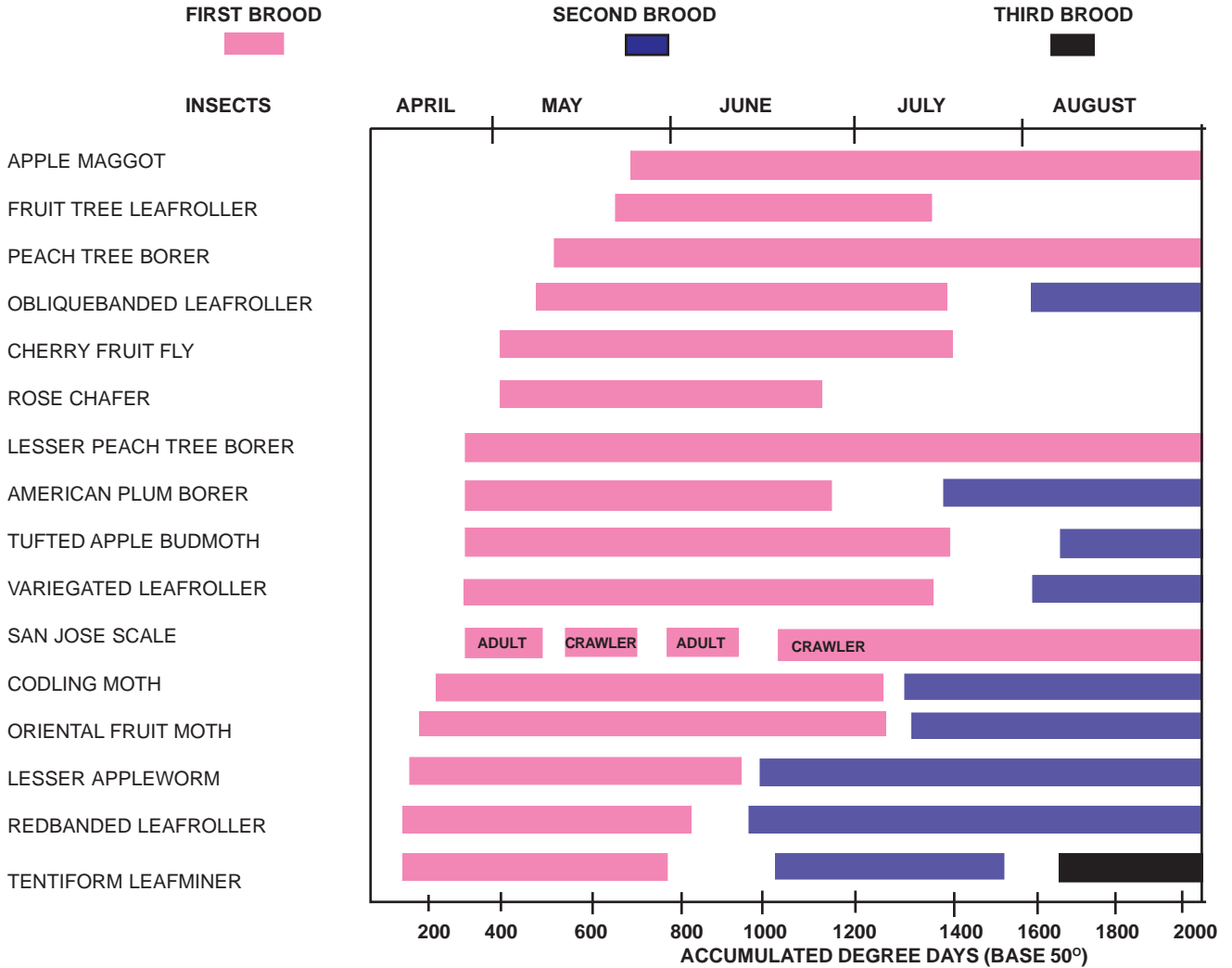


The following information is to be used as an approximate guide to the timing for a specific insect pest event to occur. Areas to the south should look for these events to happen sooner regarding specific dates. Degree day information remains fairly constant. The time of year for these events can vary widely according to the region in the US where you are located. It is best to consult your local extension office to get information regarding your own local time periods.

