As I travel around Florida for my Extension program, I always ask my audience two questions: 1) Do you know what IPM is? and 2) Do you use IPM in your pest management program?

Incorporating IPM Into Your Landscape Management Program

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UF/IFAS file photo

To implement an effective landscape IPM program, ask yourself how your pest management decisions will affect the landscape's ecosystem, your wallet, and people. UF/IFAS file photo.

NEARLY EVERYONE in the audience always knows what integrated pest management is. This is great. However, not everyone who knows what IPM is, practices IPM. Herein lies the challenge.

One of the biggest hurdles to implementation is convincing pest managers that IPM will improve long-term pest control, reduce risk, and result in more satisfied customers. The most effective way to get this across is by example. Fortunately, there are multiple case studies of effective landscape IPM programs. Unfortunately, there are not effective IPM strategies for all major pests, and challenges are always changing, which can make implementation difficult. That is what I'm here for.

What is IPM?

Integrated pest management is an informed selection and use of pest control measures based on their environmental, economic, and sociological consequences. Ask yourself how your pest management decisions will affect the landscape's ecosystem, your wallet, and people.

Whenever I talk about IPM with landscape professionals, I emphasize that thinking in an IPM framework is the most important first step of practicing IPM. What is the IPM framework? It follows five general steps:

1. **Identification** – What is the pest, and how do you know?
2. **Monitoring** – When, where and how will you look for and track the pest or its damage?
3. **Decision making** – At what point should you act to control a pest?
4. **Intervention** – How will you manage the pest?
5. **Evaluation** – How well did you do? Would you change things next time?

Although IPM is critical for managing pest weeds, diseases and nematodes, I will use insect pests in the landscape throughout this article to walk through the IPM process.

Identification

One of the most important steps of IPM is correct identification. Some pests cause severe plant damage more rapidly than others. Also, different insecticides affect insects and mites differently. This is because pests are biologically different, feed on different plant parts, or are exposed to different elements. For example, research showed that elm trees treated with imidacloprid had more severe spider mite infestations because the insecticide caused them to produce more offspring. However, imidacloprid targeting aphids can work quite well. Proper identification is critical.

Plant identification is a great way to narrow down possible pests. Some of my nonentomologist colleagues joke that they could name most insects by the plant they are found on. That is not always the case, but often is. Many insect pests specialize on a single host or plant group. For example, most people know what pests to expect on azalea or crapemyrtle. It becomes more challenging when generalist pests come into the picture.

Many pests feed on multiple host plants or cause damage and leave the scene. Figure out what kind of mouthparts (chewing or piercing–sucking) caused the damage, or what pest may have left behind the symptoms — e.g., honeydew on leaf surfaces. That will narrow things down quite a bit.

Monitoring

Once you have identified the pest, you can effectively monitor for it. This is arguably the second most important step of IPM. Many pests are vulnerable to control efforts only during a brief period during their development. Typically, younger insects are easier to kill. The only way to know how young it is, is by actively monitoring the population. The only way to monitor it is by knowing where and when to look, which is dependent on accurate identification. See why the first two steps are most important?

One of the best examples of IPM is managing armored scale insects. There are over 140 species in Florida. Armored scales are protected most of their life by a covering that prevents insecticides from killing them. The only time they can be killed on contact is during a few weeks of their life as immatures, or crawlers, looking for a place to feed. The only way to know when these crawlers are out is by monitoring.

Mole cricket management also requires monitoring to time effective control efforts. Monitoring for these pests with soapy water flushes will allow you to keep track of insect development. Research found that when most flushed individuals are half an inch long, the majority of eggs have hatched, and nymphs are still small enough to be killed by insecticides.

Decision making

Deciding when to act against a pest can be one of the most difficult steps. However, those who have identified and monitored for the pest are miles ahead of those who have not. For a few pests there are infestation thresholds, or points at which populations will cause damage if left alone. In landscape management, control efforts are largely driven by aesthetic standards and customer demand. Therefore, it is up to the manager to make responsible, informed decisions based on the knowledge they gain from proper identification and monitoring of the pest. After deciding to act, there are several approaches that can be taken to reduce pest populations.

Intervention

The best IPM approach is a well planned combination of each principle described below. This management is "integrated" because it integrates multiple strategies and approaches.

Mechanical control is physically removing or excluding pests from a host plant. This can be as

simple as pruning off infested plant material or collecting and discarding infested turf clippings when mowing. Active monitoring can catch infestations early, making this an effective option.

Cultural control practices, methods of manipulating the host plant and its surrounding environment, are critical for effective pest control. We always hear the phrase, "right plant, right place." This is cultural control. Plants have evolved to tolerate certain environmental conditions and pests. If you plant them somewhere outside of this, they will likely struggle without intensive management. If you know there are problems with a specific pest in a landscape, select a plant that is not a host to that pest. Set up plants for success from the beginning.

Biological control of insect pests can be difficult to regulate in managed landscapes. Most people think about releasing predators and parasitoids onto their plants, but the most effective biological control in these systems is conservation. Preserve habitats that are conducive to natural enemies. Leave habitat for them, but also use control practices that they can live with.

