



HORT MATTERS



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Pear Psylla Requires Season-long Management

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Pear psylla (*Cacopsylla pyricola*) is a perennial pest of pears, but some orchards are experiencing more than the usual difficulties with psylla this year. All life stages of this pest can currently be found in pears; from tiny (0.3 mm) eggs mostly laid (at this time of year) along the midribs of leaves, to adults (3 mm). Nymphs are also present in all stages; the early stages are pale yellow to orange while the fifth and final nymph stage has wing pads and appears darker.

For such a tiny insect pest, pear psylla can cause major damage. Vast numbers of these insects can build up in pear orchards if a season-long management plan is not followed. In extreme cases, trees can die from “psylla-shock” caused by the buildup of a toxin injected into the plant as the psylla feed. Psylla also excrete a sweet liquid called “honey-dew” as they feed. Honey-dew is an excellent substrate for the growth of sooty mold which is the main problem associated with psylla feeding.

When psylla first become active in the spring, most egg-laying is done before buds open. Dormant oils kill some psylla outright, but more importantly, oils keep female psylla from laying eggs early. When either the oil or the psylla’s patience breaks down, spring eggs are laid in a short period of time and a more synchronous first generation of nymphs appears. The synchrony is important because a population mostly composed of early stage nymphs is easier to control with insecticide than a mixed-stage population. The late stage “hard-shell” nymphs and adults are much harder to control with insecticides than the early stage nymphs.

Later in the season, nymphs and adults prefer to feed on new succulent growth such as water sprouts. Pulling those sprouts from the trees helps with air flow, spray penetration, and light penetration, but it also takes out a large number of psylla nymphs. Leaving new shoots high in the trees is not wise as many nymphs and adults will congregate there and, in many cases, proper spray coverage does not occur at the tops of the trees.

The development of pesticide-resistant populations is a big concern with pear psylla. Psylla have only one host (pear), so each application to pears puts selective pressure on the entire local population. There is little to no dilution of resistant populations by immigration of insecticide-susceptible psylla. Therefore, rotation between different chemical families is very important through the season. Numerous insecticides are registered for pear psylla. Products like Mitac, Agrimek, Guthion, Endosulfan, and Pyramite have long preharvest intervals (PHI) (14 to 28 days: see page 206 in OMAFRA Publi-



Sooty mold on pear leaf. (OMAFRA)



Adult and hardshell stage pear psylla
(BC Ministry of Agriculture and Lands website)

cation 360 –Fruit Production Recommendations 2004-2005) so they are best used only early in the season. Pyrethroids generally have shorter PHIs but may not have the expected length of activity in hot summer temperatures. The newer neonicotinoids (like Assail) should be part of a regular rotation with other chemical families – it's important not to over-use the new products.

Psylla populations resistant to organophosphates and pyrethroids have been reported in Ontario but have not been documented recently. If psylla control is less than ideal this year, don't immediately blame resistance though. Consider dormant oil in the spring and sucker-pulling in the summer as integral parts of your season-long psylla management program. Rotate chemical families and in all cases, especially during dry weather, increase water volumes in sprays to help the products penetrate the stickiness associated with psylla feeding.

Oriental Fruit Moth Flagging – Old or New?

Neil Carter, Tender Fruit and Grape IPM Specialist

Long flight periods for both first and second generation OFM this year have led to continual OFM pressure in most peach orchards in August. The vast majority of OFM larva will now be found in fruit. Just as there are always a few early OFM attacks on fruit, there are some late season shoot attacks as well. Most of these occur on very young trees with succulent growth and/or no fruit on the tree. On mature trees, shoots are hardening off and larval OFM greatly prefer soft, ripening fruit.

What might be leading some to think that a lot of new shoot damage is taking place is either a misidentification of shoot flagging from causes other than OFM or the fact that some older OFM flagging still has obvious frass (insect excrement on it). The retained frass is easy to explain: in dry years, it doesn't get washed off by rain! After a couple of weeks, the frass becomes almost cement-like on the shoot and later rains may not dislodge it. New OFM flagging is soft and pliable; old flagging is dry and crunchy. New flagging can be peeled apart easily revealing a hollowed stem in the twig and sometimes a larva. Older flagging will be grown over and sappy. New growth will often sprout beyond old flagging injury but will never be present on fresh flagging.

