DIVISION OF AGRICULTURE
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Pest Management News

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IPM from the Urban Perspective

John D. Hopkins

Many County Extension Agents are familiar with the role Integrated Pest Management (IPM) plays in commercial agriculture (traditional farming) but may not have thought much about IPM's role in the urban environment. Non-farming areas where IPM strategies play a role include homeowner and commercial pest management aspects of: 1) turf and lawn care; 2) nursery/greenhouse production and ornamentals in the landscape; 3) home vegetable gardens; and 4) indoor and perimeter pests of single/multi-family dwellings, institutional and commercial buildings.

To begin with, what is a PEST? There is no biological definition but it is instead based on human perception. Any animal (insect / mite / nematode / etc.), plant (weed), or disease (fungal, bacterial, and viral) that adversely impacts us or the things we value could be considered a pest. Nursery and greenhouse pests as well as structural pests are capable of causing economic $$$ damage. Household and landscape pests adversely affect our quality of life through aesthetic and sometimes health impacts.

Integrated Pest Management (IPM) is currently recognized as the most effective pest control strategy that also strives to provide the least hazardous impact to humans and the environment. So, just what is IPM? A good working definition for IPM is that it's a decision making process that anticipates and prevents pest activity and infestation by combining multiple management tactics to achieve long term solutions to pest problems. Previous and outdated methods of pest control usually involved no more than periodic or scheduled applications of pesticides. IPM is a common sense approach to pest management that uses a variety of methods to control pests. Considerable effort is put towards preventing pest problems by controlling conditions which may attract and support pests. Chemical pesticides are not solely relied on but can, when used appropriately and judiciously, constitute an important part of an IPM program.

There are five basic steps in an IPM Program:

1. Inspection / Monitoring
2. Positive pest identification
3. Establishment of an action threshold
4. Employment of two or more control measures that are:
    a. economically feasible and
    b. environmentally compatible

5. Evaluation of control measure effectiveness
    a. continued inspection / monitoring
    b. good record keeping

<u>IPM Step 1 – Inspection</u>

Why Inspect or Monitor?

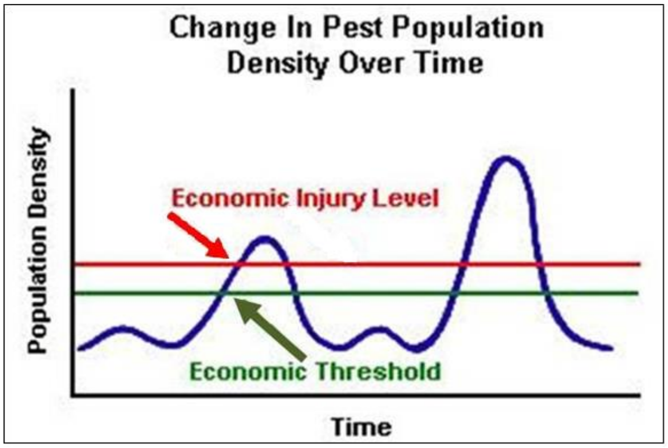
- Determine location and extent of pest problem
- Note damage caused by the pest
- Determine conditions conducive to infestation
- Identify other items or factors that could impact control program

<u>IPM Step 2 – Identification</u>

Pests Must be Positively Identified before deciding what control measures to employ and when, where and how best to employ those control measures. Useful information that can be gained through proper identification include: an understanding of pest food and habitat requirements, pest behavioral patterns, an understanding of pest and host biology, and the potential for damage presented by the pest.

<u>IPM Step 3 - Establishment of Threshold Levels</u>

The **Economic Threshold (ET)** is the pest population level at which control measures are initiated. The **Economic Injury Level (EIL)** is the point where cost of control = value of damage inflicted.



The threshold concept originated in agricultural pest control where the value of pest damage could be readily determined. In the urban arena, thresholds are often based on aesthetics or individual tolerance to damage or pest presence. Thus, in the urban arena, the tolerance level is equivalent to the Economic Injury Level and control measures should be initiated at a predetermined population threshold (ET) to prevent the pest population from ever reaching the Tolerance Level (EIL).

