Potato Leafhopper

Potato leafhopper (PLH) feeds on tender young terminal leaves. Initially, injured leaves turn yellow around the edges, then become chlorotic (Fig. 1) and deformed (cupping upward) and later turn brown or scorched. Damage is caused by a toxin injected by PLH while feeding. PLH also occasionally causes symptoms similar to the effects of growth regulators, such as excessive branching preceding or beyond the point of extensive feeding. PLH damage is often mistaken for injury caused by herbicides, nutrient deficiency, or over-fertilization. PLH injury may not be serious on mature trees but can severely stunt the growth of young trees.

Nymphs and adults should be assessed on 50–100 randomly selected terminal leaves in an orchard. Older trees should be inspected approximately every three weeks during the summer. Young trees should be examined weekly through July. PLH nymphs are often described as moving sideways like crabs, whereas white apple leafhoppers generally move forward and back. No formal studies have been conducted in NY to determine the economic injury level for PLH on apples, so we suggest a tentative threshold of an average of one PLH (nymph or adult) per leaf. Little is known about the natural enemies of PLH, but it is assumed that they cannot effectively prevent damage by this pest in commercial New York orchards.

Damage by this migratory pest is usually worse when it shows up early. PLH can cause significant damage to newly planted trees that are not yet established. When PLH, white apple leafhopper (WALH), rose leafhopper (RLH) and aphids are present, control measures are often warranted.

Field trials conducted some years ago in the Hudson Valley evaluated reduced rates of Provado against all three species of leafhoppers. Provado continued...
was applied in combinations at a full rate (2 oz/100 gal) and a quarter rate (0.5 oz/100 gal), at varying intervals (3rd–5th cover). Nymphs of PLH, WALH, and RLH were sampled and leaf damage by PLH was monitored. Because of Provado's translaminar activity, all rates and schedules produced excellent control of WALH/RLH nymphs. Against PLH nymphs, the number of applications was shown to be more important than rate; i.e., better protection of new foliage. Considering the percentage of leaves with PLH damage, the number of applications again appeared to be more important than application rate.

Admire Pro, the current imidacloprid product from Bayer, is also an excellent aphicide, and the same principle would hold as for PLH — maintaining coverage of new growth is more important than the rate. Moreover, reduced rates are likely to increase the survival of cecidomyiid and syrphid predators that are common and effective biological control agents. Other management options for these leaf feeding hoppers can be found in the "Additional Summer Sprays" section starting on p. 147 in the Tree Fruit Pest Management Guidelines. Check Table 7.1.2 (p. 67) for impacts of any of these products on beneficials.

**Aphidology**

Although small numbers of green aphids (Spirea aphid, *Aphis spiraecola*, and Apple aphid, *Aphis pomi*) may have been present on trees early in the season, populations are now increasing as the summer weather pattern has become established, and recent rains will promote flush growth that they favor. Both species are common during the summer in most N.Y. orchards, although no extensive surveys have been done to compare their relative abundance in different production areas throughout the season. It's generally assumed that infestations in our area are mostly Spirea aphid.

Nymphs and adults suck sap from growing terminals and water sprouts. High populations cause leaves to curl and may stunt shoot growth on young trees (Fig. 2). Aphids excrete large amounts of honeydew, which collects on fruit and foliage. Sooty mold fungi that develop on honeydew cause the fruit to turn black, reducing its quality.

Aphids should be sampled several times throughout this season starting now. Inspect 10...
rapidly growing terminals from each of 5 trees throughout the orchard, noting the percentage of infested terminals, including rosy aphid-infestations, since they tend to affect the foliage similarly to the green species at this time of the year. No formal studies have been done to develop an economic threshold for aphids in N.Y. orchards. Currently, treatment is recommended if 30% of the terminals are infested with either species of aphid, or at 50% terminal infestation and less than 20% of the terminals with predators (below). An alternative threshold is given as 10% of the fruits exhibiting either aphids or honeydew.

The larvae of syrphid (hoverflies) and cecidomyiid flies (midges) prey on aphids throughout the summer (Fig. 3). These predators complete about three generations during the summer. Most insecticides are somewhat toxic to these two predators, and they usually cannot build up sufficient numbers to control aphids adequately in regularly sprayed orchards. Check Tables 7.1.1 (p. 65) and 7.1.2 (p. 67) in the Tree Fruit Pest Management Guidelines for ratings of efficacy and impact on beneficials, respectively, for common spray materials. Both aphid species are resistant to most organophosphates, but materials in other chemical classes that control these pests effectively include: Actara, Admire Pro, Asana, Assail, Aza-Direct, Beleaf, Danitol, Lannate, Movento, Pyrenone, Sivanto Prime, Vydate and Warrior, as well as pre-mixes containing some of the same a.i.s.

**Woolly Apple Aphid** colonizes both aboveground parts of the apple tree and the roots, and commonly overwinters on the roots. In the spring, nymphs crawl up on apple trees from the roots to initiate aerial colonies. Colonies initially build up on the inside of the canopy on sites such as wounds or pruning scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August, but you may already begin to notice these aerial colonies in high pressure orchards in the region; we have begun to see these colonies in the Geneva research plantings. As it commonly does, WAA tends to be more noticeable in larger trees with dense canopies. Movento and Beleaf are probably not as effective options as they were earlier in the season; if Assail is elected, a penetrant such as LI-700 would improve its effectiveness. Diazinon, as always, is the gold standard for woolly aphid control, but bear in mind the restrictions against its use imposed by certain markets.