### ADULT EMERGENCE OF KEY FRUIT PESTS IN MICHIGAN



### PEST EVENTS UNDER NEW YORK CONDITIONS

PEST EVENT	DD Base 50	Approx date	PEST EVENT	DD Base 50	Approx date
Pear Psylla-Egg Laying	43±28	11 Apr±15 Days	Pear Psylla-Hard Shell Observ.	274±48	20 May±9 Days
Rosy Apple Aphid-1st Egg Hatch	60±13	24 Apr±7 Days	LPTB-1st Adult Catch	285±98	26 May±10 Days
RBLR-1st Adult Catch	64±30	17 Apr±7 Days	OBLR-Peak Catch	590±52	7 June±17 Days
STLM-1st Adult Catch	67±30	18 Apr±7 Days	STLM-2nd Gen. 1st Adult Catch	608±85	14 Jun±6 Days
STLM-1st Egg Observed	103±56	27 Apr±5 Days	SJS-1st Crawlers Observed	671±60	19 Jun±19 Days
OBLR-1st O.W. Larvae Observed	109±55	28 Apr±5 Days	GPTB-1st Adult Catch	760±167	26 Jun±7 Days
Tight Cluster for McIntosh	110±23	28 Apr±8 Days	OFM-1st Adult Catch	827±44	29 Jun±5 Days
Tarnished Plant Bug-1st Adults	119±66	29 Apr±9 Days	Apple Maggot-1st Adult Catch	835±127	27 Jun±8 Days
European Red Mite-Egg Hatch	131±38	2 May±7 Days	RBLR-2nd Gen. 1st Adult Catch	850±48	30 Jun±5 Days
STLM-Adult Peak Flight	136±57	3 May±5 Days	STLM-2nd Gen. Peak Catch	925±94	5 Jul±7 Days
Pink for McIntosh	147±33	6 May±9 Days	RBLR-2nd Gen. Peak Catch	1021±110	12 Jul±5 Days
Full Bloom for McIntosh	188±43	9 May±9 Days	STLM-1st Feeding Mine	1076±176	13 Jul±1 Day
SJS-1st Adult Catch	235±71	16 May±8 Days	LPTB-Peak Catch	1255±343	22 Jul±17 Days
STLM-1st Sapfeeding Mines	245±76	18 May±11 Days	Apple Maggot Peak	1654	6 Aug
CM-1st Adult Catch	256±83	20 May±9 Days	STLM-3rd Gen. Peak Catch	1848±116	23 Aug±9 Days
Plum Curculio-1st Egg Laying	269±56	23 May±11 Days			

## GUIDE TO INSECT MONITORING

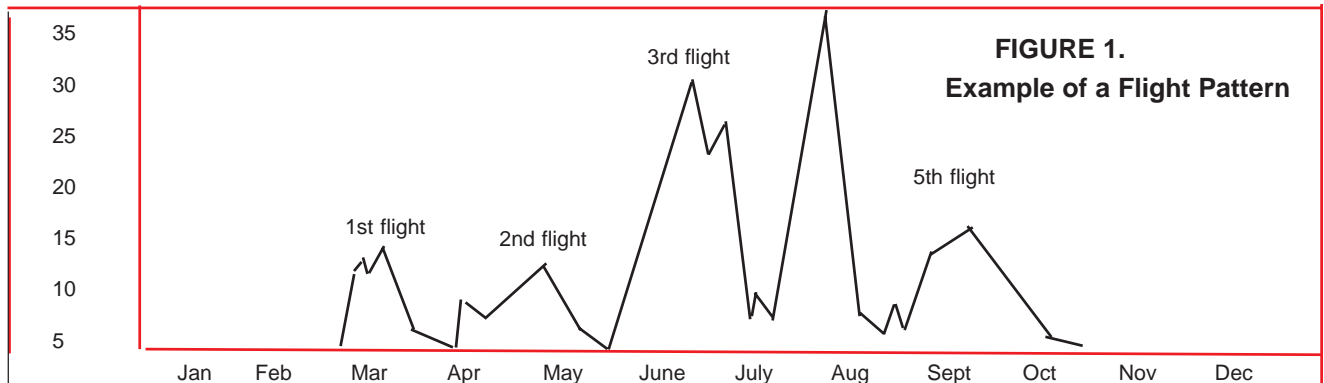
**GENERAL INFORMATION** Initially, for any large scale monitoring program we recommend consulting a local extension agent, university, or other trained professional qualified in the field of pheromone monitoring.

