

## Traps for Monitoring Apple Pests in Ohio

### One target pest best suited for monitoring by traps in all Ohio orchards:

<i>Pest</i>	<i>Monitoring period</i>	<i>Seasonal needs &amp; Trap placement</i>	<i>Expected trends</i>	<i>Decision making guidelines</i>
<b>Codling moth</b>	bloom (late April) until harvest = about 24 weeks (5 months)	For 3 traps per orchard: <ul style="list-style-type: none"> <li>• 9 long-life pheromone lures or 18 standard pheromone lures</li> <li>AND</li> <li>• 3 bucket traps</li> <li>or</li> <li>• 3 sticky traps &amp; 30 sticky panels (10 per trap)</li> </ul> Place trap 6-7 feet above ground.	First catch at petal-fall or within 2 weeks of petal-fall. Usually 2 generations per year (peak catch in late May & mid-August) or sometimes 3 generations per year (peak catch in late May, mid-July, & late August).	Traps plus temperature data can help determine best timing of sprays to target larvae emerging from eggs. For first brood larvae, spray 200-250 degree-days (base 50°F) after biofix (date of sustained catch of moths), and again in 14 days, plus a third spray if large catches continue. For second brood larvae, spray 1250 degree-days (base 50°F) after biofix, and again in 14 days. One or 2 late-summer sprays are needed on late-maturing varieties if traps detect a 3 <sup>rd</sup> generation in August or September.

### Four target pests well suited for monitoring by traps in blocks with history of specific problem:

<i>Pest</i>	<i>Monitoring period</i>	<i>Seasonal needs &amp; Trap placement</i>	<i>Expected trends</i>	<i>Decision making guidelines</i>
<b>San Jose scale</b>	early pink-bud stage (mid-April) until late summer = about 5 months	For 1 trap per orchard: <ul style="list-style-type: none"> <li>• 5 pheromone lures</li> <li>• 20 Pherocon-V traps (vertical sticky cardboard; different than traps for moth pests)</li> </ul> Place trap 6-7 feet above ground.	First catch at pink or bloom. Peak catch around bloom or petalfall. 2-3 generations per year. Early peak can be >1000 males per trap per week. Late peaks up to 6000 per week.	Apply insecticide to control crawlers which are expected about 400 degree-days (base 50°F) after first catch in traps (about 4-6 weeks after peak flight), or control adult males at time of peak flight. Presence of crawlers can be confirmed by wrapping black electricians tape around branch and looking for yellow crawlers caught on tape.
<b>Dogwood borer</b> (if burr knots on trunks)	petal-fall (early May) until late summer = about 4 months	For 1 trap per orchard: <ul style="list-style-type: none"> <li>• 4 pheromone lures</li> <li>AND</li> <li>• 1 bucket trap or 1 sticky trap &amp; 8 sticky panels</li> </ul> Place trap 4 feet above ground.	One generation per year. First catch in mid or late May, peak in early July.	Control by trunk application at peak egg hatch; eggs hatch 8-9 days after being laid on trunk. First hatch occurs about 9 days after first trap catch. Peak egg hatch occurs about 20 days after peak catch.
<b>Oriental fruit moth</b>	silver-tip (late March) until harvest = about 6 months	For 1 trap per orchard: <ul style="list-style-type: none"> <li>• 4 long-life pheromone lures or 8 standard pheromone lures</li> <li>AND</li> <li>• 1 bucket trap</li> <li>or</li> <li>• 1 sticky trap &amp; 12 sticky panels</li> </ul> Place trap 4 feet above ground.	At least 3 generations per year. First catch as early as late March.	Similar rule to codling moth, except that the degree-day base is 45 degrees F (rather than 50F). First insecticide spray should be at 150-170 cumulative degree-days after biofix. Treatment for second brood is about 1000 degree days after biofix.
<b>Apple maggot</b> (especially in northern Ohio)	early June until mid-August = about 2.5 months	For 3 traps per orchard: <ul style="list-style-type: none"> <li>• 3 red ball traps</li> <li>• 1 can or tube of Tanglefoot</li> <li>• optional: 3 fruit volatile lures (one per trap per year)</li> </ul> Place trap 5-6 feet above ground.	First catch in mid-June. One generation per year.	Spray immediately when the following threshold number of apple maggot flies are trapped (average of 3 traps): <ul style="list-style-type: none"> <li>• 5 flies per trap if fruit volatile lures are used</li> <li>• 1 fly per trap if fruit volatile lures are <u>not</u> used</li> </ul> Note: these are <i>cumulative</i> not per-week catches. 10-14 days after spray, start cumulative count again.