Other causes of shoot flagging can be canker, mechanical twig damage, and brown rot. Cankers are usually fairly obvious on the affected branch and the flagging that occurs usually involves all the leaves on the affected twig or branch past the canker. In comparison, OFM flagging rarely extends far past the tip of a twig. Mechanical damage is most often noticed two or three days after a mid season spray or other trip through the orchard with the tractor. The broken twigs are easy to spot on close inspection –the confusion comes from observing the damage from the laneway. Overhead irrigation may cause leaf shredding (similar in appearance to pale green weevil feeding) or flagging from broken twigs but will be prevalent in the row where the irrigation equipment traveled. Brown rot (or “twig blight”) also affects all the leaves on a twig and should be so dried out by now as to no longer be confused with OFM flagging.



Fresh OFM flagging – note succulent tissue and frass.



Old OFM flagging – brittle and dry. Note new growth past damage.



Peach leaves shredded by irrigation. One “flag” visible in lower right.



Whole twig flagging caused by canker.

Problem Weeds in Strawberries

Leslie Huffman, Weed Management Specialist (Horticultural Crops)

Now that strawberry harvest is finished and renovation well underway, we are getting questions about specific weeds and making changes to weed management systems for next season. Here are some comments about some of the common problem weeds in strawberries:

First, let's deal with 4 perennial weeds that are *impossible to control in strawberries* and need to be handled in rotational crops before strawberries are planted:

1. **Toadflax:** Try using Amitrol before cereals, corn or beans, or after cereals. Tillage is also useful to suppress this weed, but avoid dragging roots to clean fields. Toadflax is on our Roundup label for 15cm vegetative regrowth after summerfallow tillage for established plants. Dacthal will control germinating seedlings.
2. **Oxalis (wood sorrel):** Of the registered herbicides, Dacthal is your only hope and really doesn't give good control, even when applied several times per year. Growers who integrate Sinbar into their program several times through the season see much less oxalis in their fields. Use frequent tillage to knock down small seedlings, and try to prevent seed set by mowing where possible (eg. field edges). Goal applied premulch will reduce oxalis, but will not clean up a totally infested field.
3. **Yellow nut sedge:** Rotate to corn or a vegetable crop where you can use Dual II Magnum as a PPI treatment. Use Dual II Magnum PPI in new strawberry plantings. Cultivate before nutlets begin forming in July, and avoid dragging nutlets into uninfested fields. Sinbar can suppress nut sedge if high rates can be used. This is a weed that is never eradicated forever, but try to start with clean strawberry fields.
4. **Horsetail:** In strawberries, horsetail will be suppressed by 2,4-D or Sinbar. Try rotating to corn to use MCPA or Amitrol (before or after the crop). Also, after wheat, Buctril M, MCPA or Amitrol can be fairly effective on horse-tail.

Some of the newer field crop herbicides are effective on these problem weeds, but watch for carryover residues.

Because these 4 weeds are not well controlled with glyphosate (eg. Roundup), innovative approaches are needed to clean them out of strawberry fields before planting. Pay close attention to their life cycles (especially their propagation method eg. seed, rhizomes, spores, etc.) to hit them when it hurts. Mowing of field edges and patches of these weeds and seeds can keep problems from getting worse.

Next, let's look at 4 weeds that are *difficult to control in strawberries*, but can be eradicated in the preplant year with glyphosate. Here are the keys to helping glyphosate work:

- Apply to actively growing weeds
- Use clean water and low water volumes
- Choose the correct rate for the weed:
 - high labelled rate for most broad-leaved perennials
 - medium rate for quackgrass
 - low rate for annual weeds
- Apply at the specific growth stages for each weed.