Before starting your program, it is important that you become familiar with the target pest's life cycle. You will need to determine: A) The earliest known emergence date for the insect you plan to monitor determined by Degree day accumulation and B) The average number of adult flights that are of economic importance in your area and their average length (Fig. 1). Local CES offices or University entomologists may be helpful in obtaining this information.

Your trap program should be supplemented with a regular field scouting program. Analysis of your orchard or fields is important to keep ahead of potential problems. Also consider that certain factors may influence trap catch. Inspecting traps twice weekly is usually sufficient to determine trends. Read daily or every other day when emergence is expected to peak. This regular servicing is essential for maintaining the traps efficiency. Remove all insects and debris after each inspection and record the number of insects so you have a written record of each insect for future reference. Replace trap bottoms as needed. Make sure sticky surface is in good condition. You may apply additional sticky material if bottom is in good condition after cleaning off all of the old material. Pest species other than the target may blunder into the trap. These insects should be identified and recorded as they may signal an additional problem. After recording number of insects caught at each inspection, you should graph the numbers to enable you to spot flight peaks visually. Fig. 2 is an example for a first generation peak emergence scenario. The spray timing however, is not the same for all insects thus the importance for consulting your local extension agent, or other professional pest control advisor. Tabulate total trap catches at the end of the season and keep all data for future reference. This information, if properly recorded, will provide you with the best possible data base from which to draw conclusions on the insect population dynamics in your specific fields.

The trap design used for most insects is the Wing trap. A disposable plastic coated cardboard trap known as the Pherocon IC or the modified version which is called the Pherocon ICP. Also available is a deluxe version which comes with a reusable plastic top known as the Pherocon PIC, PICP, or the Scentry Wing. The bottom of the wing trap is replaced periodically as required. All parts of wing traps are interchangeable regardless of manufacturer. The disposable paperboard Pherocon II or Diamond style trap is a one piece general purpose trap used for many insects by professional fieldmen because of its convenience; entire trap is replaced as required. A third design is the Delta traps which are used more for field crop and forest insects. Some insects require a specific trap design like the Heliothis trap to catch corn earworm and corn borers as the sticky traps do not work as well to capture them. Our reuseable bucket style traps (Universal Moth traps) can be used in place of the sticky traps for many insects and are recommended when any program of mass trapping is considered. Data is still being accumulated on the total number of insects we can effectively use this style of trap to capture, since it does not work effectively as the sticky traps on some insects. Please consult with us if you wish to try the traps on insects other than what is listed in the catalog. Remember that the trap design, shape, or color can alter catch. Action thresholds are based on trap catches, so by changing trap types or styles you may alter these thresholds and affect how you interpret the data. Consult with your local extension or a qualified pest consultant before altering your program.

