



# THE TENDER FRUIT GRAPE VINE



*A Newsletter for Commercial Fruit Growers*

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## **Irrigation – Why, When, And How Much ?**

*By Ken Slingerland, Tender Fruit & Grape Specialist, OMAFRA*

### **Why Irrigate ?**

This should seem obvious but here's a quick review.

- To establish good root systems in new plantings of orchards and vineyards,
- To reduce stress on plants to increase orchard and vineyard life,
- To improve plant hardiness heading into winter,
- To enhance growth and shoot length increasing the supply of carbohydrates,
- To ensure flower bud initiation and sufficient blossoms for the following year,
- To assist in the uptake of nutrients to reduce nutrient deficiencies,
- And to increase fruit size, marketability and overall crop yield.

### **When do you need to irrigate ?**

There are too many factors to list to come up with a precise schedule. Most growers will start in mid June depending upon the crop, the soil type and the rainfall to date. "Feel" testing is one simple method to determine whether the soil needs irrigation. At 50% of saturation (or field capacity), clay and clay loam soils will be somewhat pliable and will form balls under pressure when squeezed in the hand. Sandy loam soils will appear to be dry and will not form a ball under pressure.

Another method is to determine field capacity in the spring after a heavy rainfall, which brings the soil reservoir to the saturation point. Then subtract the

daily use water of the crop from the total available water in the root zone until the irrigation point is reached (50% of the crop available soil water).

Samples of average daily water use for mature trees and vines:

	<b>Peach/Pear (mm per day)</b>
May	2.5
June	4.1
July	5.1
August	4.0
Sept.	3.0

For tender fruits it should be noted that there are two key times for irrigation, cell division right after June drop, and cell expansion, a few weeks before predicted harvest. The critical irrigation period for grapes is from berry set through the ripening period (veraison). Avoid irrigation in September to maintain sugar levels and reduce the probability of late growth and winter injury unless under severe stress.

### **How much do you irrigate?**

A general rule of thumb for tender fruit trees under "normal conditions" would be 25 to 38 mm (1 to 1.5 inches) per week early in the season and 38 to 50 mm (1.5 to 2 inches) during final swell. Also, each mature tree requires 36 litres (8 Imperial gallons) of water per day during July and August. Avoid extended dry periods combined with excessive volumes of water to replenish soil moisture with peaches early in the season to reduce the incidence of split pits.

## **Keep on Top of Cherry Leaf Spot and Black Knot Regardless of Crop Load**

*Neil Carter, Tender Fruit and Grape IPM Specialist, OMAFRA, Vineland, and Michael Celetti, Plant Pathologist, Horticultural Crops, OMAFRA, Guelph*

Spring frosts had a significantly negative impact on sour cherries in some parts of Ontario this year. However, with a reduced crop or even no crop, disease management remains important throughout the year. If no fruit is expected, growers may cut back somewhat on insect pest management, but should continue to be vigilant against diseases such as leaf spot and black knot. Those two diseases have important impacts on the long term health of trees.

Cherry leaf spot symptoms first show up a few weeks after petal fall as small, purplish spots on the upper surfaces of leaves. These spots eventually turn brown and may coalesce to form large patches or fall out giving a “shot-hole” appearance. Leaves with lesions will quickly turn yellow. Later in the summer the disease will be most noticeable in the tops of trees (yellow leaves and/or premature defoliation) where spray coverage is often inadequate. Premature defoliation weakens trees making them more susceptible to winter injury. Trees may be stunted or even killed if defoliation occurs in successive years.

Although pruning and burning infected branches is the most important first step in black knot management, protective fungicides are also critical in controlling this disease. Infections that occur this year may not be apparent until next spring. The more knots present in an orchard, the more spores produced that can initiate new infections. Some sour cherry orchards have no history of black knot, so can rely on visual checks for occasional knots at pruning time.

To keep on top of these diseases, consult the cherry calendars in OMAFRA Publication 360 –Fruit Production Recommendations and do not skip any fungicide applications. There is a wide range of products registered for leaf spot control and only a few that are effective against black knot. Note that a

new product in the calendar this year – Mission 418EC is the same chemical (propiconazole) as Topas 250E. Be sure to rotate between different fungicide families through the season for resistance management.