### Other Ohio apple pests for which pheromone lures are available:

<i>Pest</i>	<i>Monitoring period</i>	<i>Seasonal needs &amp; Trap placement</i>	<i>Expected trends</i>	<i>Decision making guidelines</i>
<b>spotted tentiform leafminer</b>	silver-tip (late March) until late summer = about 6 months	For 1 trap per orchard: • 6 pheromone lures • 1 sticky trap & 24 sticky panels. Place trap 5 feet above ground.	3 or 4 generations per year; first catch at green tip, 1 <sup>st</sup> peak at early pink; 2 <sup>nd</sup> peak in late June.	If leafminers have been a persistent problem in previous years, spray can be applied to target adults at peak emergence. However, a large catch of adults does not always mean many eggs are laid, so it is better IPM to scout for eggs at the pink bud stage or for larvae at petal-fall and in early July; treat if threshold exceeded.
<b>lesser appleworm</b>	bloom (late April) until harvest = about 5 months	For 1 trap per orchard: • 6 pheromone lures • 1 sticky trap & 24 sticky panels. Place trap 5 feet above ground.	Same as codling moth	Usually controlled by sprays directed at codling moth.
<b>red-banded leafroller</b>	silver-tip (late March) until late summer = about 6 months	For 1 trap per orchard: • 6 pheromone lures AND • 1 bucket trap ---or--- • 1 sticky trap & 12 sticky panels	First catch at green tip. 3 generations per year. 1 <sup>st</sup> peak at early pink (typically 85 moths per week); 2 <sup>nd</sup> peak in late June (typically 50 moths per week); 3 <sup>rd</sup> peak in early September (typically 25 moths per week).	No guidelines available for using traps other than as an indication that if adults are trapped then larvae of this species might be present.
<b>oblique-banded leafroller</b>	petal-fall (early May) until late summer = about 5 months	For 1 trap per orchard: • 5 pheromone lures AND • 1 bucket trap ---or--- • 1 sticky trap & 10 sticky panels	First catch in late May or early June. 2 generations per year. Peaks in mid-June & late July to late August.	No guidelines available for using traps other than as an indication that if adults are trapped then larvae of this species might be present. Best monitoring method for this pest is scouting for larvae at bloom.
<b>tufted apple budmoth</b>	petal-fall (early May) until late summer = about 5 months	For 1 trap per orchard: • 5 pheromone lures AND • 1 bucket trap or • 1 sticky trap & 10 sticky panels Place trap 5-6 feet above ground.	First catch in mid-May. 2 generations per year. Peak catch in late May (typically 25 moths per week) & late August (typically 10 moths per week).	Traps help determine best timing of sprays to target larvae emerging from eggs. To control first brood, spray 530 degree-days (base 45°F) after sustained catch of moths and again at 805 degree-days. To control second brood, spray 2280 degree-days (base 45°F) after sustained catch of moths and again at 2665 degree-days.
<b>variegated leafroller</b>	petal-fall (early May) until late summer = about 5 months	For 1 trap per orchard: • 5 pheromone lures AND • 1 bucket trap ---or--- • 1 sticky trap & 10 sticky panels Place trap 6.5 feet above ground.	First catch in late May. 2 generations per year. Peak catch in late May (typically 12 moths per week) & late July (typically 20 moths per week).	No guidelines available for using traps other than as an indication that if adults are trapped then larvae of this species might be present. Best monitoring method for this pest is scouting for egg masses on upper leaf surface starting at the time of peak moth catch; mark and monitor eggs, spray at hatch.

