PENNSTATE
The Pennsylvania INTEGRATED PEST MANAGEMENT PROGRAM
Pennsylvania Department of AGRICULTURE

Basic IPM for Tree Fruit – Monitoring/Scouting
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An ecological approach to managing pests in agricultural crops is known as Integrated Pest Management (IPM). IPM involves compiling detailed and timely information about a crop and its pests to ensure that pest management decisions are economically, environmentally, and socially sound. In practice, it involves using several control tactics based on knowledge of the crop, weather conditions, pests and associated natural enemies to avoid crop losses and to minimize harmful effects on the environment. Implementing IPM requires not only an understanding of pest biology and control measures, but takes into account the financial, physical, social, and labor constraints of orchard operations. IPM requires a more tolerant approach to pest control than traditional insecticide-based programs. IPM programs recognize that pest populations vary from block to block and/or year to year and that flexibility must be built into control programs to allow for this variation. **One spray program does not fit the whole farm when IPM principles are applied.** Eliminating all pests from the orchard **is not** the objective of IPM. Natural enemies are to be conserved as much as possible and some non-economic damage (especially to the foliage) is to be tolerated. Post-bloom pyrethroid applications are a last resort in IPM blocks because of the extreme disruption to biological control. Benefits of IPM include: a) greater survival of natural enemies and non-target organisms, b) slower development of pesticide resistance, c) fewer outbreaks of secondary pests and less pest resurgence after pesticide applications, and d) reductions in pesticide applications and greater use pesticide chemistries that are safer to the applicator and to the environment.

At the farm level, IPM is approached as a series of activities that culminate in a control decision made by the grower or his consultant (Fig. 2-1). The first activity is gathering information about the environment, pest, potential biological control agents and the crop. This activity is termed scouting, or monitoring, and is performed frequently during the growing season to acquire periodic information about the orchard status so that timely decisions can be made and actions can be taken if necessary. Monitoring is the most fundamental, yet the most often neglected activity in an IPM program. Both the need for control and the effectiveness of any action taken are determined by monitoring pest and natural enemy populations.

In monitoring, the grower or an IPM scout takes representative samples to assess the growth status and general health of the crop and determines the presence and intensity of pest infestations/infection or the potential for future pest problems. If the block is not uniform, i.e. there are significant differences in topography (i.e. adjacent to a wood lot) or cultivar susceptibility, it may be necessary to subdivide the block into separate sections for sampling. Since it is impossible to count all the pests or beneficials present, only sub-samples can be made. To decide if control is required, pest density must be related to the potential damage and balanced against how likely it is that biological control agents can maintain control below damaging levels. Even if treatment thresholds are unknown for particular pests, sampling provides information on the insect's stage of development, population densities and the ratio of pests to natural enemies. This information forms a sound basis for decision making – the absence of this information usually leads to the overuse of pesticides.

In order for management decisions to be made in a timely fashion, information must be acquired on a frequent and regular basis, in most cases, **weekly.** A specific time should be scheduled each week for monitoring activities, and growers/scouts should realize that a substantial time commitment is required in order to benefit from a monitoring program.

See the *Pennsylvania Tree Fruit Production Guide* or the *Mid-Atlantic Orchard Monitoring Guide* for more detailed discussions on pest monitoring techniques, phenological development and sample timings, and pesticide efficacy on pests and selectivity towards beneficials.

Pheromone Traps & Pest Phenology Models

Many of the most economically important insect pests are moths (i.e. codling moth, Oriental fruit moth, leafroller, lesser peachtree borer etc.). For many of moth pests, artificial lures have been developed based on the specific sex pheromone that the female of each species uses to lure males for mating. Pheromone traps using these lures and a sticky coating are a quick and convenient way to monitor the populations of such pests. Traps are placed in the orchard before the beginning of moth emergence and are checked daily to record the first capture, or biofix, and then again at weekly intervals throughout the pest's life cycle each season. Each week the trapped insects and debris are removed and trap bottoms (the sticky portion) and pheromone lures are replaced as necessary. The biofix can be used to begin accumulating degree days for use in insect development models to predict future insect stage distributions for various pests throughout the season so that growers will know the optimum timing to control various pests. Insect traps alone should not be relied on for management decisions, but should be used in conjunction with direct tree inspections in the orchards. Trap catches can be affected by many factors (pheromone mating disruption, weather, trap design, trap placement, trap maintenance, pesticide applications) as well as pest population pressure. Variability in insect trap catches can be minimized if the overall trapping program is standardized and consistent (i.e. same trap design, trap density, lure source and lure age).

The following species at minimum should be monitored in each of the following crops with at least 1 trap for each species in sets of 4:

- Apple & Pear – Codling Moth, Oriental Fruit Moth, Oblique-banded Leafroller. Pear Psylla and mite visual counts should also be made in both crops.

