University of Kentucky
College of Agriculture,
Food and Environment
Cooperative Extension Service

Center for Crop Diversification Fact Sheet
CCD-FS-25

Integrated Pest Management for Agricultural Service Providers

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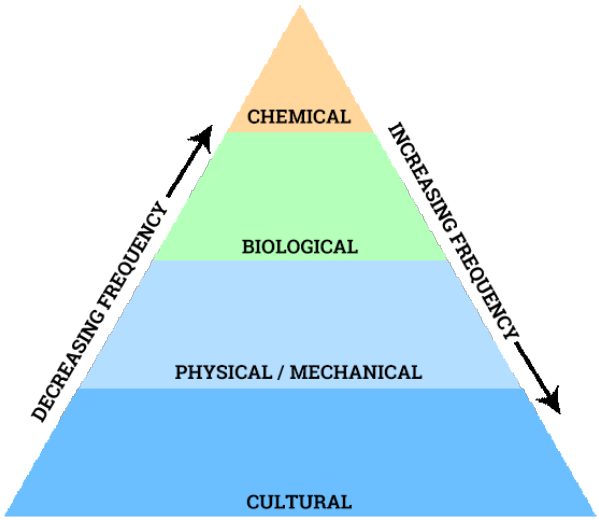

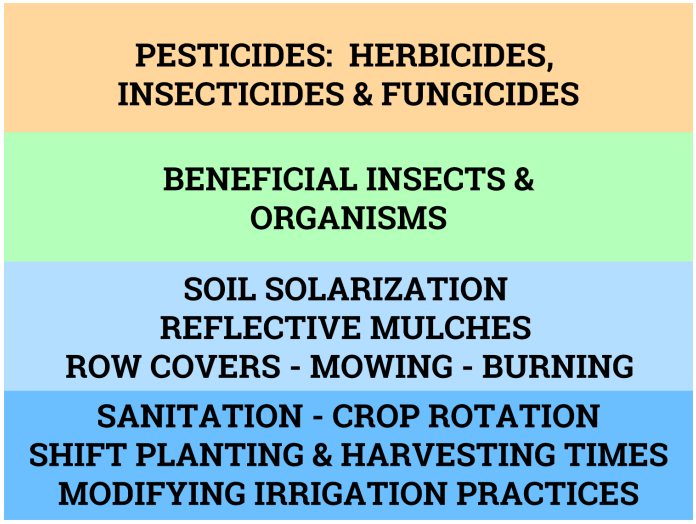

When teaching about IPM we can think of this philosophy of pest management in terms of a couple of metaphors. Some visualize IPM as a pyramid with the thickness of each layer corresponding to the frequency that type of tactic is deployed. Others describe it as a toolbox approach, teaching that each method we can use in a given growing situation is available for use, you just have to make sure it matches the problem at hand.

Classically, IPM is split into categories called cultural management, physical and mechanical control, biological control, and chemical management. There are some programs that have reorganized the system into what is called the PAMS approach, which stands for Prevention, Avoidance, Monitoring, and Suppression.
No matter which way you slice it, the foundational element that makes IPM work is the inclusion of monitoring as a practice. Monitoring ensures that growers are finding pest populations when they are smallest and most manageable and allows us to find more success with approaches like physical or biological control.

Cultural management focuses on modifying cultural practices and choices that go into agricultural production. By altering these systems or practices we can reduce pest survivability, attraction, and injury. Ultimately, we are aiming to reduce the carrying capacity of pests in any given system. The carrying capacity is the highest sustainable population of any given organism in a particular system. To alter the carrying capacity we are reducing available amounts of food, water, and breeding space. The simplest form of cultural management is sanitation, removal of debris or alternate hosts cuts down on the number of pests that can survive in an area and therefore less pressure. Other cultural methods include crop rotation, cultivar selection, altering planting or harvesting time, and modifying irrigation practices.

