



HORT MATTERS

OMAFRA Specialists in Horticulture and Specialty Crops.



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Aster Leafhoppers versus Potato Leafhoppers

Jennifer Allen, Vegetable Crop Specialist



It's really important to distinguish between these two species of leafhoppers. Aster leafhoppers have 6 black spots on their head and are often dark green in colour. Conversely, potato leafhoppers are bright green in colour with white markings between their eyes. In carrots, celery and lettuce, it's important to monitor and control aster leafhoppers because they persistently transmit, aster yellows, a mycoplasma-like organism that can severely damage these crops. Aster leafhoppers pick up the disease from feeding on infected material. Once ingested, the disease incubates within the leafhopper for approximately 3 weeks, following which the leafhopper becomes infective and is capable of transmitting the disease for the remainder of its life. Unfortunately once a plant is infected there are no curative measures

Since we can't battle aster yellows directly, we target the vector, aster leafhopper. Thresholds for aster leafhoppers are based on three factors: 1) number of leafhoppers per 100 sweeps; 2) crop tolerance to aster yellows (see Table 1); and, 3) infectivity rate

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The infectivity rate for aster yellows can accurately be determined using PCR technology. In the U.S, leafhoppers are sampled from different locations and sent off to a diagnostic lab where the infectivity rate (the number of samples containing aster yellows) is determined, providing both temporal and spatial infectivity levels. In Ontario, growers and consultants use either a set infectivity level of 4-5% or rely on data reported from Michigan, Wisconsin or New York. In general, infectivity rates increase throughout the season as resident populations pickup aster yellows from infected hosts, or as populations migrate or move with storm systems from the U.S.

For a complete listing of crop thresholds, check out Publication 363.



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<http://www.ontario.ca/crops>

COMING EVENTS

July 7, 8, 15 & 29—**2009 Apple IPM Summer Twilight Meeting**—see page 8 of this issue for more information

July 8 or July 9, **Southwest Crop Diagnostic Day**, 8:30 am—4:00 pm, University of Guelph, Ridgetown College Campus. For further information visit: www.diagnosticdays.ca or call 1-877-424-1300

July 14, 15, 16—**Ontario Weed Tour**—Woodstock, Exeter, Harrow, Ridgetown, Elora, For enquiries and/or directions to locations, please contact: Rob Nurse, Robert.Nurse@agr.gc.ca, 519-738-1288

July 22, **Summer Tree Fruit Orchard Meeting**, Cedar Springs Research Station, Blenheim. 2:00-6:00 p.m. For further information contact John Zandstra at jzandstr@ridgetownc.uoguelph.ca

August 11, **Grape Tailgate Tour**, 12:30 pm—5:30 p.m. More information to follow

August 18, **Simcoe Vegetable and Alternative Crop Open House**, 1:30 p.m., Simcoe Research Station. Please RSVP by Aug 14 to 519-426-7127, ext 323. For more info visit: <http://www.omafra.gov.on.ca/english/crops/conferences/20090818.htm>

Permit to Take Water Workshop—9:00 a.m. or 1:00 p.m., Simcoe OMAFRA office.

• October 15, November 19, December 17
For more information call 519-426-4920 or visit http://www.omafra.gov.on.ca/english/engineer/facts/pttw_course.htm

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To receive a fax version of Hort Matters, send your fax number to: OMAFRA, Vineland Resource Centre, Box 8000, 4890 Victoria Avenue N, Vineland Station, ON L0R 2E0 or fax to 905-562-5933.

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Suggestions?

We'd like to hear from you

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Cucumber Beetle Control

Elaine Roddy, Vegetable Crop Specialist

The most effective cucumber beetle control is the use of Admire 240F in-furrow at the time of planting. This treatment provides up to 4 weeks of systemic cucumber beetle control. If Admire was not used at planting, or if the residual control is starting to wear out there are a couple of foliar application options. However, the current heat wave does pose some challenges.

Endosulfan (Thiodan, Thionex) is less effective in hot weather. Late evening or early morning spraying can help to improve the initial knock-down. Residual control with this product will be limited and a subsequent spray may be necessary if a second flush of beetles moves into the field. Malathion and Sevin are also registered for cucumber beetle control. However, under hot weather conditions small amounts of phytotoxicity may occur with malathion. Do not use Sevin if the plants are flowering or if there are bees in the field.

