INTEGRATED PEST MANAGEMENT
The PAMS Approach

Adoption of Integrated Pest Management (IPM) occurs along a continuum from reliance on prophylactic control measures and pesticides to multiple-strategy biologically intensive approaches. The practices of IPM are site-specific and individuals tactics are determined by the particular crop/pest/environment scenario. Each site should have in place a management strategy for **Prevention, Avoidance, Monitoring and Suppression** of pest populations (The **PAMS** Approach).

The Natural Resources Conservation Service uses PAMS as core strategies in the 595 IPM Practice Standard. Growers enrolled in the Environmental Quality Incentives Program for pest management are required to have a site-specific IPM plan. The IPM plan uses these PAMS strategies to identify a specific course of action to control pests in the cropping system.

PREVENTION

Prevention is the practice of keeping a pest population from infesting a field or site and should be the first line of defense. It includes such tactics as: 1. using pest-free seeds and transplants, 2. preventing weeds from reproducing, 3. irrigation scheduling to avoid situations conducive to disease development, 4. cleaning tillage and harvesting equipment between fields or operations, 5. using field sanitation procedures and eliminating alternative host or sites for insect pests and disease organisms.

Photo Credit: Peter Werts, IPM Institute

In many apple growing regions, abandoned orchards harbor pests that can be difficult to control. This five acre orchard of no value to the grower was removed to help reduce pest-pressure at neighboring commercial orchards.

MONITORING

Monitoring and proper identification of pests through surveys or scouting programs, including trapping, weather monitoring and soil testing where appropriate, should be performed as the basis for suppression activities. Records should be kept of pest incidence and distribution for each field or site. Such records form the basis for crop rotation selection, economic thresholds and suppressive actions.

Photo Credit: Iowa Extension

Soybean aphids monitored by suction traps. These traps monitor the aphids as they migrate between alternate hosts and soybean plants.

Photo Credit: MN Extension

A crop rotation between corn and alfalfa can be used to help break the life cycle of corn rootworm beetle or other perennial weeds.

AVOIDANCE

Avoidance may be practiced when pest populations exist in a field or site but the impact of the pest on the crop can be avoided through cultural practices. Avoidance tactics include: 1. crop rotation such that the crop of choice is not a host for the pest, 2. choosing cultivars with genetic resistance to pests, 3. using trap crops or pheromone traps, 4. choosing cultivars with maturity dates that may allow harvest before pest populations develop, 5. fertilization programs to promote rapid crop development, 6.not planting certain areas of fields where pests populations are likely to cause crop failure. Some tactics for prevention and avoidance strategies may overlap in most systems.

SUPRESSION

Suppression of pest populations may become necessary to avoid economic loss if prevention and avoidance tactics are not successful. There are four primary suppressive tactics that growers employ: cultural, physical, biological and chemical control(s).

Cultural practices such as narrow row spacing or optimized in-row plant populations, alternative tillage approaches such as no-till or strip-till systems, cover crops or mulches, or using crops with allelopathic potential in the rotation.

Photo Credit: Mark Carlton, Iowa Extension

Using no-till systems combined with crop rotations will improve soil health and increase biological activity in the soil. This benefits natural predators and will increase the plants own ability to be resilient to insect and disease damage.

Physical suppression tactics may include cultivation or mowing for weed control, baited or pheromone traps for certain insects and temperature management or exclusion devices for insect and disease management.

Biological controls, including mating disruption for insects, should be considered as alternatives to conventional pesticides, especially where long-term control of an especially troublesome pest species can be obtained. Where naturally occurring biological controls exist, effort should be made to conserve these valuable tools.

Chemical controls are important in IPM programs and some will remain necessary. However, pesticides should be applied as a last resort in suppression systems using the following sound management approach:

1. The cost-benefit should be confirmed prior to use and depend on economic thresholds where available.
2. Pesticides should be selected on their least negative effects on environment and human health in addition to efficacy and economics.
3. Where economically and technically feasible, precision agriculture or other appropriate new technology should be utilized to limit pesticide use to areas where pests actually exist or are reasonably expected.
4. Sprayers or other application devices should be calibrated prior to use and occasionally during the use season.
5. Chemicals with the same mode of action should not be used continuously on the same field in order to avoid resistance development.
6. Vegetative buffers should be used to minimize chemical movement to surface water.

Photo Credit: MSU IPM Program

Fruit growers have found success using pheromone mating disruption as an alternative to chemical control for such pests as codling moth and oriental fruit moth in apples.

For additional information see the following links:

North Central IPM Center:
www.ncipmc.org

Grower Incentives for IPM Work Group
www.ipm.msu.edu/work-group/home.htm

IPM Institute of North America, Inc.
www.ipminstitute.org

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