**Mites**

Although mites have not been much of an issue so far this season, they are extremely good at exploiting any high temps that occur, and can summon a few more generations before they quit for the winter; twospotted spider mites are also favored under dry conditions, including in pears and stone fruit plantings. A periodic inspection of your foliage can pay big dividends if they happen to build rapidly before the crop is fully mature. We remain at the 5.0 mites/leaf threshold (sampling chart on p. 76 in the Recommends) until the
end of this month; the 7.5 mites/leaf threshold would be appropriate starting at the beginning of August. 

**SWD TRAPPING UPDATE**  
(Julie Carroll, NYS IPM Program, Geneva; jec3@cornell.edu)

SWD numbers are down in all but one orchard. But, this one orchard had only a single female caught and is now just at first catch. Only one orchard is yet to have first catch of SWD; yes, an inland orchard. Traps set in 6 of the 11 orchards caught zero SWD this past week. All others had only one SWD. Interestingly, only females were caught. It has been hot and dry.

Over 90°F weather doesn’t favor SWD survival. Male SWD are less tolerant of high temperatures than females, at least in lab assays following 24-hr-long exposure to high temperature treatments and assessing the lethal temperature for 25%, 50% and 75% of the treated SWD. I wrote a blog about this research in 2014, might be worth a look, Frozen or baked SWD?, at http://blogs.cornell.edu/swd1/2014/04/08/frozen-or-baked-swd/.

I would hazard a guess that the lethal effect of both the temperature and the insecticide are enhanced one by the other, possibly synergistically—though this would require further research. Mowing makes a lot of sense right now; eliminate cool, shady refuges for SWD, reduce competition for water from groundcover. Keep in mind bird pressure. We may see increased pressure from bird damage to fruit because of the dry weather conditions. There may be fewer fruit resources in the wild. There may be greater demand for the moisture in cultivated fruits.

Keep up the good work! We are entering the harvest season, with some orchards slated for harvest next week and U-pick orchards opening this weekend. Here is a recap, tightening up the perspective:

**SWD management up to harvest:**  
· Focus on SWD (unless you are addressing European cherry fruit fly quarantine requirements).  
· 7-day spray interval max.  
· Plan insecticide use so you have materials with lower PHI for use close to harvest.  
· Rotate active ingredients (IRAC groups) through to harvest.  
· Achieve thorough coverage. Spray every row.  
· If it rains, reapply (according to label).  
· Mow the row middles.  
· Read and follow label recommendations.


**Bookmark online resources**  
- SWD on Cornell Fruit Resources (CFR) fruit.cornell.edu/spottedwing/  
- SWD Management on CFR fruit.cornell.edu/spottedwing/management/  
- SWD Insecticide Quick Guide www.hort.cornell.edu/fruit/pdfs/swd/treefruit-grape-insecticides.pdf  
- Cornell Fruit Resources, www.fruit.cornell.edu

**MODEL BUILDING**

**Insect model predictions for Highland[H]/Geneva[G]**  
[Source: NEWA Apple Insect Models, http://newa.cornell.edu/index.php?page=apple-insects; all DDs are B-E]

**Obliquebanded Leafroller** development: Median larval development of earliest emerging larvae at 720 DD43, 90% hatch at 810 DD43 after biofix; currently at 1033 (>100% hatch)[H] / 890 (~95% hatch)[G].
NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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### INSECT TRAP CATCHES

<table>
<thead>
<tr>
<th></th>
<th>Geneva, NY</th>
<th>Highland, NY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7/6</td>
<td>7/9</td>
</tr>
<tr>
<td>Redbanded leafroller</td>
<td>19.0</td>
<td>15.0</td>
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<tr>
<td>Spotted tentiform leafminer</td>
<td>63.5</td>
<td>55.0</td>
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<tr>
<td>Oriental fruit moth</td>
<td>12.0</td>
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<td>Coddling moth</td>
<td>5.0</td>
<td>11.0</td>
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<td>Lesser peachtree borer</td>
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<tr>
<td>Dogwood borer</td>
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<tr>
<td>Peachtree borer</td>
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<td>8.0</td>
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<tr>
<td>Obliquebanded leafroller</td>
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<tr>
<td>Apple Maggot</td>
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<td>0.0</td>
</tr>
</tbody>
</table>

**Geneva, NY**

- 7/6: 31.7
- 7/9: 10.0
- 7/13: 8.7

**Highland, NY**

- 6/24: 31.7
- 7/1: 10.0
- 7/8: 8.7

* INSECT TRAP CATCHES (Number/Trap)

### UPCOMING PEST EVENTS

<table>
<thead>
<tr>
<th>Event</th>
<th>Ranges (Normal ± StDev)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American plum borer 2nd flight starts</td>
<td>1560-2140 / 1028-1434</td>
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<tr>
<td>Apple maggot 1st oviposition punctures</td>
<td>1605-2157 / 1144-1544</td>
</tr>
<tr>
<td>Coddling moth 2nd flight starts</td>
<td>1584-2211 / 1034-1482</td>
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<tr>
<td>Comstock mealybug 1st flight subsides</td>
<td>1818-2132 / 1216-1418</td>
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<tr>
<td>Lesser appleworm 2nd flight starts</td>
<td>1429-2108 / 924-1405</td>
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<tr>
<td>Obliquebanded leafroller 1st flight subsides</td>
<td>1642-2049 / 1069-1379</td>
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<tr>
<td>Oriental fruit moth 2nd flight starts</td>
<td>1463-1953 / 933-1311</td>
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<tr>
<td>Peacnhooe borer flight peak</td>
<td>1085-2014 / 662-1363</td>
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<tr>
<td>Redbanded leafroller 2nd flight peak</td>
<td>1507-1960 / 964-1311</td>
</tr>
<tr>
<td>San Jose scale 2nd flight starts</td>
<td>1629-1979 / 1058-1336</td>
</tr>
</tbody>
</table>

**NOTE:**

- *first catch

*all DDs Baskerville-Emin, B.E.