Cucumber beetles are the primary vector of bacterial wilt. Even a fairly low population of beetles can spread this disease across the field. Once infected, there is no cure for this disease. Plants will rapidly wilt and die, effectively reducing the plant stand and the yield potential. Cucumbers are the most susceptible to bacterial wilt followed by melons, pumpkins and zucchini.



Figure 1. Early Symptoms of Bacterial Wilt



Figure 2. Bacterial Wilt Infected Plant

The cucumber beetle spray threshold is 1 beetle per plant. Inspect 100 plants across the field and divide the number of beetles by 100 to determine the average number of beetles per plant. Cucumber beetles are most active in the early morning hours. They often hide in the soil during the heat of the day. Population assessments done in the middle of the day may not be representative of the actual number of beetles in the field.

Downy Mildew and High Temperatures

Elaine Roddy, Vegetable Crop Specialist

Downy mildew is often referred to as a cooler weather disease. However, in cucurbits it is actually active at a wide range of temperatures. Maximum spore production occurs at temperatures between 15-20 C. Downy mildew growth and sporulation does rapidly decline at temperatures above 30 C. Low relative humidity and high levels of sunlight will also help to reduce spore viability.

Keep in mind that lower night time temperatures and heavy dew fall can provide downy mildew spores with an opportunity to infect the plant. At 20 C wind borne sporangia can germinate with as little as one hour of leaf wetness. Interestingly, the optimum temperature for zoospore germination is 25 C.

While high day-time temperatures do reduce the risk of spread; a preventative fungicide program is still the best defense against this disease.

With hotter temperatures we occasionally see amounts of phytotoxicity in the field. Spraying in the early morning or late evening will help to prevent burn-like damage on the leaves. At this stage the plants are growing rapidly and will quickly outgrow any damage of this type.

Nursery Crop Insect Update—Ornamental Insects

Jen Llewellyn, Nursery Crop Specialist

Adapted from Nursery and Landscape Report for June 26, 2009

Check for adults of **black vine weevil** and **strawberry root weevil** on crops such as *Picea*, *Rhododendron*, *Taxus*, *Thuja* and *Euonymus* in field production nurseries and the landscape. BVW are about 1.5 cm long, black, with mottled brown flecks on their backs. SRW are about 0.8 cm long, reddish brown. Adult weevils can be found hiding deep in foliage or just under leaf litter during the day. In nursery production, Pounce and Thiodan are registered to manage the adult stages of weevils. Applications of beneficial nematodes are no longer effective at this time. The next window for nematodes to target the next generation larvae in soil will be September.

White grubs are pupating and many May/June beetle adults have already emerged. Preventative applications of Intercept (imidacloprid) are registered for white grubs in nursery production. The application period is late June and July (to coincide with egg-laying). Nematode applications for white grubs are not effective at this time. Try timing nematode applications for late August/early September to catch early instar larvae.

Japanese beetle adults are *just starting* to emerge (where the *Tilia cordata* are blooming). Look for large, coppery-green metallic beetles (13mm long) with distinctive white tufts of hairs around the sides of their abdomen. They are very attracted to floral lures and Japanese beetle sex pheromones and can be easily trapped for manual disposal. The adults will feed on the flowers (*Rosa*) and foliage (*Tilia*) of many woody and herbaceous plants. They lay their eggs in grassy areas and the larval stage feeds on the roots of plants. If adult populations become economically threatening, applications of Imidacloprid, Sevin and Malathion may be warranted.

Leafhopper populations are starting to build, they are infesting outdoor ornamentals in many parts of the province (watch your *Caragana*, *Ptelea*, *Acer*) especially after forage crops are cut. Each year I receive calls of injury on *Acer* in the mid-summer and quite often, late spring leafhopper injury is to blame. Leafhoppers (and aphids) that feed on expanding foliage will cause it to twist and become shrunken and distorted. Leafhoppers injury also appears as bronzing or stippling to mature leaves. Monitor populations and treat with pesticides before damage becomes economically threatening. Leafhoppers are very mobile, tiny, pale coloured jumping insects that are easily disturbed when you approach infested foliage. Leafhoppers are also attracted to yellow sticky cards, for monitoring. Registered insecticides include

Tristar and Sevin XLR.