Monitoring: In a soybean field, a scout counts the number of western corn rootworm adults on a yellow sticky trap. Application of low-insecticide bait is recommended when 14 are caught over a 7-day period. Source: USDA

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Physical and mechanical control are often lumped together, though there is some nuance between the two. Physical control is an attempt to create conditions that are less suit-

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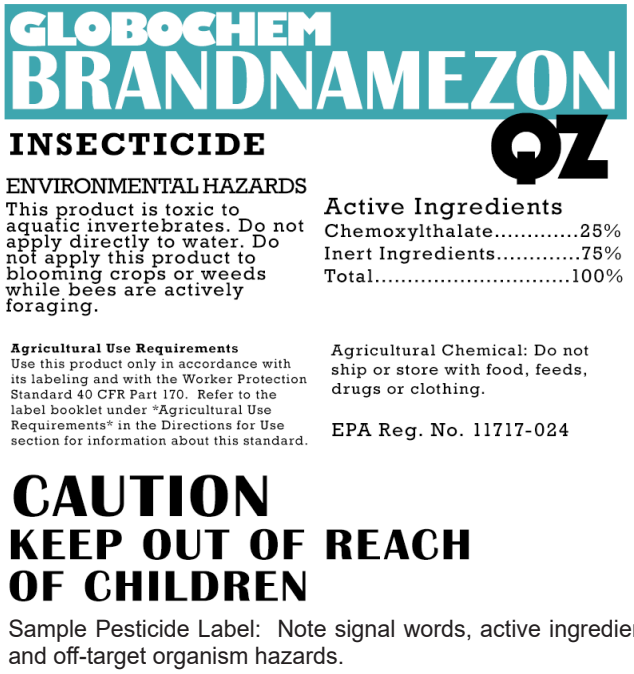
able for pest entry, dispersal, survival, and reproduction. Row covers that exclude pests are a common example of physical control, but we could also mention solarization, which creates situations that are too warm for some weeds and pathogens, and reflective mulches, which can interfere with insect pest establishment by repelling them from the growing site. Mechanical control is a destructive process that will kill the pest. Mowing, using flames, or plucking insect pests from the plant and dropping them in soapy water are mechanical methods deployed to destroy pests..

Row Covers: Row covers protect young plants from many insect pests. Source: Ric Bessin, University of Kentucky

Biological control is a foundational element to Integrated Pest Management. The original concepts behind IPM were called integrated management and focused on how we could pair insecticides with natural enemies more successfully. Biocontrol is defined as the activity of any one species that reduces the adverse effects of another. It is most often considered for the management of arthropod pests but can also be deployed against weeds. For most growers, we would teach about augmentation biological control or possibly conservation biological control. ***Augmentation biological control*** is tantamount to an application of a pesticide, it happens in response to a certain number of pests being discovered and we apply a natural enemy to the area to suppress the population of the pest. One example would be the release of lacewings and lady beetles to manage aphid populations breaking out in a greenhouse. Usually, these releases don't anticipate breeding populations to establish and maintain long term suppression of pest problems. ***Conservation biological control*** is connected to cultural methods. We can alter practices to reduce negative side effects that may be occurring to local populations of natural enemies. Encouraging their health and reproduction helps to suppress pests. One example of this would be switching from a monoculture to a polyculture growing system. More plant diversity in an area means more predators and parasitoids that will attack pests.

Chemical management is often the most downplayed portion of IPM. This doesn't have to be the case; IPM can include the use of pesticides, but it is a much more judicious use of these products. We use careful consideration


GLOBOCHEM
BRANDNAMEZON
QZ
INSECTICIDE

ENVIRONMENTAL HAZARDS
This product is toxic to aquatic invertebrates. Do not apply directly to water. Do not apply this product to blooming crops or weeds while bees are actively foraging.

Active Ingredients
Chemoxylthalate.....25%
Inert Ingredients.....75%
Total.....100%

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standard 40 CFR Part 170. Refer to the label booklet under "Agricultural Use Requirements" in the Directions for Use section for information about this standard.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

EPA Reg. No. 11717-024

CAUTION
KEEP OUT OF REACH OF CHILDREN

Sample Pesticide Label: Note signal words, active ingredients, and off-target organism hazards.

to match the proper pesticide with the pest being dealt with but also choose to use products that pose the least intrinsic hazard to natural enemies, pollinators, and humans that work in the system. This may be a comparison of different active ingredients and checking their labels to show which ones have the least problematic signal word or deciding to advocate for a formulation that poses less intrinsic hazard to non-target organisms (such as a systemic pesticide or a granular product).

Additional Resources

Kentucky IPM Manuals
https://ipm.ca.uky.edu/manuals

Kentucky IPM Picture Sheets
https://ipm.ca.uky.edu/picturesheets

IPM Video Gallery
https://ipm.ca.uky.edu/content/ipm-videos

Kentucky Pest News
https://kentuckypestnews.wordpress.com/

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