The goal of an IPM Program is <u>not</u> to kill every last pest out there (unless the tolerance level is ZERO) but to manage populations/damage at tolerable levels

IPM Step 4 - Employment of 2 or More Control Measures

Consideration should be given to control measures that are:

- most likely to produce permanent reduction of pest population
- easiest to carry out effectively
- most cost-effective over the short and long term
- least disruptive of natural controls
- least hazardous to human health
- least toxic to non-target organisms
- least damaging to the general environment

Control Measures/Tactics fall under the following categories:

- Cultural Control
- Mechanical/Physical Control
- Natural/Biological Control
- Chemical Control
- Regulatory Control

Cultural control measures, from a lawn and landscape perspective, include: proper plant selection (resistant or tolerant varieties), fertility, watering, aeration, dethatching, mulching, tillage, mowing, and reduced competition from adjacent plants. Healthy plants are better able to withstand pest attack. Appropriate cultural practices can also affect whether pest or abiotic problems such as sunscald or drought stress develop. Plant pest problems can also be reduced by avoiding mechanical damage to plants (string trimmer wounds).

From a household and structural pest control perspective, no other non-chemical control measure can be more beneficial than sanitation. Sanitation involves habitat modification or manipulation of the environment so that it is less favorable for pest survival. Sanitation issues should be addressed first because of their effect on other pest management procedures. It is important to note that in commercial pest control situations, client cooperation is required to successfully eliminate pest harborages, water, and food sources

Mechanical / Physical control measures are meant to inhibit pest establishment. Examples of this type of control measure include pest proofing through the use of wind curtains, screens, seals, nets, and caulking; utilization of traps (light, sticky, pheromone, snap & multiple catch); and even manual removal (hand picking, hoeing, sweeping, vacuuming). Exterior light management through the proper placement of exterior lighting as well as the use of less insect attractive light sources (sodium vapor vs. mercury vapor) can reduce pest problems. Commercial heat treatment (dry heat or steam heat) and the employment of CO_2 freezing systems, when employed appropriately, can also provide effective pest control.

Natural / Biological control measures, when available or sufficiently developed, tend to be among the least environmentally disruptive pest control measures. Natural control involves naturally occurring factors (parasites, predators, and pathogens) that affect pest populations without any influence from humans. Biological control involves human manipulation of parasites, predators, or pathogens to control or manage pests through conservation, augmentation, or importation.

Chemical Control Measures should generally be the last control measure considered when developing an IPM program. However, being last does not imply that pesticides aren't an important component of an IPM control program. Often, a pesticide will have to be the first control tactic used because of the immediate need to significantly reduce or eliminate a pest population that was not detected before the onset of a severe problem. Chemical control measures should be thought of as only one of a multiple set of control tactics available.

Regulatory Control Measures, when employed, can be the easiest way to prevent development of a pest problem simply by not allowing the pest to become established - (Don't import your problem). This method is particularly important for some imported/exotic pests. These imported pests can be much more difficult to eliminate after they become well established because their associated complement of natural enemies is absent. Federal and state agencies can and often do place quarantines on certain exotic pests to prevent their spread into other areas of the state or country. Examples of Invasive Species: red imported fire ant, gypsy moth, emerald ash borer, sudden oak death, and spotted knapweed.

IPM Step 5 - Evaluation of Effectiveness

The final step in the IPM process is evaluation of control measure effectiveness. Follow-up monitoring allows for assessment and adjustment of control measures.

