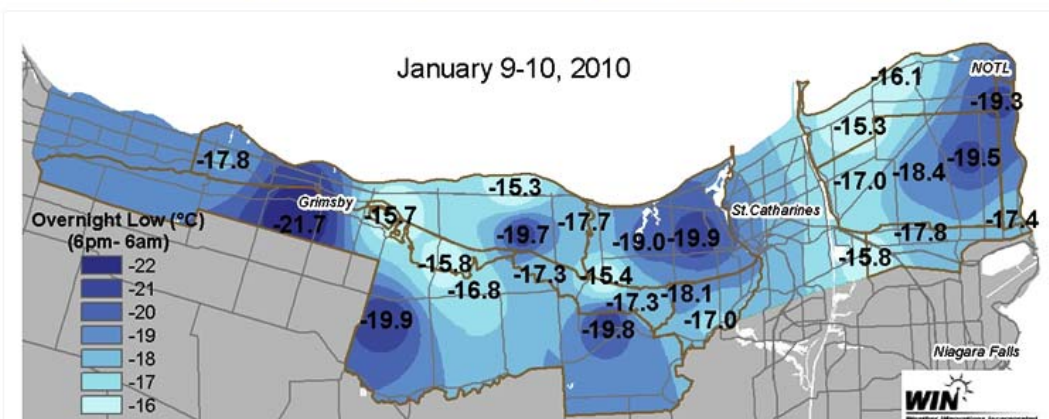
*Continued on page 3*



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### Niagara Peninsula - Overnight Low

[Historical Data](#) [Forecast Data](#) [Disease Pressure](#) [GDD](#) [ET](#) [Rain](#) [Overnight Low](#)



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- Reducing cold injury through the use of wind machines—final report
- New OVTP funding and deadline change
- Update on Gramoxone resistant Canada fleabane

Ministry of Agriculture,  
Food and Rural Affairs

 Ontario

## 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)

February 17-19, **Viticulture 2010**, Rochester Riverside Convention Center, Rochester, NY. Visit <http://www.viticulture2010.org/> for program, exhibitor and registration information.

February 24, 25, **Ontario Fruit & Vegetable Convention**, Brock University, St. Catharines. For more info visit [www.ofvc.ca](http://www.ofvc.ca) See inset for registration form.

February 27—March 3, **53rd IFTA Conference 2010**, Amway Grand Plaza Hotel, Grand Rapids, Michigan. For more info visit: <http://www.ifruittree.org/>

March 9, **Regional Agriculture Forum**, Rittenhouse Hall, Vineland Research and Innovation Centre, 4890 Victoria Avenue N, Vineland Station. For more information visit: <http://www.vinelandresearch.com/> or contact Kathryn Goodish at [kathryn.goodish@vinelandresearch.com](mailto:kathryn.goodish@vinelandresearch.com)

Feb 27-March 3 - **International Fruit Tree Association Conference**, Grand Rapids, MI. Further details can be obtained at: <http://www.ifruittree.org>

The **Annual General Meeting** and Elections of the **Niagara Peninsula Fruit & Vegetable Growers' Association** will be held at the Tender Fruit Board offices on **Tuesday, March 2, 2010**. All are welcome to attend. Anyone interested in serving as a director may contact Glenna Cairnie at 905-945-5363

Subscribe on-line to view the full coloured newsletter (in pdf format) or to receive notice by email when a new issue of the Tender Fruit Grape Vine is posted. All you need to do is submit your email address at <http://www.omafra.gov.on.ca/english/subscribe/index.html>

## Weather Information

Location	Maximum °C		Minimum °C		Precipitation (mm)	
	Nov	Dec	Nov	Dec	Nov	Dec
Vineland (85 yr ave)	17.4 9 <sup>th</sup>	12.1 2 <sup>nd</sup>	-2.7 13 <sup>th</sup>	-11.0 29 <sup>th</sup>	29.1 67.4	70.5 64.9
Harrow	17.1 17 <sup>th</sup>	8.1 1 <sup>st</sup>	8.1 1 <sup>st</sup>	-10.5 10 <sup>th</sup>	18.7	68.4
Simcoe	18.7 9 <sup>th</sup>	11.5 3 <sup>rd</sup>	-2.8 7 <sup>th</sup>	-14.1 30 <sup>th</sup>	na	na

\*We would like to thank the University of Guelph at Simcoe, Weather INnovations Incorporated, and AAFC Harrow for the weather data

*Continued from page 1*

New products for sign-in users include:

#### **Additional management tools**

- Region maps with sub-appellations and terroir information; user can zoom into a sub-appellation to view a map with road names and place names to assist in identifying station locations
- Disease Pressure Map
- Disease Pressure Tool
- ET Map
- Forecast Data
- Hourly: 5 day forecast
- Daily: 10 day forecast
- GDD Map
- GDD Tool
- Overnight Low Map
- Rain Map

#### **Current and historical weather data:**

- 15 minute Data: the past month
- Hourly Data: the past 6 months
- Daily Data: since January 1st; however, data is not archived until the beginning of April, so more than a yearly dataset will be accessible from January-March

**"My Favourites" Tool** - the ability to save user preferences to expedite viewing time on subsequent visits

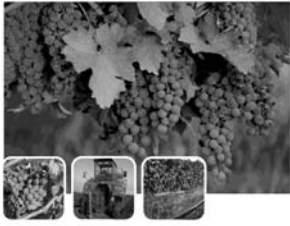
- Daily Data Comparisons
  - Various parameters over the past 2 weeks

Visit [www.vineandtreefruitinnovations.com/userguide.cfm](http://www.vineandtreefruitinnovations.com/userguide.cfm) to learn about each of the outlined products and how to access them.