It is important to protect the trees from premature defoliation (caused by leaf spot) even after harvest time so that the trees go into the winter in a healthy and hardy state. Use full label rates and ensure excellent coverage by using sufficient water volumes and spraying every row. Even with a small crop or no crop this year, you should not skimp on any aspect of disease management.

## **Plum Curculio and Peaches**

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

Despite their name, plum curculio (PC) have a wide range of cultivated tree fruit hosts and can also survive on wild hosts such as hawthorn, wild plum, and native crabapple. It doesn't take long in a warm spring like we've had for PC to start wandering into orchards from their overwintering sites in hedgerows and bush areas. This year, PC were caught in traps on orchard edges over the weekend of May 6-7 and again on May 12; they may have been active even earlier. These small weevils will feed on leaves as soon as they emerge and will switch to blossoms and fruit as soon as they are present. Cosmetic damage from their feeding and oviposition (egg-laying) scars on fruit are a problem, but significant damage comes from the grubs (larvae) feeding within the fruit. With normally protracted emergence time in spring (2 to 6 weeks) and a long oviposition period (which can also extend 4 or even 6 weeks), grubs can still be present when fruit ripens.

Some PC activity occurs before the first oriental fruit moth spray in peaches. The current resistance management strategy for OFM in peaches with Lorsban (chlorpyrifos) for the first OFM spray has the added benefit of reducing PC in peach orchards. Lorsban is not labeled specifically for PC, but it does a good job of controlling them. However, depending on the temperatures after that first OFM

spray, PC that were missed can continue to lay eggs in developing fruit for anywhere from 2 to 6 weeks.

The key to deciding if additional PC sprays are warranted is monitoring for new PC damage on fruit 7 to 10 days after application of Lorsban. Fresh damage shows green tissue in a characteristic crescent-shaped scar while older damage will callous over and turn brown. Older damage retains the crescent shape though, so diagnosing PC damage is relatively easy. If new PC damage is found only on the border of an orchard, a border spray is usually adequate. A variety of products are registered for PC in peaches (such as Guthion, Sevin, Zolone, and Imidan) and other products are registered for this pest in different fruit tree crops.



Plum-curculio egg-laying scars on young apples are easier to detect than on peaches. *Photo from 'Common Tree Fruit Pests' by Angus J. Howitt (1993).*

## Phytotoxicity in Tender Fruit and Grapes

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

“Phytotoxicity” means literally “poisonous to plants”. Phytotoxicity can occur as a result of air pollution, contaminated soil, and from sprays of pesticides or nutrient solutions. Phytotoxic effects can vary from mild to severe, showing up as fruit resetting, marginal leaf necrosis (leaf edge or tip “burning”), leaf death, or even death of entire plants. Different crops and varieties within a crop can differ widely in their sensitivities to various chemicals. There are also many factors that can influence the occurrence and severity of phytotoxicity including weather conditions, plant growth stage, combinations of products used, and the spray history of the crop.

Herbicides are an obvious cause of phytotoxicity in many cases and are not included in the following table. The table lists only specific warnings about phytotoxicity found on labels of fungicides and insecticides commonly used on grapes and tender fruit (apricot, sour cherry, sweet cherry, peach, plum, and pear). It is not a comprehensive list for all registered products or registered uses and does not include generic warnings about potential incompatibility for products in tank mixes. The “registered for use on” column only includes registrations for grapes and tender fruit; many of these products are registered on a wide range of crops. A label warning for a crop does not necessarily mean the product is registered for use on that crop.