This means appropriate selection of **chemical pest control** tools. The most important part of chemical pest control is product selection. Products differentially affect different insects and mites. Also, an insecticide application will never kill every pest in a population. Natural enemies are there to finish the job after and between applications. Plant pests generally reproduce more quickly than predators. Therefore, predator-free windows of time may leave any remaining plant pests behind to flourish and damage plants.

Many landscape managers rely on chemical control as their primary means for pest management. In this volume-driven industry, "insurance" cover-spray applications of mixed products (insecticide, fertilizer, herbicide) make things simpler and allow for more site visits per day and meet customer demands. However, this exposes plants, arthropods and microbes in those landscapes to the same products.

WE HAVE learned a few things over the years that have improved chemical control in landscape IPM. This boils down to making treatments when needed rather than on a calendar basis, spot treating infested areas rather than treating the entire landscape, and using reduced-risk or biorational, selective insecticides rather than broad-spectrum products. Reduced-risk insecticides are those that pose minimal risk to applicators, have low toxicity to nontarget organisms, can be used at low rates, and are compatible with IPM practices. These include many neonicotinoids, anthranilic diamides, insect growth regulators, and others. Broad spectrum products like pyrethroids, carbamates, and organophosphates do not provide these benefits.

Multiple studies have demonstrated that calendar-based, cover spray applications wipe out natural enemies, which causes secondary pest outbreaks and leads to unsatisfied customers. This practice may provide short-term business success, customer satisfaction, and pest reduction. However, it is also introducing a lot of risk to the applicator and environment. Repeated sub-lethal exposure to pests may lead to insecticide resistance.

Toxicity to natural enemies often leads to secondary pest outbreaks like scale insects, aphids, and spider mites. Plus, recent developments have demonstrated risks associated with insecticide toxicity to pollinators. None of these risks are something that anyone wants to add to their already-full plate. They are also not necessary.

I have spent most of my entomology career working on developing armored scale insect IPM strategies. We demonstrated that a combination of accurate identification, proper timing (because we were monitoring for crawler emergence), and proper product selection is the most effective way to reduce scale insect populations and damage. Plants treated with reduced-risk and/or systemic products have more natural enemies on them, which means they can provide additional pest control and reduce plant damage.

Recently my lab has been investigating chilli thrips management on Indian hawthorn. Several products that run the gamut of chemistries are used to control these pests. Some of them are

University of Florida Receives Mosquito Traps For Graduate and Family Housing

GAINESVILLE, Fla. — The University of Florida Department of Housing and Residence Education will receive traps designed to stop mosquitoes in their tracks through a donation from Seoul Viosys, a South Korean–based company.

While there are no cases of locally transmitted Zika virus on the UF campus, Gainesville or Alachua County, Sharon Blansett, assistant to the associate vice president for UF student affairs, welcomes the mosquito traps as a virus-prevention measure for students living in graduate and family housing.

"The Department of Housing and Residence Education is happy to receive the mosquito traps to help further protect residents living in graduate and family housing from mosquitoes that could potentially transmit viruses," said Blansett, whose duties include managing UF student housing. "We do not have a mosquito problem at UF, but it's great to know we're getting more help in our continued efforts to keep students safe."

Apartment complexes in UF graduate and family housing include Corry Village, Diamond Village, Maguire Village, Tanglewood Village and University Village South.

Photo by Camila Guillen, UF/IFAS

From left: Michael Bartlett of UF Housing, Paul Choi of Seoul Viosys, a South Korean-based company, and Philip Koehler, UF/IFAS Entomology, at University Village. Seoul Viosys donated 100 MOSClean mosquito traps to UF Housing.

Phil Koehler, an entomology professor with the UF Institute of Food and Agricultural Sciences, said the device — called the MOSClean trap — is well-designed. It uses a combination of carbon dioxide and ultraviolet light — which comes from light-emitting diodes — to attract mosquitoes, then traps them inside via a vacuumlike method.

"It is a very effective way of being able to capture mosquitoes, hopefully before they bite someone," Koehler said.

Mosquitoes can transmit more than 20 types of viruses, including Zika, West Nile, St. Louis encephalitis, eastern equine encephalitis, chikungunya, and dengue, Koehler said. About 750,000 people die globally each year from mosquito-transmitted diseases. PP

— Report by Brad Buck, UF/IFAS

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reduced-risk products and others are not. Our goal was to determine how well the most common products control thrips, what effects they have on key predators, and how long these effects last.

We found that the products containing broad-spectrum active ingredients were immediately toxic to thrips and predators. After 14 days, they continued to kill over 30 percent of predators, but no thrips. The reduced-risk products we tested never killed over 10 percent of predators and were still causing thrips mortality after 14 days.

Evaluation

No matter the stage of management, constant evaluation of what you are doing and observing is critical. Framing your pest management program with the five steps of IPM will facilitate this evaluation and successful pest management. Making the effort to properly identify and monitor pests and selecting the most appropriate control measures can ultimately save you time, money and plants. PP

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