**TRAP PLACEMENT** The key benefit of an insect monitoring program is protection of crop quality by timing pesticide sprays more accurately. As a general rule, traps should be placed in the field 1-2 weeks before the earliest known emergence date. This date varies each year according to temperature and rate of Degree Day accumulation. Check with local extension offices for approximate dates in your location. This allows you to monitor the overwintering, or first generation, of the insect, and enables you to more effectively deal with successive generations. In considering where to place traps, it is advisable to draw a map



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You should begin your program with this type of information. The date of the earliest emergence and average number of flights should be available from Fieldmen, consulting entomologists, university extension agents, or publications.

of the area to be monitored. Factors such as soil type, different elevations, adjoining woodlots, and age of trees in orchard block all have a bearing on insect emergence patterns. Soils with more humus and slopes facing the sun develop earlier emergences. Many insects will enter an orchard from the direction of an adjoining woodlot, fence row, or nearby abandoned orchard. Young trees have a more open canopy which encourages earlier insect emergence due to higher soil temperatures; therefore, it is recommended that blocks of older trees and blocks of younger trees be monitored as separate units.

Ideally, all fields or orchards should be monitored both in the interior as well as around the perimeter. Perimeter traps help detect infestations that originate in other areas and migrate in. Hang traps in corners of small orchards or evenly spaced around perimeter in larger orchards. Special attention should be applied to trap placement in the orchard nearest the border that adjoins an abandoned orchard, woodlot, fence row with wild apple trees, as many insects overwinter in these areas, then migrate to the orchard. If monitoring more than 1 species of insects, pheromone traps for each species should be placed at least 30 feet apart, if possible. Hang pheromone traps in a shaded area on the outside of the tree canopy at a height of 4-6 feet above ground. For field crops, mount the trap on a pole just above the plant terminals. For visual traps such as the yellow AM or Ball traps for Apple Maggot, it is important that traps are placed in unobstructed areas where they are highly visible to the insect as this visibility is one of the keys to trapping the target insects. This holds true for all yellow traps, white traps, orange traps, and all the ball traps. When used with no attractant, they rely on their colors or shapes to attract the insect. In trees, this means hanging them on the southern exposure about head high on the outside canopy being sure to clear away all branches and leaves.

**TRAP DENSITY** As a rule of thumb for pheromone monitoring or baited visual traps: 1 acre or less use 1 trap, 1-10 acres use 2 traps, 10-40 acres use 2-4 traps, 40-100 acres use 4-6 traps, over 100 acres use 1 trap every 20 acres. This applies to each insect you are

trapping. For visual traps without any bait, we recommend trap densities of 3-6 times greater as insects have to see the trap for it to be effective.

For mass trapping with pheromones, 1-4 traps per acre are recommended. Mass trapping only works for some insects and under certain conditions. Consult with us before considering a program.

**HANDLING INSTRUCTIONS** Pheromones require special handling. Extreme caution must be exercised when handling to avoid contamination. Pheromones have an affinity to penetrate many materials that they come in direct contact with or have prolonged exposure to. If placing lures for several species, it is important that you do not touch lure septum of one species and then a lure for a second species as the pheromone from the first will transfer to the second via your hands causing lure failure for the second species, or third, etc. We recommend using disposable forceps if handling more than one species. If you are only working with one species, contamination is not a problem. Pheromones will penetrate the material of the trap it is placed in. Use only one trap per species; do not use different insect lures in the same trap as contamination will occur causing lure failure. Field life of pheromones varies from 2 weeks to as high as 30 weeks plus; specific times are listed in catalog for various vendors. If in doubt, contact us for information. Pheromone lure placement in the traps varies with trap style. Sticky traps generally have the lures just dropped into the sticky trap bottom. So release rate is not affected, place rubber septa on their sides so large opening is not in adhesive and for hollow fibers make sure the fibers are not placed down in the adhesive. Remove foil pouches and all old lures from the field and discard. For the bucket style traps, lures have to be placed near the center of the lid, either by pinning the lure to the lid or placing in an appropriate receptacle. For the heliothis traps, lure placement is in the middle of the large opening at the bottom of the trap. Pheromone lures should be stored in refrigerator or freezer; this will give them several years shelf life. Never leave lures in vehicle or in any area where they may be exposed to unusually high temperatures as this will cause lure failure.

**FIGURE 2. Example of the Biology and Flight Patterns of One Flight**