This new program is currently sponsored by the Grape Growers of Ontario, OMAFRA and Ontario Tender Fruit Producers. WIN thanks these sponsors for their assistance in providing tools and resources to the industry. Please contact WIN at 519-352-5334 ext 223 or email [inichols@weatherinnovations.com](mailto:inichols@weatherinnovations.com) to explore additional sponsorship opportunities to serve the grape and tender fruit sector. Any questions regarding the new website or additional weather monitoring services, can be directed to Wayne Heinen, WIN Operations (Niagara or PEC) 289-241-6338 or Ian Nichols (Lake Erie North Shore) 519-352-5334.

#### **How cold did it get in Niagara on the night of January 9-10, 2010?**

On Saturday, January 9, conditions were suited to an extreme temperature drop. The day was marked by relatively clear skies, yet temperatures remained well-below 0°C. As the sun lowered during the early evening hours, there was a simultaneous drop in wind speeds. Consequently, radiational cooling occurred rapidly, as skies remained clear and wind speeds were low. A very strong temperature inversion developed, ranging from a 5°C to 8°C difference between temperatures at vine-level and at a height of 20m. This sudden drop in temperature resulted in the coldest temperatures experienced yet in the 2009/2010 winter season. Some areas experienced relief as wind speeds rose above 7km/hr (the approximate wind speed at which there is enough natural mixing to begin to break up inversions). Alternatively, wind machines were started to perform the same action, bringing warm air down to vine-level. Temperatures at vine-level fluctuated greatly until morning, in sync with natural wind speed fluctuation and/or mixing generated from wind machines. A map outlining the minimum hourly average temperature that occurred at each location during this event is shown on page 1. (These maps are posted daily on our website for anyone who signs in). View this map and much more at [www.vineandtreefruitinnovations.com](http://www.vineandtreefruitinnovations.com)



**Establishment & Production Costs for Grapes in Ontario**  
2009 Economic Report

Ministry of Agriculture, Food and Rural Affairs  
Ontario

## 2009 Cost of Production for Grapes – Now available

Ken Slingerland, OMAFRA

The Establishment and Production Costs for Grapes—2009 Economic Report is now available. All growers who receive mailings from GGO will receive a copy in the mail. Anyone else interested in receiving a copy should call GGO at 905-688-0990 or OMAFRA at 905-562-4147 (press '2' for OMAFRA).



### Online Registration

Guarantee your lunch and ticket to the evening event by pre-registering.

Go to [www.ofvc.ca](http://www.ofvc.ca)

## NIAGARA PENINSULA FRUIT & VEGETABLE GROWERS' ASSOCIATION



### 2010 Award of Merit

All growers and related industry are invited to join us to honour

**Ross Parker**

Recipient of the 2010 Award of Merit

In recognition of his many years of volunteer service as Chair of the Ontario Fruit & Vegetable Convention Trade Show

Thursday, February 18<sup>th</sup>, 2010

7:00 pm

Keefer Mansion Inn  
14 St. Davids St.W., Thorold

For tickets and information please call Glenna Cairnie at 905-945-5363

## 2010 OFVC Tender Fruit Program

The key note speakers for this year's program are Harold and Jon McClarty from McClarty Farms (HMS Fresh Foods) in California. The father-and-son team will present the two sides of farming: the production of stone fruits and the marketing of stone fruits. HMS Foods is a large supplier of stone fruits in Ontario and Jon will present on 55 steps to easy farming while Harold will present on the marketing and the future of California Stone Fruits.

Other speakers are focusing on marketing and consumers this year. Barb Smith from Foodland Ontario will make a presentation about the peach promotion while Martin Gooch from the George Morris Centre will talk about the connection between producers and consumers. Anne Marie Diotte, OMAFRA, will present new updates to the Growing Forward Business Development Program.

On the production side, Dr. Bill Shane, MSU, will speak on his experience with Michigan varieties with a second presentation on peach disease management. Dr. Jay Subramanian, University of Guelph, will speak about new *Prunus* cultivars at Vineland. Ken Slingerland, OMAFRA, will relate the past summer's results on the mechanical blossom thinning trials in grower's orchards in 2009.

Pears and cherries will also be covered in the program. Dr. Jennifer DeEll, OMAFRA, and Welcome Sauer, AgroFresh Inc. in Washington State, will present their results from pear storage trials. The final session will be a panel on Innovation. Steve Pohorly, a Niagara-on-the-Lake grower, will discuss his experience with sweet cherry production and marketing from tunnels. John Zandstra, University of Guelph, will present his results from the high tunnel trials in Cedar Springs and other developments in the southwest. Dr. Marcel Bergman, Carnegie Mellon University in Pennsylvania, will share his research on innovations in crop intelligence and agricultural automation for tree fruit production.