We've noticed quite a significant population of **aphids** in the landscape and on outdoor nursery stock this year. There are several species that can be found feeding on the stems and leaves of woody and herbaceous plants. There is a species of aphid (black with white lines on the back) that we are finding widely across southern Ontario, it has been detected on several species of woody deciduous shrubs and trees. Insecticidal soap may help reduce populations of aphid, repeat applications at least weekly to give good knock-down. In the nursery, several insecticides are registered to manage aphids on ornamental crops.

Gypsy moth (*Lymantria dispar*) larvae can be found feeding on several different kinds of plants right now. They are 2.5 to 5 cm long, dark, fuzzy larvae and are especially fond of ***Quercus*, *Tilia* and *Ulmus***. You will be able to see the blue and red dots on their backs. **We are seeing some larval death due to pathogens this week!** Dipel is not as effective with these larger larvae, especially after the head capsule turns yellow. Try spinosad (Success) insecticide to manage more mature larvae. Some keen homeowners can install a burlap skirt at the base of the tree to create a shady, protected area for larvae to hide during the day. Homeowners will need to inspect burlap skirts and underlying bark crevices daily (1-3 pm is best) and remove/destroy larvae.

Peach tree borer (*Synanthedon exitosa*) adults are flying. Look for cankered regions and chewed bark/wood in the lower stems of *Prunus x cistena* (and other *Prunus* spp.) as a sign of larval damage. The clearwing moths that emerge resemble wasps. Adults are very much attracted to sticky wing traps that are baited with peach tree borer pheromones. Place pheromone traps out in early-mid June (approximately 390 GDD Base 10°C, 'Red Prince' Weigela in full bloom) and monitor for peak flight of adults. You can expect peak egg hatch around 10-14 days later, if you are thinking of treating newly-hatched larvae. The same 'clearwing moth' pheromones and traps can be used to monitor for **Viburnum borer**. Viburnum borer chews the stem (at and below the soil line) and causes significant injury to container grown Viburnum. Viburnum borer are also starting to emerge in container production at this time. To purchase **pheromones**, try ordering from IPM suppliers such as www.greatlakesipm.com and www.naturalinsectcontrol.com.

Emerald ash borer adults are flying. TreeAzin (azadirachtin, neem) has an emergency use registration (until August 31) for emerald ash borer on ash. This is an injectable insecticide that is delivered through BioForest's Ecoject system, to inject insecticides to protect ash trees from this borer. For more information contact BioForest (<http://www.bioforest.ca/>). The regulated areas for **Emerald Ash Borer** have been updated (it has most recently been found in Welland). The movement of potentially infested material is restricted in four new areas that are regulated under Ministerial Orders. In Ontario, these areas include Toronto and surrounding areas, Sault Ste. Marie, and Ottawa and its neighbouring city, Gatineau, Quebec. A new Ministerial Order is also in place for Carignan, Quebec, and its surrounding municipalities. Check out: <http://www.inspection.gc.ca/english/plaveg/pestrava/agrppla/survenqe.shtml>

Two-spotted spider mites (TSSM, *Tetranychus urticae*) are showing up on **greenhouse** grown ornamentals (woody and herbaceous). Use your hand lens to see tiny, clear bodied mites with dark regions (may be faint black) on their backs. These mites are small but the damage is significant so catch them early. Miticides registered for this mite in the greenhouse include: DynoMite, Vendex, Shuttle, Floramite, Avid and Kelthane. In the greenhouse, biocontrol agents should be brought in to coincide with the first sign of TSSM. *Phytoseiulus persimilis* is a predatory mite that feeds on TSSM when temperatures are below 26°C and it is a good choice when TSSM populations are low-moderate. *Amblyseius californicus* is a predatory mite that can be brought in ahead of TSSM appearance (because it can find other sources of food).

