



# THE TENDER FRUIT GRAPE VINE



*A Newsletter for Commercial Fruit Growers*

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## **Copper for Suppression of Bacterial Canker in Sweet Cherry?**

*Neil Carter, Tender Fruit and Grape IPM Specialist, OMAFRA*

Bacterial canker of sweet cherry is caused by a couple of related organisms, *Pseudomonas syringae* pv. *syringae* and *Pseudomonas syringae* pv. *morsprunorum*. Various pathovars (“pv”) of *P. syringae* cause numerous plant diseases including some that fruit growers are familiar with such as blossom blast of pear.

Bacterial canker infections occur through any kind of wound in a tree including through leaf scars as leaves fall in the autumn. *P. syringae* does well during cool, wet weather, so spring and fall are the main infection periods.

Since *P. syringae* is a bacteria, fungicides have no effect on it, but copper applications have been used in an attempt to manage it in some jurisdictions for many years. At least two copper formulations are registered in Canada for management of bacterial canker of sweet cherry. However, this approach does not eliminate the disease and at best, can only help suppress *P. syringae* that have not already infected plant tissues. Copper is not systemic, so those bacteria already within their hosts (such as in existing cankers) are protected from these applications.

Registered copper products suggest two applications per year; one in the fall when 75% of leaves have dropped and one in the spring before bud break. Spring applications are risky if buds are too far along since copper is quite phytotoxic to sweet cherry. Fall applications probably reduce surface populations of *P. syringae*, but at 75% leaf drop, there has been plenty of opportunity for the bacteria to invade and be protected in small leaf scars. Once again, in both spring and fall, bacteria that have already infected a host tree are unharmed by copper sprays.

There is also a relationship between cold injury and bacterial canker. *P. syringae* is an opportunistic pathogen so any tissue damaged by frost or cold temperatures can more readily be infected. In addition, the bacteria act as ice nucleation sites, so already infected tissue is more at risk from cold injury. It’s a vicious cycle, compounded by the fact that it is difficult to tell the difference between cold injury and bacterial canker even if they did occur separately.

*P. syringae* also colonize sour cherry although symptoms of the disease are not as severe in sour cherry. Sweet cherry orchards adjacent to sour cherry may be more at risk from bacterial canker. Limiting the bacteria in the adjacent crops should in theory help reduce the local bacterial population but that may not be practical or always advisable.

So, should copper sprays be applied against bacterial canker or not? Dr. George Sundin from Michigan State University has worked with *P. syringae* for some time. His field studies indicated that the blossom infecting

phase of *P. syringae* was relatively independent of the amount of bud colonization in the fall. In other words, fall copper applications had no effect on the populations of *P. syringae* infecting blossoms the following spring. Although there are some growers who believe that a fall copper application is useful against bacterial canker, there is no data to support that strategy at present.

In general, it probably is advisable to use copper on newly planted orchards where bacterial cankers are not already present, but for older, already infected orchards it may be pointless unless the goal is to reduce local surface populations of *P. syringae* to try to protect nearby young trees.

Since *P. syringae* is opportunistic, avoid injury during susceptible periods when possible. Prune when trees are fully dormant or, if pruning must be done in the spring, wait for a few days of forecasted warm, dry weather so pruning cuts can heal more rapidly. That won't prevent all infections from occurring (nothing really seems to!), but it might help. Stressed trees are more likely to become infected, so all other good horticultural practices that keep trees healthy and productive should be followed.