### Wednesday, February 24

- 9:30 a.m. Experience with new fresh market peach varieties in Michigan  
*Dr. Bill Shane, SW Michigan Research and Extension Center*
- 10:00 a.m. Foodland Ontario's peach promotion  
*Barb Smith, OMAFRA*
- 10:30 a.m. Capturing greater value from Ontario's tender fruit market  
*Martin Gooch, George Morris Centre*
- 11:00 a.m. Local commercial trials and international experience using SmartFresh on pears  
*Dr. Jennifer DeEll, OMAFRA and Welcome Sauer, AgroFresh Inc., Washington*
- 2:00 p.m. *Prunus* cultivars at University of Guelph  
*Dr. Jay Subramanian, University of Guelph*
- 2:30 p.m. Peach disease management in Michigan  
*Dr. Bill Shane, SW Michigan Research and Extension Center*
- 3:00 p.m. Growing Forward Business Development for Farm Businesses Program: Helping you reach your business goal  
*Anne Marie Diotte, OMAFRA*
- 3:30 p.m. Marketing California peaches: The peach and the chain saw  
*Harold McClarty, McClarty Farms, California*

### Thursday, February 25

- 9:30 a.m. Mechanical blossom thinning to reduce labour  
*Ken Slingerland, OMAFRA*
- 10:00 a.m. Farming stone fruit in 55 easy steps  
*Jon McClarty, HMC Fresh Foods, California*
- 10:30 a.m. Innovations in crop intelligence and agricultural automation for tree fruit production – 1 hour panel  
*Steve Pohorly, grower, NOTL  
John Zandstra, University of Guelph  
Dr. Marcel Bergman, Carnegie Mellon University, Pennsylvania*



## 2010 OFVC Grape Program

The key note speaker this year for the grape program is Allen Holstein from Argyle Winery in Oregon. Argyle Winery was named "OREGON'S PREMIER WINERY" by Wine Spectator in 2000. Allen will give an overview of the grape and wine industry in Oregon for his first presentation. His second talk will describe the evolution of viticulture in the Willamette Valley. Allen is also speaking in the Uncorked Winery session.

Martin Gooch from the George Morris Centre will talk about the connection between producers and consumers. Anne Marie Diotte, OMAFRA, will be presenting new updates to the Growing Forward Business Development Program. Darrell Brown, from the law firm of Sack, Goldblatt and Mitchell, L.L.P., will discuss the hot topic of the legalities of contracts between growers and processors.

On the production side of grapes, Dr. Kevin Ker, from KCMS Applied Research and Consulting and Hugh Fraser, OMAFRA, will present the final Wind Machine report after 4 years of research. Dr. Helen Fisher, University of Guelph, will speak on improving vineyard soils through soil amendments and Dr. Terry Bates, Cornell University, will discuss wine grape production on acid soils with rootstock and soil management. Dr. Wayne Wilcox, Cornell University, will tackle the tough issue of black rot management while Justin Scheiner, Cornell University, will advise growers on how to reduce green aromas in the vineyard. Dr. Andy Reynolds, Brock University, will talk on a method for assessing vineyard crop potential and Ken Slingerland and John Molenhuis, OMAFRA, will make a presentation on the cost of grape production.

### Wednesday, February 24

- 2:00 p.m. Growing Forward Business Development for Farm Businesses Program: Helping you reach your business goal  
*Anne Marie Diotte, OMAFRA*
- 2:30 p.m. Capturing greater value from Ontario's table grape market  
*Martin Gooch, George Morris Centre*
- 3:00 p.m. Wind machines: best management practices and next steps for research  
*Dr. Kevin Ker, KCMS Applied Research and Consulting and Hugh Fraser, OMAFRA*
- 3:30 p.m. Contracts between growers and processors  
*Mr. Darrell Brown, Sack, Goldblatt and Mitchell, L.L.P.*



### Thursday, February 25

- 9:30 a.m. Organic amendments to improve vineyard soils  
*Dr. Helen Fisher, University of Guelph*
- 10:00 a.m. Improving wine grape production in acid soils with rootstocks and soil management  
*Dr. Terry Bates, Cornell University*
- 10:30 a.m. The Mummy Returns: Black rot management in grapes  
*Dr. Wayne Wilcox, Cornell University*
- 11:00 a.m. An overview of the wine grape industry in Oregon  
*Allen Holstein, Argyle Winery, Oregon*
- 2:00 p.m. Reducing green aromas in the vineyard  
*Justin Scheiner, Cornell University*
- 2:30 p.m. Assessing vineyard crop potential  
*Dr. Andy Reynolds, Brock University*
- 3:00 p.m. Grape cost of production - Where did all the money go?  
*Ken Slingerland, OMAFRA*  
*John Molenhuis, OMAFRA*
- 3:30 p.m. Evolution of viticulture in the Willamette Valley of Oregon  
*Allen Holstein, Argyle Winery, Oregon*

## Uncorked Winery Session

Wednesday, February 24

9:30 a.m.	Wine consumer trends <i>Pamela Lawson, Liquor Control Board of Ontario</i>	2:00 p.m.	Amarone-style wine making: Why, how to, and challenges in Ontario climate <i>Len Crispino, The Foreign Affair Winery</i> <i>Angelo Pavan, Cave Spring Cellars</i>
10:30 a.m.	The commercial evolution of a cool climate region in Oregon; Argyle Winery's experience. <i>Allen Holstein, Argyle Winery, Oregon</i>	2:15 p.m.	Sparkling wines – Explore the opportunity, challenges and styles <i>Dan Speck, Henry of Pelham Family Estate Winery</i> <i>Ed Madronich, Flat Rock Cellars</i>
11:15 a.m.	Marketing strategy - building the whole brand. A successful discipline to guide you in finding insight into your target audience and developing your message <i>Brian Torsney, Play Advertising</i>	3:15 p.m.	Yeasts and enzymes <i>Lallemande Inc.</i>



## Demonstrations at OFVC

For those looking for detailed hands-on information, we have 6 demonstrations all designed to be interactive and practical.