- Stone Fruits – Oriental Fruit Moth, Lesser Peachtree Borer, and Peachtree Borer,

At least one set of sex pheromone traps (including all 4 species) should be used in each monitored orchard block, but no less than two sets of traps per orchard operation if the orchards are smaller than 25 acres, 3 sets of traps if the orchards are 26-50 acres; 4 sets of traps if the orchards are 51-75 acres; and at least 5 sets of sex pheromone traps if the orchards are 76-100 acres. Traps should be placed in the orchard at the beginning of flight of each species and maintained throughout the entire season (i.e., lures and floors exchanged every 4 weeks, traps checked weekly, moth capture data maintained for the entire season)

Disease phenology models based on daily temperatures and rain events also provide continuous current information on the timing of recommended fungicides or antibiotics against apple scab or fire blight. This information can be combined with scouting information from

individual orchards and used in making pest management decisions. Each season the information on moth captures in pheromone traps for codling moth, oriental fruit moth, leafrollers, and various other insect species as well as information on diseases in the Biglerville area are available at the PSU FREC web site: http://frec.cas.psu.edu/ and it is also published by Penn State Cooperative Extension in the monthly newsletter, Fruit Times (http://fruittimes.cas.psu.edu/Default.html).





Basic IPM

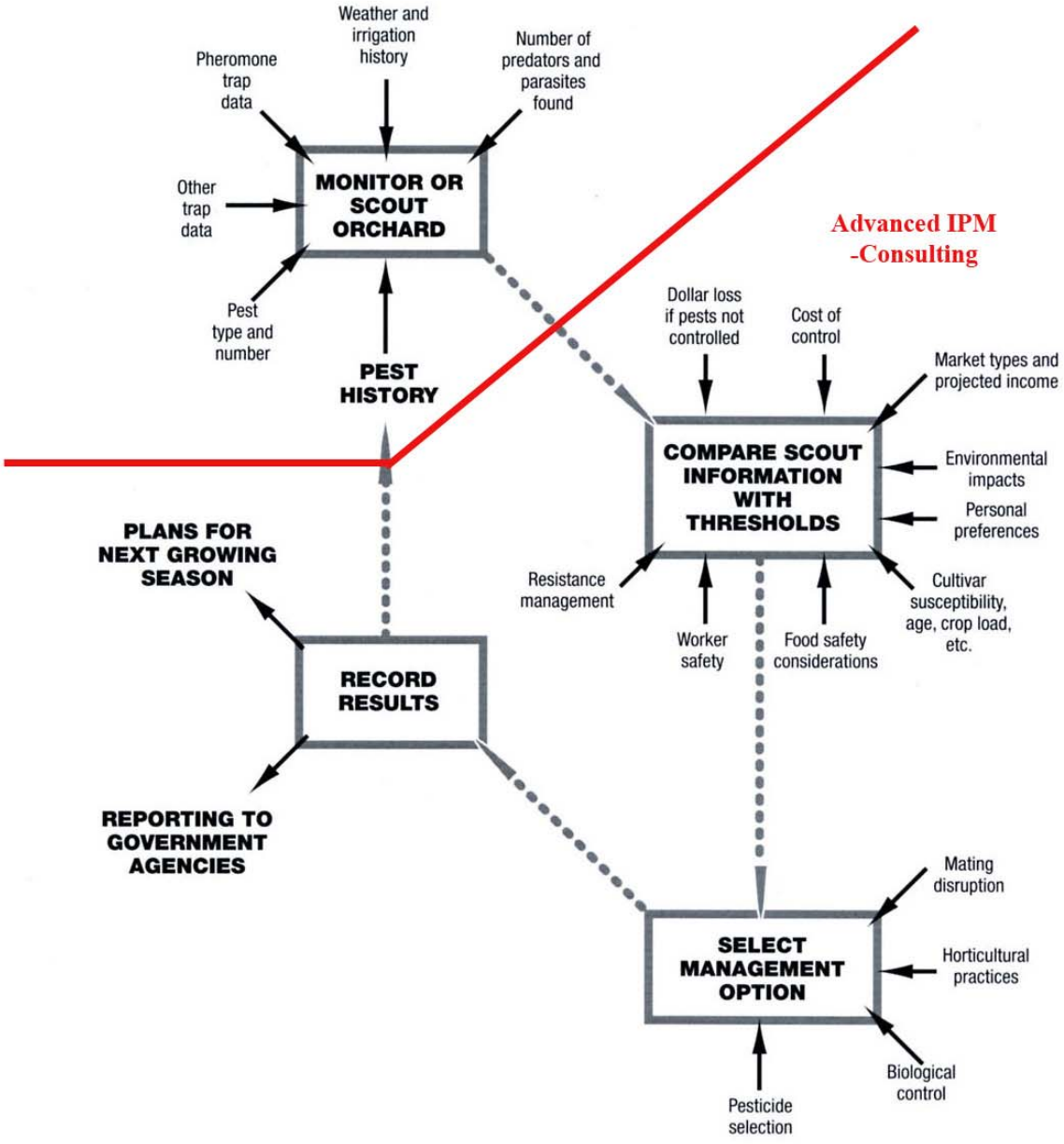

Figure 2-1. How to make an integrated pest management decision.

Check Off List

Do they have a copy of the Pennsylvania Tree Fruit Monitoring Guide and or Mid-Atlantic Orchard Monitoring Guide and are familiar with them? There are several fruit IPM guides from other states that might qualify as well. (if no, disqualify).

Are they familiar with:

- Reentry Intervals
- Pre-harvest Intervals
- Pesticide Efficacy Tables
- Pesticide Impacts on Beneficial Insects

Have them show **weekly** pheromone trap catches and for which species.

How often did they change pheromone lures? Should be every 4-5 weeks, but some long lasting lures are also available that are effective from 8-12 weeks.

What kind of beneficial insects were monitored and how? Were they effective in controlling the target pest?