

Pest and Pesticide Management

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Pest Management

Pest management is evaluating and using a tailored pest management system to reduce crop and environmental damages. Scouting is done to identify insects, weeds and diseases. Precaution is taken to keep any chemicals from leaving the field through leaching, runoff or drift. Scouting and spot treatment for only those pests that are threatening can save money and using fewer chemicals improves water quality. Using specialized treatments for specific pests only on certain areas of a field can prevent the over-treatment of pests.

Before implementation, consider the following:

- Which soils on your farm are likely to leach pesticides?
- You should establish filter strips along streams.
- Pest control alternatives.
- Using records of crops and pest control for reference.
- Rotating crops to reduce the chance of pest problems.

The following are guidelines to follow for applying and mixing pesticides:

- Complete a pesticide risk assessment of potential environmental damage from leaching or runoff. Consider this information when selecting a pesticide.
- Wear protective clothing when applying pesticides.
- Mix and load pesticides in an area that won't contaminate water supplies
- Prevent back siphoning.
- Triple rinse containers before disposal. Burn paper bags.
- Apply pesticides during periods with minimal potential for drift or runoff.
- Use the lowest application rate practical and rotate pesticides.
- Use spot treatment or banding when possible in areas of concentrated pest populations.
- Use proper erosion control.
- For maintenance, continue scouting to best identify pests and control methods, keep records to track costs and chemical applications, and calibrate spray equipment.

Pest Management Plan

As with fertilizers and nutrients applied to farmland, it is environmentally effective for one to develop a pest management plan. The goals of a pest management plan are to reduce the impact of pests to the crops, create a list of options based on location and types of crops, and to create a plan that will provide agricultural practices which can reduce problems associated with pesticide usage. Biological controls, mechanical controls and cultural controls can all help reduce the amount of pesticides used on farms, which will in turn help protect water quality.

A pest management plan includes:

- A history of pest problems, present pest problems and crop history
- Biological and physical factors
- An environmentally conscious selection of the pesticide to be used, the application of the pesticide and the timing of this application.
- The safe storage and application of pesticides

The most important practice in a pest management plan, for the most sustainable methods of pest control, is the use of an integrated pest management plan (IPM). An IPM aims at reducing pesticide use while increasing yields in crop production without damage to the environment.

There are four components to an IPM system:

1. All pests must be identified and recorded whether damaging or beneficial.
2. Thresholds must be established to determine the best times action must be taken to control the pests.
3. A combination of various methods to control pests in order to reduce the use of pesticides should be used. For example, cultural control, mechanical control, biological control and chemical control.
4. You should record and monitor pest problems to identify the locations of population establishment.

Biological Control

Biological control is the control of pests by introducing enemies or predators to keep populations of crop pests regulated, which in turn prevents further damage to crops.

For successful introduction of biological control agents:

- The environment must be suitable for the population to flourish.
- Management of the control agent must be done in order to prevent the establishment of the control agent as a pest.
- Be certain the control agent will virtually feed only on the weed or pest species itself, and not on crop plants.
- The control agents must not be native to the area.

Successful biological control can have many benefits to the environment. Examples of biological control agents in vegetable crops include:

- The six spotted thrips to control spider mites in sweet corn. The thrips feed on the larvae and eggs of the mites without damaging the corn crops.
- Tiny parasitic wasps will control earworm in sweet corn crops. The wasps damage corn earworm eggs and larvae by laying their own eggs on top of earworm larvae and eggs. The wasp eggs take a parasitic action against the earworm eggs and will eventually kill them.
- Typhlodromus pyri will control European red mites, which are common pests to apple orchards. This species will not feed on the apple but only the mites present on the leaves. Typhlodromus pyri will not feed on leaves where there are large numbers of mites present and will search for alternative food sources. This species will survive in the winter months in large numbers.

Herbicide Application

Recommendations to reduce the amount of herbicides used for weed and insect control:

- Band at a 15 inch band with 30 inch row spacing allows for a 50 percent reduction in herbicide usage.
- Band at a 10 inch band with 30 inch row spacing allows for a 67 percent reduction in herbicide usage.
- Apply half rate or reduced rate applications as well as timely row cultivation.
- Spot treatments
- Use buffer strips and conservation tillage to reduce harmful effects of pesticide runoff.
- Use foliar, soil or soil injection applications.
- Avoid spraying on windy days. Also avoid spraying on hot days as some pesticides are volatile.

Alternative practices for insecticide use:

- Application of insecticides based on scouting methods for determining insect populations.
- Spot treatment.
- Directed sprays over rows rather than spraying the entire area with large sprayers.
- Insect attracting baits, such as cucumber juice mixed with pesticides.
- Create economic thresholds for determining the rate of application.
- Using insect resistant crops such as BT corn.

Cultural Control

Cultural controls are farming practices used to destroy a pest's or weed's habitat by methods such as tillage, crop rotation and changing of planting and harvest dates.

Cultural control methods include:

- Selecting varieties of crops that are resistant to pests.
- Intercropping which is the planting of two crops between each other to reduce insect damage. For example, intercrop broccoli with clover.
- Cover cropping which can provide a cover or shield against insect damage.
- Trap cropping which is the use of certain crops to attract the insect away from the cash crop. For example, when planting potatoes, plant eggplant to attract potato beetles away from the potato crop.
- Crop rotations that change weed seed banks and prevent annual and perennial weeds from returning to certain areas.
- Knowing the soil composition and texture, including the percentage of sand, silt and clay as well as knowing the topography, including slope and water resources as this can have an effect on harboring insects.

Mechanical Controls

Mechanical controls include practices using machinery or physical labor to control insects and weeds. Mechanical controls include plowing, hand weeding and increased tillage methods to control weed seed banks.

Mechanical methods include:

- Re-vegetation or follow up weed prevention. This includes establishing dense, competitive vegetation that can permanently replace weeds. Re-vegetation can prevent weed infestation in areas where the soil has been disturbed or the vegetation has been removed.
- Containment and reduction of weeds. This is most successful in undisturbed areas that have native plants which are heavily intermingled with weeds. Containment and reduction of weeds use planned hand weeding in favor of natural or native plants. Successful use of this method will allow native vegetation to regenerate and fill the area where the weeds once lived. Hand weeding is done by starting on the edges of the area and working inward, the area where the weeding is started must be accessible and must have a ratio of one weed to two native plants. It is recommended you start weeding on strips approximately 12 feet wide. While weeding, make sure to replace bare soil with leaf litter that does not contain mature weed seeds. Do not increase the area weeded until native vegetation has established. The native plants, or crop plants, do not have to be tall just dense enough to form a cover over the soil to prevent the weeds' seeds from getting sunlight. This method has been shown to be successful by clearing a 40 acre woodland reserve that only needed attention two times a year. This process is lengthy but, the end results will provide a farm field that requires the smallest amount of weed control. This practice will eliminate the use of herbicides after completion.