- Demonstration 1 - Spray Patternator and Crop Adapted Spraying
- Demonstration 2 - How Good Is Your Weed I.D.? Test Your Knowledge With These Often Confused Look-a-likes At The Weed I.D. Table
- Demonstration 3 - Assessing the Benefits of On-Farm Biogas Production via Anaerobic Digestion
- Demonstration 4- Constructed Wetland
- Demonstration 5- Water Sanitation
- Demonstration 6- Advantage i-GAP

## Automation is key to reduced input costs for fruit and vegetable growers

Input costs for horticultural crops is dominated by labour expenses. At the Ontario Fruit and Vegetable Convention, we have talked about how to get the most out of your labour, how to plan your pay system to increase individual performance and how to record the productivity of individuals. With the upcoming rise in minimum wage rates, managing labour cost will continue to be a challenge. This year, the Ontario Fruit and Vegetable convention is profiling advances in automation as a way to deal with labour in the “Farming in the Future” session.

Automation includes more than just the machines we think about when we visualize automotive assembly plants. It can be incorporated into all aspects of production. Comprehensive Automation for Specialty Crops (CASC) is a \$6 million multi-institutional research and demonstration initiative established for apples to build automated farming systems.

CASC is led by Carnegie Mellon Robotics Institute and will develop methods to improve production efficiency, identify threats from pests and diseases, and, detect, monitor and respond to food safety hazards. The key industry needs addressed by the project include: early detection of diseases and insects, monitoring of plant health, assessment of crop value, reduction in the amount (and cost) of sprays and nutrients, increase in the efficiency of labor, and reduction of damage to crops at harvest. The objectives include developing, integrating, testing, deploying, and assessing a carefully chosen set of information, mobility, manipulation and plant science technologies, assessing their socio-economic utility, and transferring results to the end users via commercialization and outreach.

Dr. Marcel Bergeman, from the Carnegie Mellon Robotics Institute will be at the Ontario Fruit and Vegetable convention to report on the project and some of its early outcomes. More information on the project can be found at

<http://www.fieldrobotics.org/casc/CASC/Welcome.html>

## 2009 Cultivar Evaluations - Peaches

Ken Slingerland, Tender Fruit & Grape Specialist, OMAFRA

Location	Cultivar	Yr	Cr	Rd	Un	Sf	Co	Bl	At	Fi	Fr	Qu	RF	Sp	LS	Fs	Or
Jordan Station	HW 269	99	8	July 25	6.5	7	7.5	7.5	7.5	6.5	6	7	9	8	9	9	7
Vic Farm	V92301	04	7.5	29	7	7.5	7.5	8	8	7.5	6	7	9	8	9	8.5	7
Jordan #2	V92301	06	6	30	7	6	7.5	8	8	7.5	6	7	9	8.5	8.5	8.5	6.5
Fonthill	HW 274	05	5	31	7	7	6.5	6.5	6.5	5	6	6.5	8	8	8	9	5.0
Fonthill	PF 7	05	6	Aug 1	7	7.5	7.5	7.5	7.5	7.5	6.5	7	9	8	9	9	7.5
Fonthill	V853914	00	7	4	7	7.5	7.5	7.5	7.5	7.5	7.5	7.5	9	8	9	9	7.5
Fonthill	V85384		6	5	7	7	7.5	7.5	7	7.5	5.5	6	8	5	9	9	5.5
Vic Farm	HW274	98	7	9	7	7.5	7.5	7.5	7.5	6	7	7	8.5	8.5	8.5	9	6.5
Vic Farm	Risingstar	98	7	9	7	7.5	7	6.5	7	7	6	6.5	8.5	8	9	9	6.5
Fonthill	PF 15A	00	7.5	14	7	7	7.5	7.5	7.5	7.5	8	7	8	8.5	9	9	7
Vic Farm	HW 272	98	7	17	7	7	7	7	7	7.5	7.5	7	8.5	9	9	9	7
Vic Farm	Redhaven	92	7	18	7	8	7.5	7.5	7.5	6.5	7.5	7.5	8.5	8	9	9	7.5
Vic Farm	HW271-W	98	7	17	6.5	7	7.5	7.5	7	6.5	8.5	7	8	5	8.5	9	7
Vic Farm	Redstar	98	7	21	7	7.5	7.5	7	7	7.5	7.5	7.5	8.5	9	9	9	7
Vic Farm	Starfire	98	7.5	21	7	7.5	7.5	7.5	7.5	7.5	7.5	7.5	9	8.5	8.5	8.5	7
Vic Farm	Blazingstar	98	7.5	22	7	7.5	8	8	8	7.5	8.5	7.5	8.5	9	8.5	9	8
Vic Farm	V92131 - W	02	7	26	7	8	7	7	7.5	8	7	7	7.5	9	8.5	9	7.5
Vic Farm	HW 267	98	6.5	26	7.5	8	7	7	7	7	8.5	7.5	8.5	8	9	9	7
Vic Farm	PF 17	98	7.5	29	7	7.5	7.5	7.5	7.5	7.5	9	7.5	9	9	9	9	7.5
Vic Farm	Allstar	98	6.5	30	7	8	7	7.5	7.5	7.5	8	7	8.5	8	9	9	7
Vic Farm	Coralstar	98	7	Sept 4	7	8	7.5	7.5	7.5	7.5	8	7	8.5	8.5	9	9	7.5
Vic Farm	PF 23	98	7.5	5	7.5	7.5	8	8	8	8	9	7.5	8.5	9	9	9	8
Vic Farm	Bounty	98	7.5	7	7	8	7.5	7.5	7.5	7.5	8.5	7.5	8.5	9	9	9	7
Vic Farm	Glowingstar	98	7	8	7	7	8	8	7.5	7.5	9	7.5	8.5	8.5	8.5	9	7
Vineland	PF 24-007	04	3	12	7.5	9	8	8	8	7	9	7.5	8.5	9	8.5	8.5	4