If you have worked your field this spring, and have had rain, your weeds may be approaching the proper stage for glyphosate:

1. **Bindweed** - apply at 10% to full flower
2. **Milkweed** - apply at early flower bud
3. **Canada thistle** - apply at early flower bud
4. **Quackgrass** - apply at 3-6 leaves
5. **Coltsfoot** - apply at full leaf

Consider buying a wick wiper (around \$50) and spending a little time each month targeting patches of problem weeds. An ounce of prevention.....

So what do you do if these weeds creep into your strawberry fields? Here are some strategies to try in strawberries:

1. For **bindweed**, try 2,4-D at renovation, or use a spot spray of 2% glyphosate when bindweed is in bloom.
2. For **quackgrass**, apply Venture or Poast Ultra + Merge in the spring OR after quackgrass grows back after renovation, or use a spot spray of 1% glyphosate when quackgrass has 3-6 leaves.
3. For **milkweed**, a wiper applicator with a 33% solution of glyphosate at flower bud can be very effective.

4. For *coltsfoot*, try a spot spray of 2% glyphosate after harvest but before mowing. Good coverage is essential to try to control this weed.
5. For *Canada thistle*, use a spot spray of 2% glyphosate at early flower bud, or a wiper application of 33% solution of glyphosate. 2,4-D or Lontrel at renovation will help, especially if the thistles are in full leaf to flower stage. Regular use of Sinbar will also suppress thistles.

Now let's look at some **tricky weeds in strawberries**:

- **Field violet (pansy)** has become a real problem in many areas. Dacthal will control germinating seedlings, but will only give 6-8 weeks of control. Because of the cost, target it on fields where both field violet and dwarf snapdragon, likely in early spring and possibly at renovation (especially if they have gone to seed). Sinbar used at Labour Day will also control weeds that would germinate through the fall, and Goal used at pre-mulch will reduce the populations next spring.
- **Dwarf snapdragon** is also showing up in more areas. Again, Dacthal should be used early in the spring before they germinate.
- **Groundsel** is a problem because it flowers and produces large numbers of seeds all season. Devrinol is effective if applied before they germinate, but works best if applied at either Labour Day (with irrigation) or pre-mulch. Once groundsel is established, Lontrel used at renovation will control established plants. Avoid allowing groundsel to go to seed, especially in the fall (these seeds have longer dormancies). Use of Gramoxone as chemical renovation can greatly reduce groundsel populations. Where oxalis is also a problem, the pre-mulch Goal application has also reduced groundsel populations.
- For **vetch, ox-eye daisy, thistles and sheep sorrel**, applying Lontrel at renovation will control established weeds. Do not apply Lontrel after mid-August to avoid injury to developing fruit buds in the early fall.

Spot Treatments for Herbicides

Leslie Huffman, Weed Management Specialist (Horticultural Crops)

Using spot treatments for patches of weeds is an important part of integrated weed management to reduce weed pressure in the long-term. Here is some equipment that can be used to apply spot treatments:

Hand sprayer

- Used for small areas
- Can be used for any pesticide; for either PRE or POST herbicides
- Recommend separate sprayers for herbicides esp. 2,4-D and glyphosate
- **Need to calibrate** – see infosheet on Calibrating Hand Sprayers
- For glyphosate, mix 1 to 2 L product/100 L water (1-2% solution)
- Many models available
- Use even flat fan nozzles for uniform coverage (PRE) or flood jet nozzles for larger droplets



Wick wiper

- Used for emerged weeds
- Only glyphosate is registered for wick wipers
- Several models available eg. Hockey stick, U-shaped rope
- Do NOT test with water alone – will prevent wetting
- Fill with 33% solution (1L product/2L water); massage with glove to wet fabric or rope; bag after use and leave wet for later use
- Wait for optimum timing for perennial weeds (see handout)



Wick wiper head (right) & ropewick (left)

Dripper/Selector

- Used for emerged weeds
- Only glyphosate is registered for spot applications
- Mix a 7-10% solution (1L product/ 15-10 L water)
- Drip 0.1 to 0.2 mL per plant
- Wand available in 2 lengths
- Tip: Avoid jamming the wand into the ground