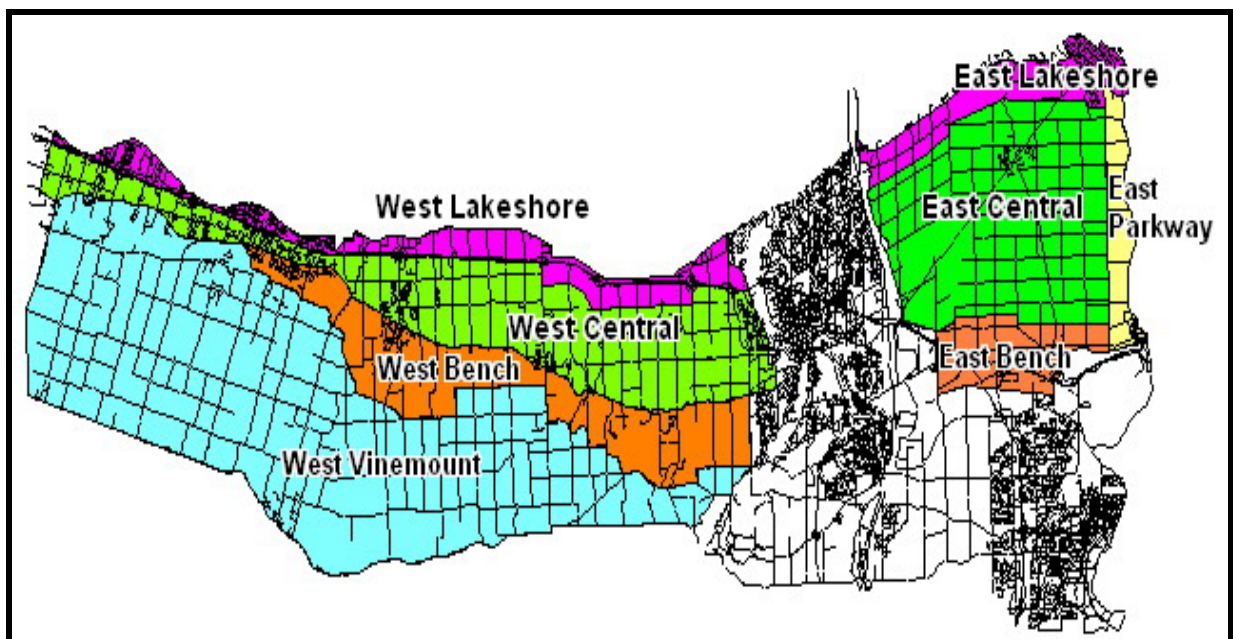
**Winter Injury Studies 2006/07**  
**Grape Bud Survival - March 19, 2007**

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Grape bud sampling to establish winter survival is part of the 3 year - CanAdvance and CRESTech funded Winter Injury and Wind Machine project. The tables in this article report the sampling results based on the bud collection during the week of March 19, 2007. However, the percent alive may vary up or down from the last sample due to the variation in the samples taken. The tables below are based on multiple samples and multiple sites within in area for each cultivar.



**% Live Buds - Labrusca – March 19-22, 2007 (NS means no sample taken)**

<b>Cultivar</b>	<b>Location</b>	<b>East of Canal</b>	<b>West of Canal</b>
Concord	Vinemount	NS	96
Niagara	Vinemount	NS	94

**% Live Buds - Hybrids – March 19-22, 2007 (NS means no sample taken)**

<b>Cultivar</b>	<b>Location</b>	<b>East of Canal</b>	<b>West of Canal</b>
Baco Noir	Central	80	90
	Parkway	80	NS
Foch	Central	NS	75-78
	Vinemount	NS	90
Vidal	Central	68-79	74-78
	Parkway	84-90	NS
	Vinemount	NS	66-76

**% Live Buds - Vinifera – March 19-22, 2007 (NS means no sample taken)**

<b>Cultivar</b>	<b>Location</b>	<b>East of Canal</b>	<b>West of Canal</b>
Cabernet Franc	Bench	83-99	77-95
	Central	80-97	79-97
	Lakeshore	75-85	81
	Parkway	72-86	NS
	Vinemount	NS	63
Cabernet Sauvignon	Central	NS	95
	Lakeshore	NS	75
	Parkway	83	NS
Chardonnay	Bench	86-97	76-89
	Central	85-86	78-88
	Lakeshore	74-81	NS
	Parkway	67-75	NS
	Vinemount	NS	96
Gamay	Parkway	92	NS
Merlot	Bench	80-99	64-92
	Central	65	88-100
	Lakeshore	82	84-85
	Parkway	74-77	NS
	Vinemount	NS	89
Pinot Noir	Bench	79-97	77-95
	Central	69	68-96
	Lakeshore	91	73-82
	Parkway	81	NS
	Vinemount	NS	66-72
Riesling	Bench	74-97	65-76
	Central	84-85	72-97
	Lakeshore	76	84
	Parkway	77-84	NS

	Vinemount	NS	77-90
Sauvignon Blanc	Central	71	65
	Lakeshore	72	NS
Syrah	Lakeshore	NS	56
	Parkway	76	NS

## Why is grape berry moth so difficult to manage?

*Neil Carter, Tender Fruit and Grape IPM Specialist, OMAFRA*

Grape berry moth (GBM), *Paralobesia viteana*, has been a difficult pest to manage for a very long time, especially in areas with consistently high populations of this insect. In the past, there have been some broad spectrum pesticides that gave adequate control, but they came with their own set of problems including a high level of non-specificity (i.e. they killed beneficial insects and mites along with the pests). Although there are rumours of an extension of the registration for the broad spectrum pesticide azinphos-methyl (Guthion), the logistics of working around a 28 day re-entry interval (REI) for grapes are problematic to say the least.