Bird Bangers...Best Management Practices Factsheet now available

Hugh Fraser, Agricultural Engineer, OMAFRA

As some of you know, there is a Normal Farm Practices Protection Board hearing underway in Niagara related to whether a grape grower's use of bird bangers on his vineyard should be considered normal farm practice, or not. The season for bird banger use will be here before you know it, so here is a gentle reminder about what are considered best management practices (BMPs). Many of you will have already seen the Factsheet I wrote this past winter on the use of bird bangers which discusses; how they work; what BMPs are; what is considered normal farm practice and perhaps more importantly what isn't; appropriate hours of use based on a table of sunrise and sunset times; and how to figure out what appropriate setbacks to your neighbours should be based on how you're operating the equipment. Please help reduce the many complaints I received in 2008 by following the information in the Factsheet and helping persuade other growers to as well. I'm confident complaints will be down this year. Remember, the BMP setback from a neighbour's house for a bird banger is 125 m (410 feet) when operated:

- during the regular grape season, ceasing about the end of October (not the extended season for ice wine, which could go well into winter some years)
- with proper leveling of the bird banger so it spins uniformly 360 degrees in all directions (not when set to fire only in a 180 degree plane around a neighbour's home)
- using the 'B, loud volume' setting (not the 'A, quiet volume' setting, available on some bird bangers)
- on Frequency 2 setting; four to eight minute sequence interval (not Frequency 1; two to four minutes)



Fertilizer and Disease: What is the Connection?

Sean Westerveld, Ginseng and Medicinal Herbs Specialist

Ginseng growers have seen many foliar diseases in the past few weeks. These diseases have been due to favourable weather conditions and frost damage. However, the role of fertilization in the development of disease is often overlooked. No fertilization strategy can prevent disease when weather conditions are highly favourable for infection, and fertilization cannot prevent frost damage. However, over the life of a garden, improper fertilization can make disease outbreaks more severe than they otherwise would be. While very little research has been conducted to test the effects of fertilization on ginseng, research has shown some consistent effects of certain nutrients on similar diseases in other crops.

There are 3 main ways that fertilization can affect disease:

1. By altering the microclimate within the canopy due to changes in plant size and shape
2. By directly affecting the infection, growth and reproduction of the pathogen
3. By increasing or decreasing the plant's natural defences

Low Fertilization

Too little of a nutrient can weaken the plant and make it more susceptible to certain diseases. This is especially the case for diseases that are only weak pathogens and can only penetrate a weakened plant. For example, *Alternaria* diseases are often increased by low fertilization, especially nitrogen. However, much of the nitrogen requirements for ginseng comes from the breakdown of manure and organic matter. Even if applied nitrogen rates are low, the plant still may have sufficient nitrogen to produce a healthy crop. The recommended nitrogen rate for ginseng is 40 kg/ha broadcast each spring. Low calcium, which is often related to acidic soil, can also increase disease.

Excess Fertilization

Excess fertilization can often cause a boost in plant growth, which results in larger and more succulent plant cells with weaker cell walls. This can cause some pathogens, especially root rotting pathogens such as *Phytophthora* and *Pythium*, to more easily infect the plant. Research has shown that damage from many root rotting fungi increases with increasing nitrogen application. However, inconsistent effects of fertilization have been found for *Rhizoctonia* and *Fusarium* diseases. While laboratory studies have shown that *Cylindrocarpon*

develops faster with higher nitrogen, this has not been confirmed in the field.

The other problem with too much fertilization is the excessive leaf growth that often occurs. This can cause a very dense canopy and restrict air movement. As a result, the leaves can remain wet for a longer period of time after rain or dew periods, and humidity can be higher. This can increase infection periods for foliar diseases and also restrict the penetration of fungicides into the canopy. Foliar *Phytophthora* and *Botrytis* can increase under these conditions.

So how do you know how much to apply? Recommended rates of many different nutrients are provided in Publication 610: Production Recommendations for Ginseng. Soil and tissue analysis can also provide some clues to whether there is a deficiency or excess of nutrients. When fertilizing ginseng, keep the following key points in mind:

1. Proper fertilization can reduce disease susceptibility of ginseng.
2. It is possible to have too much of a good thing – avoid over-fertilizing.
3. No fertilizer can completely prevent disease development – combine proper fertilization with cultural and chemical disease controls.
4. Ensure proper fertilization before planting because it can be very difficult to correct deficiencies of some nutrients after they occur.

