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IPM strategies can reduce pesticide runoff

When selecting a pest-management option, consider the economic and environmental implications. **By Karen L. Robb**

Integrated pest management practices help to minimize the potential environmental impact of chemicals and produce high-quality products in a cost-effective manner. Adoption of IPM strategies can substantially reduce the number of pesticide applications or the total amount of product applied, limiting potential runoff and leaching issues.

IPM starts before a crop is ever planted. Many practices can be used to reduce both pest problems and water-contamination issues. These include crop rotations and planting date adjustments to help control weed, insect and disease problems.

Pest controls

Biological controls. Integrate biological controls when they are appropriate and effective. Natural enemies can be highly effective to keep harmful pests in check. They can be used in combination with the judicious application of chemical controls for some pests. It is essential to have a good monitoring program in place and avoid the indiscriminate use of broad-spectrum pesticides.

Chemical controls. Use pesticides judiciously. Be sure to rotate pesticides to reduce development of resistance. Resistance generally results in the need for greater amounts and more frequent applications of pesticides to control a resistant pest. This increases the potential for pesticide runoff and leaching.

Timing of pesticide applications

Time pesticide applications to susceptible insect stages. Some pesticides, such as insect



Water collects in low spots under benches. Leveling the ground before planting will reduce the standing water and this pest-breeding situation.

growth regulators, target only one pest stage. Use of IGRs against adults won't result in effective control, and it wastes money and resources and increases exposure of IGRs into the environment.

Knowledge of the pest life cycle can aid in timing applications. For example, leafminer larvae tend to emerge from leaves during late morning. When pesticides are applied early in the morning, the larvae contact the fresh chemical residue as they emerge from the leaf to drop to the soil to pupate, increasing the exposure to the pesticide.

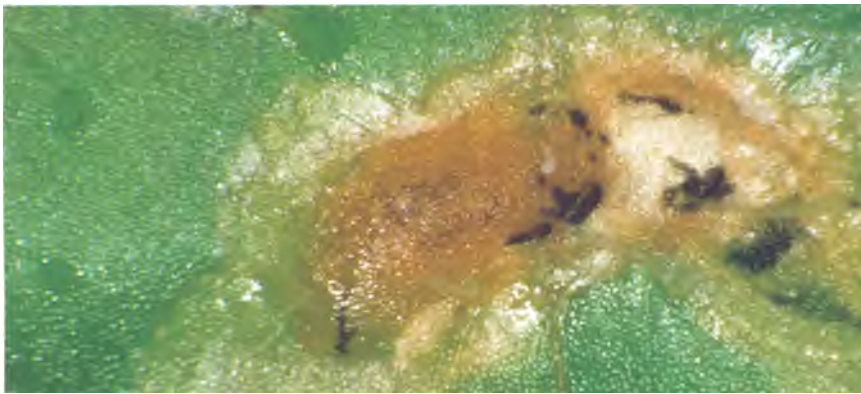
Environmental conditions, such as soil moisture levels, weather conditions (current and future) and irrigation requirements, should be taken into account to achieve the greatest efficacy and reduce the potential for offsite transport

Production practices limit pest problems

- Start clean. If your previous crop had pest problems, treat that area or leave it fallow so that the pests are no longer an issue.
- Level the ground to avoid problems with standing water.
- Know what pests are likely to occur on a crop and when to expect them, and develop

- a monitoring strategy accordingly.
- Monitor for early pest detection.
- Start with pest-free plants.
- Reduce plant stress. Plants under stress are more vulnerable to insects and diseases and can withstand less injury. Proper irrigation and fertilization is essential to

- reducing plant stress.
- Maintain proper air movement and temperature, humidity, light, pH and electrical conductivity levels and good soil conditions.
- Keep growing areas clean. Eliminate weeds and other hosts for pest populations.
- Keep watering hoses off the ground.



A third instar *Liriomyza trifolii* leafminer larva prepares to cut a hole in a leaf and crawl across the leaf surface prior to dropping to the soil to pupate.

Screening keeps out insects

Screening can prevent pests if installed before pests migrate into the greenhouse (otherwise, the pests are trapped inside an environment conducive to their development). Exclusion screening can dramatically



Exclusion screening can prevent insect movement into greenhouses.

of the pesticide.

Spot spraying when only localized areas are affected can greatly reduce overall pesticide use. Likewise, targeting the application to the sites where pests are reduces pesticide use.

Pesticide adjuvants

Before adding an adjuvant to a pesticide to make application more effective, read the label of both the adjuvant and the pesticide. Some manufacturers produce adjuvants that are most compatible with their products. Also, some pesticides already include an adjuvant so no additional adjuvant is needed.

Clean up and waste disposal

What should be done with the rinsate from the tank and pesticide containers? The rinsate can legally be applied back over the crop that was treated (or a crop for which the pesticide is registered). If the rinsate is not applied to a crop, it becomes a hazardous material and must be disposed of accordingly.

What happens with the water used to clean application equipment? As with rinsate, wash water from the equipment can be applied to the crop, otherwise it becomes hazardous waste.

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