Although there are several products that are “in the works” for GBM, there’s not much point discussing them in detail until they are registered. Newer products, as they become available, come from a wide range of chemical families. Many, if not most, of the new products are not rapid contact poisons; rather, they must be ingested to work or they may not produce rapid knockdown of the pest. If you saw the video presented by Dr. Rufus Isaacs at the grape sessions of the OFVC in February, you were presented with a vivid demonstration of why coverage is so critical with non-contact insecticides. As the video showed, the larval GBM do not even eat the grape skin where they enter the fruit; instead they chew off bits of the grape skin and toss them away. So, for those products that must be ingested, the mouthparts of each larva must come in contact with some of the product at exactly the right time at the tiny site where they chew their entrance into a berry.

Some products that are still available for GBM management are seen by some to be ineffective. Folk wisdom from some quarters has it that registered pyrethroids, carbamates, and organophosphates are all ineffective! Does this mean that resistance to pesticides by GBM is rampant? There’s no proof of that in our area and the most recent survey for GBM resistance in Niagara (Pree *et al.* 1998) found no resistance to Guthion. Of course, absence of proof is not proof of absence, but there are other possibilities for poor control that should be considered before claiming resistance is the problem. The other side of that coin is that a population can become resistant if good resistance management practices are not followed. That will always be the case, so rotation of control products by pesticide family or mode of action will always be critical.

Why else might some believe that so many products are ineffective against GBM? Some basic application issues may at times be the reason (see below) but there are also product-specific considerations that should not be ignored. For instance, the insecticidal activity of Imidan (phosmet) is reduced if spray water is above pH 7.0; use a buffer if necessary to get pH in the range of 5.5 to 6.5. Also, the activity of Diazinon is reduced when temperatures are below 20°C while pyrethroids are less effective in hot temperatures; labels of pyrethroids indicate reduced efficacy if daytime highs are above 25°C and suggest that you spray in early morning or in the evening when temperatures are cooler. However, if regular daytime highs are well above 25°C, pyrethroids will be efficacious for only a few days at best regardless of the temperature at application.

Such seemingly simple and basic considerations as ensuring good coverage through canopy management and adequate water volumes cannot be abandoned even if you are upgrading to a new sprayer system or have a desire to cover more acres

## **Don't Cut Wild Grapevines to Reduce Grape Berry Moth Populations**

*Hannah Fraser, Entomology Program Lead (Hort), OMAFRA*

The native grape berry moth is a primary pest of eastern North American vineyards. Larvae of this insect feed on the developing grape clusters, reducing yields, introducing pathogens and infesting grapes at harvest. Growers have relied on insecticides and more recently, on mating disruption of adults, to manage the damage caused by the three generations that occur in Ontario.

Grape berry moth occurs on both wild and cultivated grape. Vineyards are often located near woodlots where wild grapevines grow, which provides unmanaged habitat where grape berry moth can reproduce. Growers and pest management specialists have found that grape clusters at vineyard borders are typically more infested than those growing within the interior. Therefore, cutting wild grapevines to reduce infestations has been suggested as a pest management strategy. Similar programs targeting wild hosts and abandoned orchards have been very successful for other insect pests such as the codling moth in apples, but until recently, the impact of cutting wild grape on pest pressure by grape berry moth had not been studied.

Researchers in Michigan (Jenkins and Isaacs, 2007) attempted to evaluate the effects of alternate host removal on grape berry moth infestation levels by eliminating all wild grapevines within 60 m of adjacent vineyards. But what they found was that this very intensive work had little impact on the level of infestation at harvest. One of the reasons for this may be due to the ability of moths to move between habitats. Studies using pheromone traps show that grape berry moth males can fly more than 100 m between woodlots and vineyards; females may also move these distances in search of suitable hosts on which to lay their eggs.

So what is the message here? In short, growers should not invest the time and labour required to cut wild grapevines in woodlots near their vineyards.

of vineyard. Speaking of which, Dr. Andrew Landers provided much food for thought on sprayer adjustment and accurate delivery of pesticides in his presentation at the OFVC grape session. Dr. Landers had a lot of take home messages in his presentation but one which must always be repeated is to make sure you are getting your products to the target without wasting your time and money.