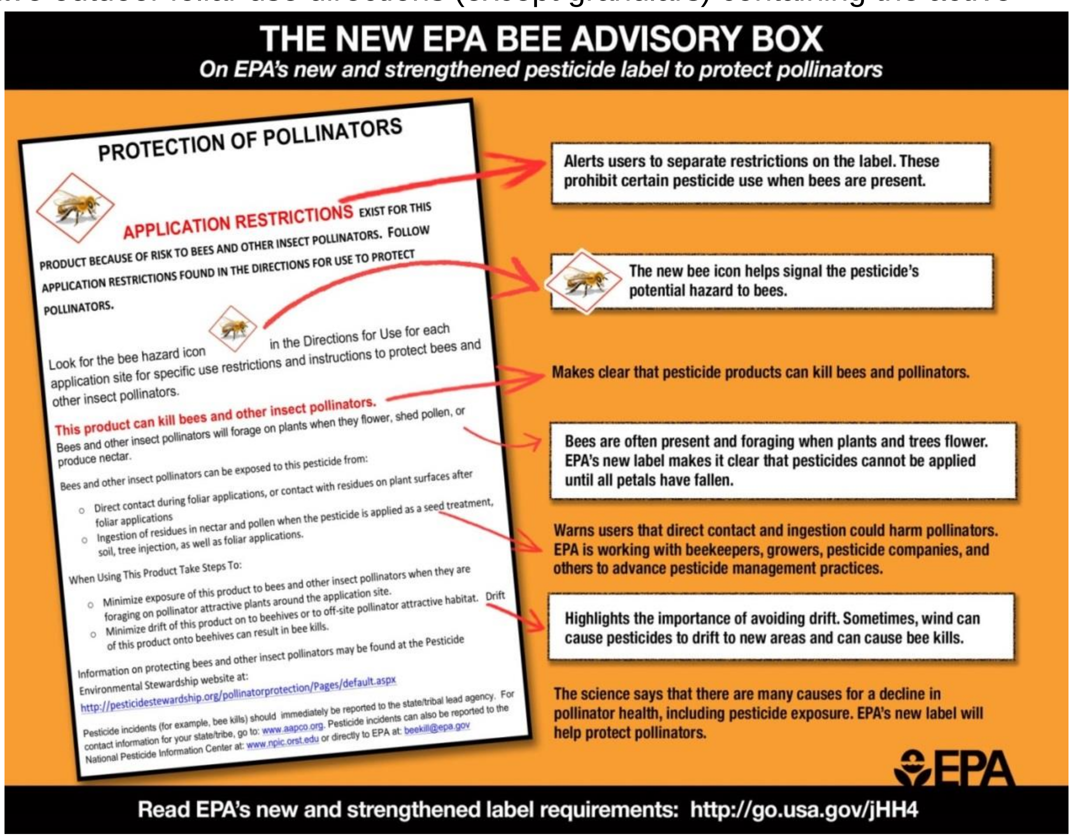
Why evaluate/monitor?

- To determine effectiveness of previous practices
- To identify new or overlooked pest problems
- To identify any previously overlooked ways to enhance pest management effectiveness
- To determine if control measures should be reapplied
- To determine the need to revise any pest management procedures as appropriate
- To develop accurate records to address liability issues

EPA Revises Pesticide Labels to Better Protect Bees

John D. Hopkins

The U.S. Environmental Protection Agency, on August 15, 2013, announced label revisions to some neonicotinoid pesticide products that prohibit applications where bees are present. The changes apply to all products that have outdoor foliar use directions (except granulars) containing the active ingredients imidacloprid, dinotefuran, clothianidin or thiamethoxam regardless of formulation, concentration, or intended user.



The new language that will appear in the Directions for Use section on non-agricultural product labels states "Do not apply [insert name of product] while bees are foraging. Do not apply [insert name of product] to plants that are flowering. Only apply after all flower petals have fallen off." A Pollinator Protection Box will also appear on product labels. **[Click here](#)** to read additional information.

Registrants must submit the label changes to EPA by this coming September 30th and the new labels will appear on products in early 2014. Registrants will undoubtedly continue to meet and talk with EPA officials about the workability of the new label language and how it will be interpreted.

Cattle Grubs

Kelly M. Loftin and Ricky F. Corder

On occasion, we receive calls about cattle grubs, especially from producers that have never seen them. One reason cattle grubs are less frequently encountered now than 30 years ago is because of the widespread use of endectocides.