Bitter Pit and Honey Crisp: How Much Calcium Are You Getting?

Christoph Kessel, Horticulture Crop Nutrition – Program lead

Reducing bitter pit in Honey Crisp and other sensitive apple cultivars continues to be a challenge. Effective bitter pit management requires integrating cultural, soil, water, and crop nutrition practices. Applying calcium (Ca) sprays every two weeks during the growing season, often beginning in mid-June, for a total of 4-8 applications is one management tool.

There are many calcium products available. The product used is not as important as the total amount of actual calcium applied over the season. To maximize the potential benefits up to a total of 12 kg actual calcium/ha per season is often required. This is usually applied in four or more sprays.

Regardless of which calcium product you may choose, it is important to know how much actual calcium the product selected provides over the season.

Determining how much calcium is applied in one season using a dry calcium product:

Calcium chloride (78% technical grade) has been shown to be cost effective in reducing bitter pit. It contains 27.8% calcium. It is applied at a rate of 5 kg/ha per application. In this example it is applied 8 times during the growing season.

(%calcium in product ÷ 100)	X	product application rate/ha	X	number of applications per season ¹	=	total amount of calcium applied per ha in one season
(27.8 ÷ 100)	X	5 kg/ha	X	8	=	11.1 kg

¹ Maximum applications from product label

Determining how much calcium is applied in one season using a liquid calcium product:

In this example, the product contains 6% calcium. It is applied at a rate of 6 L/ha per application. To determine the actual amount of calcium applied in a liquid formulation, you also need to know the product's container weight and its volume. Here the product weight is 24 kg and its volume is 20 L. It is also applied 8 times during the growing season.

(%calcium in product ÷ 100)	X	(Product container weight ÷ product container volume)	X	product application rate/ha	X	number of applications per season ¹	=	total amount of calcium applied per ha in one season
(6 ÷ 100)	X	(24kg ÷ 20 L)	X	6 L/ha	X	8	=	3.5 kg

¹ Maximum applications from product label

These simple calculations allow you to compare how close to the desired 12 kg actual calcium per ha per season each product applies. Deciding on which calcium product best suits your bitter pit management program also depends on how affectively it integrates with your other strategies. But it is important to know how much actual calcium you are applying over the season.

More information on managing bitter pit can be found at www.omafra.gov.on.ca/english/crops/facts/00-009.htm

2009 Apple IPM Summer Twilight Meeting

In June/July, OMAFRA will be holding a series of apple IPM summer twilight meeting. Funding for these meetings has been provided by the Pest Management Centre (Agriculture Agri-food Canada) and the Ontario apple growers. No registration is necessary, for more information contact Kathryn Carter at 519-426-4322. Cold drink and snacks will be provided. All meetings run from **7 pm until 9 pm**. The meeting locations and dates are as follows:

Topics covered

The hidden cost of damaged nozzles
Apple cost of production/new apple varieties
Recognizing black rot in orchards
Effectiveness of reduced risk pesticides
Economics of using reduced risk pesticides
Apple Scab: What happened in 2009?
European Apple Sawfly
Mating disruption in apples

Presenters

Kathryn Carter Pome Fruit IPM Specialist
Leslie Huffman Apple Specialist
Margaret Appleby IPM specialist
Michael Celetti Plant Pathologist
Jason Deveau Application Technology Specialist
Hannah Fraser Entomologist

Meeting Locations

Date	Location	Address
July 7, 2009	Marshall Schuylers Shrubbs orchard	797 Concession 14, Simcoe
July 8, 2009	Charles Stevens Wilmot orchards	3337 Concession rd 3, Newcastle ON
July 15, 2009	Don Dinsmore	067310 33 Sideroad, Town of The Blue Mountains, RR.1 Thornbury ON N0H 2P0
July 29	Leo De Vries	300 Sumbler Rd, Fenwick, ON

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