Flamer

- Uses intense heat to kill vegetation
- Works quickly; need to move flamer at higher speeds
- Most effective on annual weeds; perennials require re-treatment
- Repeat treatments alters weed populations over time
- Can flame weeds that emerge before the crop
- Generally uses propane
- Use reliable equipment for operator safety
- Avoid wild fire under dry conditions

Cautions:

- Check preharvest interval (PHI)
- Avoid contact with non-target plants
- Use nitrile gloves, rubber boots and spray suit



Distinguishing Friends From Enemies: Four Fabulous Insects You Want Visiting Your Orchards

Kathryn Carter, Apple IPM Specialist

This is always my favourite time of the year to scout apples because of the abundance of beneficial insects buzzing around the orchards. As pest management specialists, we always warn growers about the evil pests lurking around orchards, but all too often we forget to talk about the insect super-heroes that defend our crops against pests. Beneficial insect populations are thriving in well-managed apple orchards, munching away on aphids, mites, and an assortment of other pests. There are way too many beneficial insects that are present in apple orchards to mention in this article, so I have decided to focus on the “Fabulous Four”: lacewings (Family Chrysopidae), *Orius* spp, lady beetles, and the aphid midge (*Aphidoletes aphidimyza*).

Lacewings

Lacewings are one of the most common beneficial insects we are currently seeing in apple orchards. The green lacewing (*Chryserla carnea*) is the most common lacewing found in apple orchards in southern Ontario. Adult *C. carnea* are 7-10 mm long and are pale green with a creamy stripe running down their back, and lace-like wings. The adults feed mainly on aphid honeydew and on nectar and other plant fluids. The females mate and lay eggs individually on long string-like threads. Larvae, sometimes referred to as “aphid lions” or “aphid wolves”, have hooked, incurved, or sickle-like jaws. (Fig 1). Larvae are voracious predators of aphids, small caterpillars, leafhoppers, thrips, eggs, mites and sometimes each other.



Fig. 1 Lacewing larvae



Fig.2 Adult *Orius insidiosus*

Orius spp.

Although there are several different species of *Orius* that can be found in apple orchards, *Orius insidiosus* (Say) is the most common species. Adults (Fig 2.) and nymphs prey upon aphids, mites, leafhopper nymphs, and small caterpillars. These insects hold their prey with their front legs and insert their beak into the host and suck out the juices of the prey. Nymphs and adults have been reported to consume 30 or more spider mites per day.

Lady beetles

Lady beetles are oval, convex insects, typically with bright coloration and spots. Larvae are often described as “alligator-like”. There are several species of lady beetles present in apple orchards. The multi-coloured Asian lady beetle, *Harmonia axyridis* (Pallas) or MALB, is by far the most common species found in Ontario apple orchards.

Multi-coloured Asian lady beetle adults have a variety of different patterns on their wing covers, but they can easily be distinguished from other lady beetles by the presence of the black M on their pronotum (Fig. 3). MALB larvae and adults are predaceous on aphids and other soft bodied insects. Larvae may consume an average of 23.3 aphids per day, while adults may consume 15 to 65 aphids per day.



Fig 3. Multi-coloured Asian lady bird beetle adult (note black M on pronotum). (<http://www.nysaes.cornell.edu/ent/biocontrol/predators/harmonia.html>)



Fig. 4 *Aphidoletes aphidimyza* larvae (<http://www.nysaes.cornell.edu/ent/biocontrol/predators/aphidoletes.html>)

Aphidoletes aphidimyza-aphid midge

The aphid midge *Aphidoletes aphidimyza* is one of the prevalent but least recognized beneficial insect found in apple orchards. The larvae are small orange maggots (2-3 mm in size) that are often found feeding in terminals infested with aphids. The larvae (Fig 4.) paralyze aphids by attacking their leg joints, and then suck the aphid dry leaving a blackened collapsed aphid on the surface of the leaf. The larvae drop to the soil and pupate. The adults that emerge are small (2-3 mm) mosquito like flies with long dangling legs and antennae. The adults feed on honeydew and are rarely seen in orchards. Aphid midges attack more than 60 species of aphids, and are a voracious predator.