<b>Product</b>	<b>Registered for use on:</b>	<b>Warning for:</b>	<b>Phytotoxicity Warning (some are edited for this table, refer to product labels for full warning)</b>
Agri-mek 1.9% EC (abamectin)	Pear	Pear	Agri-mek plus oil may cause fruit injury to certain varieties of pears particularly d’Anjou and other sensitive varieties, when used alone or when other products are applied sequentially....application when temperatures are expected to exceed 30°C within 24 hours of application may result in fruit injury after the use of Agri-mek plus oil.
Bravo 500 (chlorothalonil)	Peach, cherries	Peach	Do not apply bravo 500 agricultural fungicide within 10 days of an oil application as it may cause burning to flowers and leaf tissue.
Botran 75W (dicloran)	Peach	Peach	....combination sprays of Botran 75W and miscible oil formulations of insecticides, particularly organophosphorus compounds, may cause plant injury.
Copper	Apricot, sour cherry, peach, pear, grape	All	When spraying on copper-sensitive plants, add hydrated lime to prevent injury. <i>(Although not listed on the label, grape varieties Merlot, Sauvignon Blanc, Chancellor, Vidal, Concord, Elvira, and Niagara are considered copper sensitive)</i>
Dikar (mancozeb + dinocap)	Grape, pear	Grape	Do not use Dikar in combination with Zolone on Foch and Chelois as injury may result. When applying Dikar to Foch use at least 600 L of water per hectare as more concentrated sprays may cause injury. Do not apply Dikar under slow drying conditions or temperatures above 27°C as some injury may result. Dikar with Imidan may cause injury on grapes. Do not use Dikar with lime sulphur. Do not use Dikar within 7 days before and after an oil application.

<b>Product</b>	<b>Registered for use on:</b>	<b>Warning for:</b>	<b>Phytotoxicity Warning (some are edited for this table, refer to product labels for full warning)</b>
			<i>(Although not listed on the label, Chardonnay grapes are also considered Dikar sensitive.)</i>
Equal 65WP (dodine)	Pear, sour cherry	Pear, sour cherry, peach, plum	Freezing, or near freezing temperatures, particularly when accompanied by slow drying conditions, may injure or predispose the fruit to chemical injury. Do not apply EQUAL 65WP immediately before, during or immediately after occurrence of such conditions. Care should be taken to avoid EQUAL 65WP applications on peaches and plums since foliage or fruit injury may result. Mixture with Kelthane may cause injury under some weather conditions.
Flint 50WG (trifloxystrobin)	Grape, pear	Grape	Do not apply Flint 50WG fungicide to Concord grapes or crop injury may occur. Do not apply Flint where spray drift may reach Concord grapes ...Spray equipment should be rinsed after applying Flint 50WG before application of other products to Concord grapes or crop injury may occur.
Kumulus DF (sulphur)	Cherries, peach, pear, plum, grape	All	Do not use on Concord, Foch, de Chaunac and Van Buren varieties. Caution is advised in viticulture especially when using mixtures with copper compounds. Do not apply Kumulus DF when rain or night frost is expected. Do not apply if temperature is above 27°C (in shade) and high humidity prevails, or if any of the aforementioned conditions are expected within 3 days after the treatment. Do not apply under intense sunshine. Sulphur is phytotoxic to some plants including apricots, Anjou and Cornice pears. Do not use within 30 days of an oil spray.
Maestro 80DF (captan)	Apricot, cherries, peach, plum, pear, grape	All	Do not apply Maestro 80DF in combination with or immediately before or closely following oil sprays. Combinations with solvent formulation of organic phosphates should not be used. The use of spreaders which cause excessive wetting is not advised. Combinations of Maestro 80DF and sulfur should not be used on crops sensitive to sulfur. Used at high rates or in drenching sprays, Maestro 80DF may cause a necrotic spotting of tender, immature leaves of certain varieties of apples, peaches, plums, and cherries. This type of injury is most likely to occur in the early cover sprays during long periods of warm, cloudy, humid weather. To avoid hazard of leaf spotting under such conditions, use Maestro 80DF and other spray materials at lowest recommended rates and avoid drenching trees.
Microscopic sulphur	Cherries, peach, plum, pear, grape	All	<i>See warnings above for Kumulus DF. Sulphur label defines high temperature as above 25°C.</i>
Superior Oil (mineral oil)	Peach, pear, plum	Peach, pear, plum	Avoid spray during or just prior to freezing weather. Do not spray if frost is expected before the trees dry. <i>(See warnings for captan/maestro, kumulus/sulphur, dikar,</i>