## Trapping supplies needed:

- one standard pheromone lure per trap per month, except for codling moth and oriental fruit moth for which ‘long-life’ lures are available that last for 2 months
- for each *bucket-style trap* (such as the standard ‘Unitrap’), you need:
  - 1 trap (green top, bottom white bucket, yellow middle funnel, small plastic basket)
  - 2 or 3 DDVP fumigant strips (‘Hercon Vaportape’, 1 x 1/2 inch), each lasts about 1 month
  - 2 paper clips or pins (one for the lure and one for the fumigant strip)
  - 2 wire or string hangers, each at least 10-15 inches long
- for *sticky traps*:
  - use a large plastic delta trap (such as LPD made by Scentry or Pherocon VI made by Trécé) for any moth pest.
  - use a closed model wing trap (such as ‘1CP’ made by Trécé) for codling moth and red-banded leafroller.
  - use an open model wing trap (such as ‘1C’ made by Trécé) for moth pests other than codling moth and red-banded leafroller.
  - for each trap, you need:
    - 1 trap top (plastic or cardboard)
    - 1 wire hanger
    - 5 to 24 sticky cardboard bottoms: 24 if fresh panel every week, 5 if you re-use after scraping off moths each week
  - for open traps, you need a pair of spacer tubes (2-inch section of plastic drinking straw) to keep the top & bottom separated.
- for apple maggot traps, you need:
  - red ball traps
  - hanger, one per trap
  - 1 can or tube of Tanglefoot (one will service several traps)
  - optional: fruit volatile lure, one per trap per year
- for each San Jose scale (Pherocon-V) trap location, you need:
  - 20-24 traps (sticky cardboard)
  - 1 thick twist-tie hanger

## Miscellaneous supplies useful for trap monitoring:

1. Permanent-ink fine-point marker pen, to label trap with target pest name and date.
2. Notebook for keeping records of dates and numbers of pests trapped.
3. Hand cleaner and paper towels to remove Tanglefoot from hands.
4. Mineral spirits and a rag for cleaning Tanglefoot from maggot traps (optional).
6. Forceps (tweezers), one pair per target pest, to handle the lures (optional).
7. Disposable plastic gloves, to wear when handling sticky panels or lures (optional).
5. Rubber bands or masking tape, to keep used sticky panels folded shut in transit or storage if they are to be kept.

## Sources of traps and lures:

1. Great Lakes IPM: 10220 Church Road NE, Vestaburg MI 48891  
phone: 989-268-5693 or 800-235-0285; fax 989-268-5311  
internet: [www.greatlakesipm.com](http://www.greatlakesipm.com)  
e-mail: [glipm@greatlakesipm.com](mailto:glipm@greatlakesipm.com)
2. Gempler's: P.O. Box 5175, Janesville WI 53547-5175  
phone: 800-382-8473; fax 800-551-1128  
internet: [www.gemplers.com](http://www.gemplers.com)  
e-mail: [customerservice@gemplers.com](mailto:customerservice@gemplers.com)
3. GreenStar Cooperative Inc.: 12093 Lisbon Rd., P.O. Box 3, Greenford OH 44422  
phone: 330-533-3328, 800-423-3609  
internet: <http://www.greenstarcoop.net/contact.aspx>  
E-Mail: [fruit@greenstarcoop.net](mailto:fruit@greenstarcoop.net)

## Managing pheromone traps in orchards

1. **Lure storage:** keep pheromone lures stored in a freezer until needed.

2. **Set-up traps:**

2a. **Set-up of bucket-style (MultiPher) pheromone traps:**

a. **Attach lure:** Attach lure to small plastic basket either by stabbing lure with a strong straight pin that is then stuck into the solid plastic end of the basket, or by stabbing lure with one end of an unfolded paper clip and wrapping the other end to one side of the basket. Then snap the small plastic basket into the center of the large flat green lid.

b. **Attach fumigant:** Get a 4-inch piece of wire (or an unfolded paper clip), stab one end through the fumigant strip and the other end through the hole in the cone that goes in top of bucket. Place cone in top of bucket.

c. **Assemble trap:** Screw the green lid onto the white bucket. Tie wire or string hangers onto the 2 holes on top of the lid

d. **Label the trap:** write the target pest name on the trap itself or on a piece of weather-proof tape.