**Notes:** W = White Flesh; Starfire – Slight ridge at suture; V92301 was under-thinned; HW269 had some winter injury and canker; HW274 discarded; PF7 had a spring frost; Glowingstar – odd block shape with ridge on suture; Bounty – underthinned

### Key to the Cultivar Ratings

A standard scoring for most categories, unless otherwise listed, is defined as the following; 9 = exceptional, 7 = good, 5 = commercial acceptable, less than 5 is unacceptable. A 5 rating or less is occasionally acceptable in one category when other category ratings are much higher ie. Freeness for early season nectarine is sometimes too clingy to the pit but that is normal for early season nectarines.

**Yr** – The year the cultivar was planted.

**Cr** – The amount of crop at harvest for Niagara, actual harvest weights are used for the Cedar Springs plantings

**Rd** – Ripe date when the first commercial harvest occurs. Days before (-) or after (+) Redhaven.

**Un** – Uniformity of fruit on the tree, i.e. 1 harvest = 9, 2 harvests = 8, 3 harvests = 7, 4 harvests = 6, etc.

**Sf** – Size of Fruit, e.g. 3" = 9, 2 3/4" = 8, 2 1/2" = 7, 2 1/4" = 6, 2 1/8" = 5, less than 2 1/8" = 4

**Co** – Colour of fruit exterior, background colour, etc.

**Bl** – The percentage of the blush on most of the fruit; 90% = 9, 70% = 7, 50% = 5, etc.

**At** – Attractiveness of fruit, brightness, concentration of colour, contrast, free from blemishes, etc.

**Fi** – Firmness of fruit at harvest

**Fr** – Freeness of the flesh from the pit

**Qu** – Quality of fruit, flavour, texture, sugar/acid ratio

**Rf** – Red in flesh; no red = 9, slight discolouration and some red at pit = 7, flesh heavily streaked from centre = 5, etc

**Sp** – Split pits; none = 9, 5% = 7, 10% = 5, 25% = 3.

**Ls** – Leaf spot; very resistant = 9, moderately resistant = 7, somewhat susceptible = 5, very susceptible = 3

**Fs** – Fruit spot; same as above

**Or** – Overall rating; considers above ratings and also includes susceptibility to diseases, skin pubescence, etc.

## Tips to Alleviate Replant Problems in Stone Fruit

Michael Celetti, Plant Pathologist, Horticulture Crops Program Lead, OMAFRA

Perennial fruit tree crops including stone fruit and pome fruit may grow poorly and become less productive when replanted on a site where the same crop was grown previously. In some orchards, the population of a single pathogen or parasitic nematode that builds up around the roots of mature trees over time can overwhelm young two year old trees planted on the same site. As a result, young replanted trees become severely stunted with poor growth and sometimes die prematurely. However, over 200 years of studies and research on the “replant problems” of fruit crops have found that a combination of several factors including nutrient deficiencies and toxicities, soil pH, soil conditions, poor plant soil water relationships, root and vascular pathogens as well as parasitic nematodes contribute to poor growth. Most studies have shown that when soil from orchards suffering from “replant problems” is pasteurized or fumigated, the deleterious effects disappear or are greatly reduced. This suggests that a biological component is often, but not always, the primary cause of this complex phenomenon. In some studies, no specific pathogen was associated with the poor growth of the replanted perennial fruit trees; however, the researchers proposed that microbes that breakdown the roots of the previous fruit trees release products into the soil that are phytotoxic to root growth and development of young replanted trees of the same species. Removing as much of the old root system from sites that are to be replanted to stone fruit is important.

Since plant parasitic nematodes have been found to be associated with replant problems in some orchards, a soil test for nematode analysis before replanting is always a good practice. Although “Bailey” rootstocks are considered some what tolerant to root lesion nematodes, young trees on “Bailey” rootstocks can be overwhelmed by high populations of these pests left from old trees grown on the site previously. The Tomato ringspot virus can be vectored by dagger nematodes and has an extensive host range including many crops such as grape, tomato, pepper, raspberry, as well as weeds including dandelion, sheep sorrel and common chickweed. Keeping land fallow and controlling weeds that could act as a reservoir, lowers nematode populations and results in better replanted tree growth. Unfortunately fallowing land is not a sustainable practice and can result in the loss of soil to erosion.

*Verticillium* wilt is a soil-borne vascular disease, not usually associated with replant problems that can cause significant decline in stone fruit trees. The pathogen can persist in soil for many years and has a large host range including many vegetables particularly potatoes, tomatoes, eggplant and some small fruit crops such as strawberries and raspberries. Planting stone fruit on land that was previously grown with susceptible crops may pose a risk of *Verticillium* infection and should be avoided.