Product	Registered for use on:	Warning for:	Phytotoxicity Warning (some are edited for this table, refer to product labels for full warning)
			<i>bravo, and agri-mek regarding oil.)</i>
Sevin XLR (carbaryl)	Apricot, cherries, peach, plum, pear, grape	All	To avoid possible injury to tender foliage, do not apply to wet foliage or when rain or high humidity is expected during the next two days.
Sovran (kresoxim-methyl)	Grape, pear	Cherries, pear	Cherries: Sovran fungicide may cause injury to certain sensitive cherry varieties such as Van, Sweetheart, Chelan, Somerset, Valera, Vandalay, Cavalier, Coral Champagne, Angela Vista, Emperor Francis, Royalton, Schmidt, Summit and Viva. Asian Pears: Sovran fungicide may cause injury to certain sensitive Asian pears of variety Olympic (Korean Giant). Use special care when applying Sovran fungicide to prevent contact with these varieties and other non-target plants. Avoid off-target movement. Thoroughly rinse spray equipment, including the inside of the tank, hoses and nozzles after and before using the same equipment in crops that are sensitive to Sovran fungicide.
Supra Captan 80WDG (captan)	Apricot, cherries, peach, plum, pear, grape	All	<i>See warnings above for Maestro.</i>
Thiodan 50WP <i>or</i> Thionex 50W (endosulfan)	Apricot, cherries, peach, plum, pear, grape	Grape	Causes severe injury to Concord Grapes. <i>(Although not listed on the label, Baco noir, Chambourcin, and Villard Noir are also considered Thiodan sensitive)</i>
Vanguard 75WG (cyprodinil)	Apricot, peach, plum, grape	Cherries	Do not use Vanguard 75WG fungicide on cherries.
Zolone Flo (phosalone)	Grape, cherries, peach, plum, pear	Grape	Under slow drying conditions or temperatures above 24°C, spray material or combinations may cause some degree of injury, especially to the variety Foch.

## Herbicide Injury in Fruit Trees and Grapevines

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

Herbicides applied to control weeds in orchards and vineyards sometimes cause injury to the trees and vines we are trying to protect from weed competition.

Three common orchard herbicides - glyphosate, Ignite and 2,4-D, represent three different modes of action.

- Glyphosate is a **systemic herbicide**, which means that it moves through the vascular system of the tree.
- 2,4-D is a **hormone herbicide**, controlling the plants growth and forcing excessive cell division.

- Ignite is a **contact herbicide**, causing a burn/blast injury on any green tissue it touches.

The symptoms caused by these herbicides can be related to these three different modes of action. Recognizing these symptoms will allow you to make adjustments to reduce future damage.

**Glyphosate** (Credit, Factor, Glyfos, Renegade, Roundup (also Transorb and Weathermax), Touchdown iQ, Vantage, Vision)

**Uptake and translocation:** Absorbed through foliage and translocated throughout the plant. In spring, translocation is toward the growing tips, and in late summer/fall, translocation is toward roots.

**Mode of action:** Inhibits enzymes needed for growth.

**Symptoms:** Causes growth to stop immediately, then general yellowing of tissue, especially in the growing tip (meristems). In trees, where sub-lethal doses have penetrated into the woody tissue, new growth has thin, strappy leaves. This symptom may appear for several years after application.



Glyphosate injury on fruit trees the year after application. Note the thin strappy leaves, often pale and thickened.



Gumming on trunk of cherry tree caused by Roundup injury. Note that the entire trunk is girdled, blocking the flow of nutrients and water through the trunk.



Decline of peach tree caused by gumming in trunk from glyphosate application. Avoid applying glyphosate to first year trees, and 2<sup>nd</sup> year trees if bark is still green.

**Ignite** (glufosinate ammonium)

**Uptake and translocation:** Requires a 4 hour rain-free period to be absorbed by tissue. Absorbed through the foliage, with minimal translocation through the plant. No root absorption as it is quickly broken down by soil microorganisms.

**Mode of action:** Inhibits glutamine synthetase, which allows ammonium to accumulate in the cells, which destroys them.

**Symptoms:** Chlorosis and wilting generally shows up on green tissue in 3 to 5 days, and tissue death (necrosis) in 1 to 2 weeks. Green shoots and leaves on trees and vines will show spotting where spray droplets touched them, followed by yellowing and dying leaves, twigs and canes.



Ignite injury on soybeans, with similar symptoms to tree leaves.

**2,4-D**

**Uptake and translocation:** Absorbed through leaves or roots. Translocated to rapidly growing tips (meristem) of shoots or roots.

**Mode of action:** Stimulates growth, causing uncontrolled cell division and growth, which destroys vascular tissue. Essentially plants grow themselves to death.