2b. **Set-up of wing-style sticky pheromone traps:**

a. **Prepare trap top and bottom:** bend the sides and the center of the plastic trap top along the creases so that it becomes roof-like rather than flat, and do the same to the bottom sticky panel.

b. **Attach lure:** open the sealed packet containing the pheromone lure.

- If the lure is the type that is a rubber or plastic *cylinder*, place it upright in the middle of the sticky panel (trap bottom).

- If the lure is the type that is *flat* with a covered sticky backing, peel off the back cover of the lure, and stick the lure to the middle of the trap top on the inside.

c. **Attach hanger:**

- poke the 2-pronged wire hanger through the two holes in each side of the trap top

- for open-model traps (pests other than codling moth and redbanded leafroller), place a plastic spacer tube on each side of the hanger (this keeps a space between the top and bottom parts of trap)

- poke the hanger through the two holes in each side of the sticky bottom panel

- bend the two wire ends up so that the bottom panel stays in place

d. **Label the trap:** on the bottom of the trap, write the target pest name and the date the trap is set out, using a permanent-ink marker pen. Also useful to label the trap top with target pest name.

2c. **Set up of apple maggot traps:**

a. If trap is type that is not one piece, assemble the red ball by snapping together the 2 halves; attach ball to hanger.

b. Spread a thin layer of Tanglefoot on the ball.

c. Unwrap fruit volatile lure from packet; attach to a twig or branch close to where trap is hanging in tree.

**2d. Set-up of Pherocon-V pheromone traps for San Jose scale:**

- a. fold trap in half with sticky side out (useful to wear disposable gloves for this)
- b. insert wire hanger through rectangular hole through both halves of trap
- c. insert lure through round hole just below hanger's hole
- d. write date on trap

**3. Hang trap in tree:**

- hang in the outer part of the mid-canopy at about 5 to 6 feet above ground
- in a relatively exposed spot; prune back any clusters or shoots within 6-12 inches of trap
- for apple maggot, use 3 traps per block, at least 30 feet apart. Place along edge of block nearest to an abandoned orchard or woodlot; if such area not present, then along southern edge of block. If traps not used in every block, put them in the earliest-maturing variety or blocks closest to abandoned orchards.

**4. Check trap at least once each week:** count\* and record the number of target insects trapped; compare the appearance of the trapped insects with pictures or specimens of the intended target pest to be sure you are not counting a non-target species. Keep a **record** of the counts in a notebook or record card. If the sticky panel is to be used for an additional week, write the number of moths caught then scrape them off. Scrape off non-target insects and debris. For apple maggot traps, touch-up the layer of Tanglefoot if needed.

\* Exceptions: actual counts not needed for *spotted tentiform leafminer*; you can record simply as low (<50 moths/week), moderate (50-500 moths/week), or high (>500 moths/week). For *San José scale*, the instructions printed at the bottom of the trap tell you how you can count the scales on certain marked portions of trap to estimate total number per trap.

**5. Replace lure:** for most pests, use a fresh lure **every 4 weeks** (or as recommended by the manufacturer). Remove and dispose old lure in the trash; do not leave it near the trees; wash hands immediately.

**6. Trap maintenance**

5a. For bucket traps (Multi-Pher), **replace fumigant** if trapped insects not dead; about every 6-10 weeks.

5b. For sticky traps, **change the sticky panel every 1 to 4 weeks** (note: you can often use a panel for 4 weeks or longer, but the trap can become less effective if too much dust or debris accumulates in the sticky layer).

- a. Remove the old sticky panel.
- b. Transfer the lure from the old panel to a fresh panel, if the lure was placed on the bottom surface of the trap. If the lure was stuck to the trap top, then leave it as it is.
- c. Label: Write on the new sticky panel the date the trap is set out.
- d. Reassemble the trap top and bottom; hang in tree.
- c. If species verification is needed, fold the old panel loosely in half, rubber-band or tape it shut; save.

5c. For apple maggot traps, the ball may be **cleaned** every 2-3 weeks by rolling it in a rag saturated with mineral spirits; then apply a fresh coat of Tanglefoot.