Several species of the water mold “*Phytophthora*” can cause severe root, crown and collar rot of stone fruit. The *Phytophthora* species that infected stone fruit trees has a very large host range including many other fruit trees and some small fruits such as strawberry. This pathogen is often associated with the replant disease complex, but can cause significant damage to stone fruit on its own. It is frequently found in heavy soils but can infect trees growing in poorly drained sandy soils. Planting a grass cover crop prior to planting stone fruit may help reduce the pathogen population in soil. Avoid replanting stone fruit trees in low areas where water remains standing for extended periods of time. Selecting sites that are well drained or installing good drainage in fields where water accumulate will help to reduce the environmental conditions required for *Phytophthora* infection.

Fumigating land prior to planting young trees is one of the most consistent practices that reduce the potential of replant problems. Several studies using seed meal from brassica crops such as mustards that are incorporated into soil as a green manure prior to replanting fruit trees have been shown to reduce populations of both parasitic nematodes and root rot pathogens associated with replant disease. Many brassica crops produce chemicals in their leaves, flower parts and seed coats that, when broken down by soil microbes, release biofumigants which suppress pathogens and nematodes.

There is no silver bullet to control replant problems; however, testing soil for nematodes and integrating several practices including site selection, crop rotation with cover crops and fumigating prior to replanting will significantly reduce biological agents that can negatively impact the establishment and growth of young stone fruit trees.

# Fungicide Spray Coverage

Dr. Jason S.T. Deveau, Application Technology Specialist, OMAFRA

Crop diseases are caused by a variety of pathogens, but it's the fungal pathogens that are the primary cause of crop loss worldwide. Fungicides are pesticides that manage fungal disease by specifically inhibiting or killing the fungus. Fungicides are most effective when the application is timely and achieves good coverage. Coverage gets mentioned a lot when talking about good spraying practices, but what is it exactly?

Target coverage describes the percentage of a target's surface that has spray on it, but it also describes the size and distribution of droplets. Consider a leaf with three large droplets and another leaf with 80 small droplets. Both can have the same volume of pesticide and the same percent-area coverage, but the leaf with more droplets is better protected. Consider further, two leaves with 80 droplets each: now they have the same "coverage", but one was sprayed using more water than the other and therefore has less active ingredient per droplet.

Fungicides have different chemistries and should be applied according to their mode of action. Locally systemic products have limited movement within the plant, often as little as a few millimetres and rarely throughout a leaf or into growing tissue. Contact products have to physically touch the pathogen, so there's very little margin for error. It is debatable, but good coverage generally equals good efficacy and the best results are achieved when susceptible surfaces have about 80 to 90 droplets per square centimetre, sprayed with fine-to-medium droplets, with a concentration no less than label rate (see Figure 1).

Coverage can sometimes be improved through the use of adjuvants (e.g. spreaders, stickers, etc.) but be aware that many products include adjuvants in the formulation: don't add any unless indicated on the label. Further, don't rely on kickback, systemic movement or rain-redistribution of any product to make up for poor timing or poor coverage.

To get a better sense of what adequate fungicide coverage really looks like, consider Figure 2. These are water-sensitive papers used for evaluating relative spray coverage and canopy penetration. The paper is yellow and is stained blue by exposure to aqueous spray droplets. It is perhaps surprising that paper #2 represents the ideal: just over 80 discrete droplets per square centimetre, with droplets between fine and medium (200-300 micron diameter).

Water sensitive paper is relatively cheap and can be obtained from any nozzle supplier; it provides immediate feedback as to the quality of the application and you should always have a packet (and a few clothespins) handy for a quick evaluation.

So, when you take the sprayer out of the barn at the beginning of the season, don't just set it and forget it. Take the time to consider each spray application before you start filling the tank. Make adjustments with an eye to achieving good coverage every time. For more information, check out the Factsheet "Six Elements of Effective Spraying in Orchards and Vineyards":

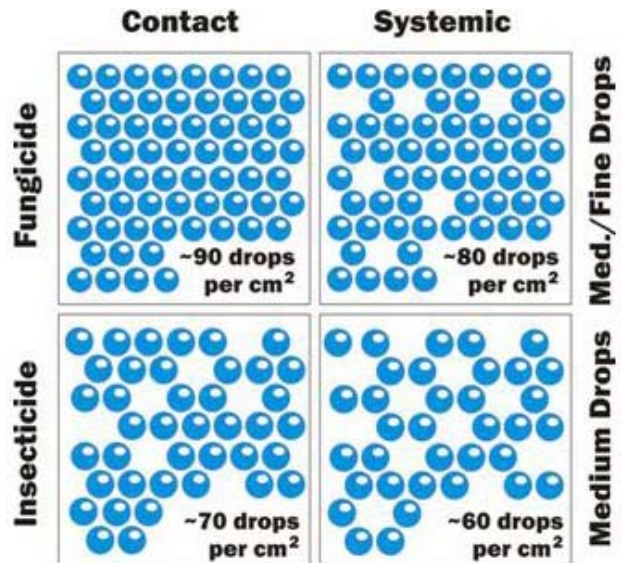


Figure 1 - There will always be exceptions, but generally these are ideal relative droplet sizes and deposit densities for fungicides and insecticides.