**Symptoms:** Leaves show bending, twisting, leaf cupping and curling. The shape of leaves and veins is abnormal, with grapes described as fan-like. Plants generally take 3-5 weeks to yellow, wilt and die



2,4-D injury on grape leaves, showing twisted growth.

Here's a good online reference:

Preventing Herbicide Drift and Injury to Grapes, Oregon State University Extension Service

<http://eesc.oregonstate.edu/agcomwebfile/edmat/em8860.pdf>

## **A Quick Primer on Soils – Part A**

*Anne Verhallen, Soil Management Specialist Hort., OMAFRA, Ridgetown*

Soil is a critical part of any field or orchard production system. It is the basis of your crop's growth. Soils can be highly variable in Ontario thanks to how our soils were formed and what we have done to them since. There are a number of tools at your disposal that can help in assessing your soil or in diagnosing soil based problems. Part A of this Primer discusses soil sampling, soil texture and soil pH. Part B looks at soil structure and some related soil problems in greater detail.

### **Soil Sampling**

Soil sampling prior to tree establishment is crucial to ensuring that soil pH and nutrient levels are at the optimum levels. Before the trees are planted it is much easier to get fertilizer evenly mixed in the soil profile. The type and depth of soil sampling will be determined by the purpose or use of the sample. Regardless, the basic sampling method remains the same:

- Use a stainless steel soil probe or auger for collecting the sample.
- Use a clean plastic pail to contain the sample.
- Use a zig zag pattern across the field to ensure the sample reflects the whole field.
- Take one composite sample for every 25 acres or less.
- If sampling problem areas, ensure that the sample represents the problem area and take a sample from the "good" or better area too.
- Ensure that the sample is well mixed
- Sample to 6 in (15 cm) for most soil samples for basic fertility, pH, etc. This is the depth that Ontario recommendations are calibrated for.

### **Soil pH**

Soil pH is the measurement of the hydrogen ion activity or concentration in the soil solution. This has an impact on the availability of most nutrients. It can cause the concentration of some elements to rise to toxic levels e.g. aluminum. It also affects the activity of soil organisms that build soil structure, cycle organic matter or fix nitrogen in legumes nodules. Soil pH also has a dramatic effect on the performance and breakdown of some pesticides e.g. Pursuit.

Soil pH can be measured with a standard lab test using an electrode and a saturated paste. There are also a number of hand held meters available. They range greatly in cost and accuracy. Generally any meter that is directly inserted into the soil is not adequate (think of the variation that we get with soil moisture over the

season –the hydrogen ions are held in the soil moisture, so pH is very difficult to measure in a dry soil). Usually a reasonably accurate meter costs in the range of \$100 to \$250. The meters can do dual purpose, many growers also use them to check the pH on spray water.

### **Soil Texture**

Soil particles come in three main sizes; sand, silt and clay. Within these, especially the sand, there are further breaks in particle size. There is a lab test called a **particle size analysis** that will give a complete breakdown of soil texture. The test is available from many Ontario labs. The information can be used to calculate the water holding capacity of a soil for irrigation scheduling. Soil texture in most fields is highly variable. It can be assessed quickly by hand with a little practice. (If you want a copy of the hand texturing key email me at [anne.verhallen@omafra.gov.on.ca](mailto:anne.verhallen@omafra.gov.on.ca))

If you are looking for soil sample tubes, soil augers or soil pH meters, here are a few suppliers:

Halltech Environmental Inc  
129 Watson Road.  
Guelph, Ontario N1L 1E4  
1-519-766-4568     [www.htex.com](http://www.htex.com)

Spectrum Technologies Inc.  
23839 W. Andrew Road  
Plainfield, Illinois 60544  
1-800-248-8873     [www.specmeters.com](http://www.specmeters.com)

Gemplers  
100 Countryside Drive, P.O. Box 270  
Belleville, Wisconsin 53508  
1-800-382-8473     [www.gemplers.com](http://www.gemplers.com)

Canadian Forestry Equipment Ltd.  
1540 Trinity Dr. Unit 4,  
Mississauga, Ontario L5T 1L6  
905-795-1610 1-800-387-4940  
[www.esupplyshop.com](http://www.esupplyshop.com)

Labon Inc.  
1350 rue Newton  
Boucherville, Quebec  
J4B 5H2  
450-641-1050  
1-800-565-1050  
[www.labon.net](http://www.labon.net)