An important factor in dealing with GBM is that its basic biology is in conflict with your best attempts at managing it. Adult emergence in the spring is often extended for up to six weeks, ensuring that overlapping generations will occur almost every season. Coordinating spray timing with peak egg hatch or peak egg laying is thus very difficult.

Of course, if your pest management technique doesn't target eggs or hatching larvae, but instead affects the behaviour of adult moths, you would have to be doing it all season. That's where mating disruption (MD) excels – once the dispensers (“twist-ties”) are put in the vineyard, MD continues for the entire season. MD for GBM has risen rapidly in acreage in the last two years and it alleviates many of the management issues of conventional pesticides.

Is MD perfect and the solution to everyone's GBM problems? Of course not, there are limitations to all technologies, but MD generally works well for GBM, requiring a minimum vineyard size of 5 acres (2.5 ha) to be effective in most cases. Pest pressure must be low to moderate for MD to work, so knowledge of the history of GBM problems on a site-specific basis is needed before starting an MD program. Transition years using both MD and insecticides can often help bring a high pressure site down to a level where MD can work alone. MD works best if the pheromone dispensers are hung in the vineyard before first flight of the moths in the spring. MD is not a “clean-up” approach and cannot help after moths have mated and are laying eggs in the vineyard. Always plan an MD program in consultation with your monitoring service in advance of the beginning of the growing season.

Wide-scale, county level removal of wild grape might have some impact on pest numbers; however, this could also have negative impacts on the overall the health and diversity of the woodlot community, including numbers of natural enemies for grape berry moth and other insect pests. A better solution to managing grape berry moth infestations is to invest in regular scouting, making timely application of insecticides or adopting area-wide mating disruption of adults.

Paul E. Jenkins and Rufus Isaacs. 2007. Cutting wild grapevines as a cultural control strategy for grape berry moth (Lepidoptera: Tortricidae). *Envir. Entomol.* 36(1):187-194.

## Part 2: Improving Weed Management in Young Trees (Preplant/early spring)

*Leslie Huffman, Weed Management Specialist (Horticultural Crops), OMAFRA*

Poor weed management can reduce performance of a new orchard for many years. Planning your weed management strategy for the planting year is important to maximize your investment. Here are 4 suggestions to begin reducing and managing weeds in young trees:

- **Weed Reduction / Avoidance in the Preplant Year:** Select fields with low weed pressure, or use a crop rotation that reduces weeds (e.g. field corn, winter cereals or green manure crops). Control perennial weeds with a 2 year strategy, targeting the most sensitive growth stage e.g. early bud in thistles, flowering in vetch. Plant a cover crop to smother weeds, especially in the fall before planting – this will prevent winter annuals from establishing. Use herbicides to control weeds in cover crops e.g. 2,4-D in wheat, or glyphosate in the spring to kill the cover crops. Mow weeds before they go to seed, especially around the field edges and in neighbouring ditches. If desired, sod can be established in the previous year and rows burnt out with glyphosate or flaming – ensure a weed-free strip at least 1.5m wide to avoid competition from the sod. **Caution:** Avoid herbicide residues by choosing low rates or non-residual herbicides.

- **Before Planting Trees in the Planting Year:** Choose between tilling to prepare the planting row *OR* using a burndown herbicide to clear early weeds. Assess your soil organic matter (OM) level – a 2% OM is required to safely use most soil applied herbicides. In Ontario, if soil OM > 2%, Sencor, Treflan or Bonanza, or a tank-mix can be incorporated before planting (PPI) to reduce weeds.
- **Plant Trees in Straight Rows:** Aside from appearances, straight rows ensure that orchard equipment like mowers, herbicide booms, flammers, or tillage tools can work close to the trunks.
- **Mulch after planting:** Mulch can be applied around each tree to suppress weeds and conserve moisture. A 10-15 cm (4-6 in) layer of settled material is required to do the job. Scout for rodents, and pull mulch back away from trunks in the fall. As well as straw, wood chips or other organic mulches, black plastic, landscape fabric, geodisks and even discarded carpet or newspapers have been used successfully. Note that where organic mulches are used, nitrogen levels in the trees need to be monitored as they break down, and extra fertilizer may be needed after a year or two.

There are many steps to a successful weed management program in new orchards, but the improved growth and early yield and fruit size makes it worth the expense and effort. Good luck with your next planting!