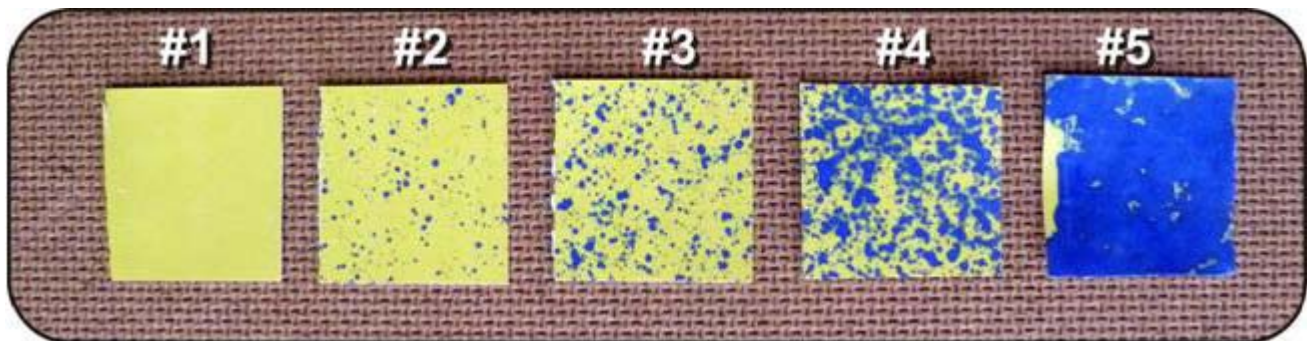


Figure 2 - Spray coverage of water-sensitive paper from least to greatest.

# Final Report: CanAdvance Project # ADV – 161; November 2005 – November 2009

*'Reducing Cold Injury to Grapes Through the Use of Wind Machines'*

Hugh Fraser, Agricultural Engineer and Ken Slingerland, Tender Fruit & Grape Specialist, OMAFRA  
Kevin Ker, Research Associate, Brock University (CCOVI)  
K. Helen Fisher, Department of Plant Agriculture, University of Guelph  
Ryan Brewster, KCMS Applied Research and Consulting Inc.

Here is a summary of the *Best Management Practices* which make up part of the 36 page report recently completed by the above researchers who are grateful for all the support of many partners. The project was sponsored by the Grape Growers of Ontario (GGO) and the Wine Council of Ontario (WCO). This project was partially funded by *CanAdvance*, through the Agricultural Adaptation Council of Agriculture and AgriFood Canada (AAFC), and by *CRESTech* through the Ontario Centres of Excellence. Other funding partners included: Vailmount Vineyards, 1340226 Ontario Ltd, KCMS Applied Research and Consulting, Agricorp, Ontario Tender Fruit Producers' Marketing Board (OTFPMB), and the Niagara Peninsula Fruit and Vegetable Growers' Association (NPFVGA). In-kind contributions supporting the project included Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), Brock University (CCOVI), University of Guelph (UG), GGO, KCMS and Agricorp.

The objective of this on-farm research project was to provide the Ontario grape and tender fruit industry with best management practices for operation of wind machines to use them more effectively and minimize nuisance noise for neighbours.

## Crop hardiness

- Plants should be managed to maintain optimum health to ensure they are as healthy as possible going into winter
- The most up-to-date plant hardiness information and critical temperatures should be taken into account when decisions are made to operate a wind machine
- Wind machines should operate only when there is the possibility of cold injury to crops within the area of influence of the machines

## Placement

- Wind machines should be located to take into account the expected skewing effects on their areas of influence by topography and wind direction
- Wind machines should be located to take into account the location of other adjacent wind machines and other features which might provide some additional cold injury protection such as roads, warm buildings, streams, bush
- Growers should consider planting crops that are more sensitive to cold injury as far as practical from neighbours, so wind machines can be located further from homes

## Monitoring

- Growers should use best local weather forecasts available such as <http://www.vineandtreefruitinnovations.com/>
- Growers should continually monitor for a strong temperature inversion, greater than 3°C (5.5°F), as close as practical on or near their farm, so they know if operating their wind machine(s) might provide some plant protection from cold injury. This would include a tower at least 10 m (33 ft) high to monitor temperatures high above the crop
- Growers should set start-up temperatures for their wind machines based on sensors located within 15 m (50 ft) of each machine, and below the fruiting wire height
- Growers should monitor and automate the start up/operation/shut down of their wind machines using a combination of real-time remote temperature/wind speed/wind machine operation sensing devices and monitoring via cell phones/computers/pagers, etc.
- Growers should set start-up temperatures as close as practical to expected critical air temperatures:
  - \* Spring frost: 2 to 3°C (36 to 37.5°F)
  - \* Fall frost: 1 to 2°C (34 to 36°F)
  - \* Winter: Variable based on latest bud hardiness data from freezing trials
- Growers should set the differential (wind machine stop) temperature on their wind machines 2°C - 3°C (3.5°F – 5.4°F) higher than start temperatures

## Wind

- Growers should monitor wind speeds before and during expected cold injury events
- Growers should not operate wind machines if wind speeds are much higher than 7 km/h (4 mph) as there is unlikely to be a strong temperature inversion or 'heat' above the field to pull down anyway
- Growers should not operate wind machines if wind speeds are 13 km/h (8 mph), or higher, as this can damage their long, thin blades
- Growers should never operate wind machines if wind speeds are 21 km/h (13mph), or higher, as this can seriously damage their wind machines

## Maintenance

- Growers should maintain machines in good condition with checkups at least annually by;
  - \* changing gearbox oil (at tower base and top)
  - \* lubricating drive lines and inspecting seals
  - \* checking tension of all bolts on tower
  - \* inspecting blades and attaching hardware
  - \* performing regular engine maintenance; and
  - \* keeping booster cables handy for quick use