Cattle grubs are the immature stages of warble or heel flies. Although two species of cattle grubs occur in the United States, the common cattle grub, *Hypoderma lineatum*, is the most common. Adult heel flies are nuisances, occasionally causing cattle to run wildly with their tails in the air (gadding) or to stand for long periods of time in deep shade or water. These defensive activities result in reduced milk production and/or reduced weight gains. However, the greatest impact is from the grubs (larvae) that are internal parasites of cattle. After hatching, larvae irritate the host's skin by burrowing into it. Larval migration to the esophagus and other organs, involving abnormal contact with these organs, is injurious. The cysts that form on the host's back are swollen, often pus-filled areas which adversely affect the host's health. This is often reflected by loss of weight and a decrease in milk production. In addition, at slaughter some of the damaged meat must be trimmed, often from expensive cuts, and discarded; the hide's value is also greatly reduced by the holes and scar tissue.

Adult heel flies are not frequently seen. They are hairy flies that look like honey bees at a glance, but only have vestigial mouthparts and do not feed as adults (Fig. 1.). Larvae are internal parasites that are usually concealed except for an occasional small bump (warble) on the back of cattle.

One year is required for the completion of the common cattle grub life cycle. In spring and summer, eggs are deposited in rows on the lower leg hair of hosts, usually cattle (other hosts are American bison and Old World deer). Up to 12 eggs are deposited on each hair, and each female lays a total of up to 500 eggs. Within a week of being deposited, eggs hatch into larvae. Newly hatched larvae immediately burrow into the skin at the base of the hair and migrate through the connective tissue to the mucous membrane of the gullet. After a few months the larvae migrate via connective tissues to positions just beneath the skin on the back and cut a tiny hole in the skin to breath. Protective cysts form around the grubs. Cattle grubs spend a total of 7 or 8 months in the animal. Mature, 3rd stage, larvae (Fig. 2) exit the animal, drop to the ground and pupate. An adult fly will emerge in 15 to 75 days after pupation. Adult flies are ready to fly and mate very soon after emergence. Adult heel flies do not feed and remain active for only a few days. Heel flies do not enter barns; therefore, animals housed indoors during the heel fly season are not impacted.

Control of adult heel flies is not practical; however, management efforts can be aimed at the parasitic stage within the host. Proper timing of grub treatment is critical to ensure optimal control and eliminate adverse host-parasite reactions in treated cattle. Cattle grub treatments should be administered after heel fly activity ends but before larvae are in the esophagus or back. If treated at the improper time, dead or dying grubs can cause a toxic reaction in cattle that can result in death.

In Arkansas, treatment against cattle grubs should take place between August 1 and October 15. Endectocides provide effective grub control. In addition, some systemic organophosphate insecticides will kill cattle grubs. Before treating dairy cattle for cattle grubs, carefully read the product label. Products labeled for use on beef cattle may not be labeled for use on lactating dairy cattle. Remember, treatment for cattle grubs after October 15 can result in toxic reactions from dying grubs. Products registered for cattle grub control are listed in the Animal Section of the 2013 Insecticide Recommendations for Arkansas (http://www.uaex.edu/Other_Areas/publications/PDF/MP144/MP-144.asp).

Fig. 1. Common cattle grub adult. Photograph by Lyle J. Buss, University of Florida.

Fig. 2. Common cattle grub larva. Photograph by Pest and Disease Image Library, Bugwood.org.

Name That Weed

Bob Scott

This month's weed is extremely common in Arkansas. The picture displays three different seedhead types that are among the possibilities for this genus. These species occur all over the state. We have at least four that are common, but all are commonly referred to by the same common name. In fact, recently it has been discovered that what weed scientists have been calling one species is most likely actually a completely different one (more explanation later). This weed is the most common and troublesome weed in rice production. In fact, there are populations of this weed that are resistant to 4 of the 7 grass herbicide families that are currently labeled for use in rice in Arkansas. Without the seedhead it is possible to ID this weed to its common name by looking at the area where the leaf attaches to the stem, there are no pubescence or hairs and no ligule present, but to determine the exact species one needs the seedhead. Be the first to email me the correct common name of this weed and win a prize. Send your guess to **bscott@uaex.edu**.

To The Readers

Please offer any suggestions for Urban or Livestock Integrated Pest Management topics (insect pests, plant diseases, weed problems, wildlife control problems) that you would like to see – *OR* – feel free to submit an article that you have prepared. Kelly and I will be glad to include it (subject to editing). Send feedback to jhopkins@uaex.edu or kloftin@uaex.edu

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