## Noise

- Wind machines should be located as far as practical from the edge of neighbouring homes within agricultural areas, but not closer than 125 m unless best management practices are in use
- For neighbours living within 125 m of a machine, growers should:
  - \* discuss the need for wind machines and how and why they operate
  - \* consider creating an early warning system about possible machine use on certain nights
  - \* give them a 24-hour cell phone number to call
  - \* use a 'Last On, First Off' principle for machine(s)
- Growers should be more diligent in operating wind machines on farms where they do not live, as they are not always there to hear if and how their machines are operating
- All wind machine engines should have mufflers

## On-going learning

- Growers should train and educate all employees who will operate wind machines on the latest best management practices to minimize machine operation

## New OVTP funding and deadline change

As the Canada-Ontario Orchards and Vineyards Transition Program (OVTP) nears its funding limit, the Ontario government is providing an additional \$2 million to the program. OVTP provides compensation to grape, apple and tender fruit producers who wish to remove unproductive and/or uneconomic vines and trees.

To allow as many producers as possible to participate before funding runs out, the application deadline has been moved up to March 31, 2010. The new deadline also helps ensure that accepted growers have enough time to complete their removals by November 30, 2010. Applications are processed on a first come first served basis, so growers are encouraged to apply early.

Eligible producers may receive up to \$1,618.74 per qualifying acre towards the cost of removing and disposing of orchard and vineyard stock. As of February 1, 2010, Agricorp has received more than 1,300 OVTP applications and verified 11,543 acres for a total of \$18.7 million in funding. We have already issued more than \$10.7 million in OVTP payments.

# Update on Gramoxone Resistant Canada Fleabane

Kristen Callow, Weed Management Program Lead - Horticultural Crops

Canada fleabane (*Conyza Canadensis*), also known as horseweed was found to be resistant to group 22 herbicides (bipyridiliums), specifically Gramoxone (paraquat) in Essex County in 1993. Approximately 5 acres were infested at 5 orchard sites. Over time, the area of infestation has declined significantly and no new cases have been reported largely due to the use of Roundup (glyphosate) to control the resistant populations.

Canada fleabane has been documented to develop resistance to Roundup (glyphosate) – glycines (group 9), as well as, ALS inhibitors (group 2 – Classic, First Rate), photosystem II inhibitors (group 5 – Gesagard, Sinbar), ureas and amides (group 7 – Betamix, Karmex) and bipyridiliums (group 22 – Gramoxone). Several cases of herbicide multiple resistance have occurred around the world. **Herbicide multiple resistance** refers to a weed or crop biotype that has evolved mechanisms of resistance to more than one herbicide and the resistance was brought about by separate selection processes. For example, after a weed or crop biotype developed resistance to herbicide A, then herbicide B was used and resistance evolved to herbicide B. The plant is now resistant to herbicides A and B through two separate selection processes. (Gunsolus, J.L., 2002)

Glyphosate resistance is of particular concern to Ontario producers, due to the reliance of this product in perennial horticulture production systems. There have been no known cases of glyphosate resistance in Ontario; however, the following American States have confirmed glyphosate resistant Canada fleabane populations:

2000 - USA (Delaware); 2001 - USA (Kentucky); 2001 - USA (Tennessee); 2002 - USA (Indiana); 2002 - USA (Maryland); 2002 - USA (Missouri); 2002 - USA (New Jersey); 2002 - USA (Ohio); 2003 - USA (Arkansas); 2003 - USA (Mississippi); 2003 - USA (North Carolina); 2003 - USA (Ohio); 2003 - USA (Pennsylvania); 2005 - USA (California); 2005 - USA (Illinois); 2005 - USA (Kansas); 2007 - USA (Michigan); 2007 - USA (Mississippi). Source: [www.weedscience.org](http://www.weedscience.org)

In Ohio and Michigan, researchers have found Canada fleabane with resistance to ALS herbicides (i.e. Classic, FirstRate) in a number of fields. Also, in Michigan resistance has been found to ureas and amide herbicides (i.e. Betamix, Karmex). There have been no known cases of ALS or urea and amide herbicide resistance in Ontario.

Canada fleabane is a weed that occurs in all parts of Ontario. Traditionally, it was a problem in pastures, and roadsides, but is increasing in “popularity” because it thrives in no-till fields. It has always been a problem in perennial crops like orchards, vineyards, berries, nursery crops and asparagus where soil is not tilled.

Controlling Canada fleabane in the spring is usually not difficult. Applications of Roundup (any glyphosate product) are usually effective for the over-wintering rosettes. High rates will be required later in the season. Gramoxone or Ignite can also be effective, but Gramoxone should be used on cloudy days. All products are more effective if applied before the fleabane gets too big.

Rotating between herbicide groups or modes of action is essential to prevent resistance development. If you have any plants that are not being controlled by your current herbicide program and you suspect resistance please contact the Agriculture Information Contact Center: 1-877-424-1300. The University of Guelph "Weeds Lab" can test for resistance of suspected weed species.

## References

Gunsolus, J.L., 2002. <http://www.extension.umn.edu/distribution/cropsystems/DC6077.html#Definitions>

## Acknowledgements

Thank-you to Peter Smith, Department of Plant Agriculture, University of Guelph for the use of his pictures.



Figure 1. Canada fleabane rosette – target herbicide application stage



Figure 2. Canada fleabane whole plant