## BEST MANAGEMENT PRACTICES for PEST MANAGEMENT

Pesticides can be classified into two broad categories: insecticides and herbicides. In order to effectively control any pest, proper identification and understanding of the pest is required. Other consideration involve monitoring for excessive population levels, identifying natural biological controls, and evaluating situations in which cultural and mechanical techniques are best suited.

Integrated pest management (IMP) is a sustainable approach that combines the use of prevention avoidance, monitoring suppression strategies in a way that minimize economic, health, and environmental risks.

**INSECTICIDES --** Applying insecticides without considering the physiology of the pest can do more harm than good. Over long periods of time, the application of insecticides has enabled some insects to become resistant to once effective chemicals. This resistive trait has forced several agricultural operations to adopt alternative methods to combat insect infestations. Some of the methods used in conjunction with insecticides involve: the introduction of biological controls, cultural and mechanical controls.

**Monitoring and proper identification of pests –** A monitoring or scouting program is the first step in the evaluation process and will include trapping and/or visual inspection. In order to sustain a ecologically balanced environment, both predator and pray insects should be present. If full eradication of crop damaging pests were achieved, the more desirable biological controls such as predator beetles and wasps would soon follow. In an unbalanced environment, the lack of predator insects allows future pests an opportunity to multiply and grow without natural controls. In addition to the identification of pest insects, current population levels are a very important consideration before implementing any form of control. The following is a list of ways in which to monitor pest populations. If implemented correctly, any one of these techniques will assist the County of San Diego Agriculture, Weights and Measures Department with identification and population levels as they relate to your situation.

Monitoring Techniques:

- Sticky traps:
  - Sticky traps are simply pieces of paper or card board which have some form of adhesive on it.
- Pheromone traps:
  - Pheromone traps are sticky traps in which a chemical element simulates the presence of other insects.

- Beating trays:
  - Beating trays are simply trays or platters in which row crops can be tapped or brushed next to the tray
- Plant sample:
  - Some insects do not have the ability to fly or crawl; for example leaf-miners or mites. In these cases, collection of a leaf or plant sample with the insect attached is a good way to collect the insect.

**HERBICIDES --** In an agricultural operation, a plant is considered a weed if it interferes with the intended use of the land and water resources. Weeds possess specific traits which make them very prevalent. These traits include competitiveness, persistence, and perniciousness. Traits such as these can cause undesirable interference and an economic hardship to agricultural operations. To put this in to perspective, losses caused by weeds exceed losses from any other category of agricultural pest. We were informed that Round-Up is used once a year in your grove for weed control. This substance is degraded readily in the soil by microorganisms, but if excess is allowed to leach or runoff into the water, downstream plant life can suffer.

**The first step in proper management of a weed involves proper identificatio**n. Once a weeds name is known, whether common or scientific, research and development of a management plan can begin. After developing a management plan, techniques can be tailored to suit and disrupt specific life cycle phases, growth habits, or developmental stages of the weed. The primary reason why a manager would want to know all this information, with regards to either a single or multiple weed species, involves several considerations some of which include: cost, effectiveness of treatment, impacts to the environment, and potential human hazards associated with chemical use.

**Controls --** Unlike insecticides, weed controls have only three methods of control which include: chemical, cultural, and mechanical techniques. Of these three techniques, typically, the most familiar to the general public is chemical control. Despite our familiarity with the process, this management option is not always the best form of control. When evaluating your need to use any chemical, you should consider and weigh all factors associated with their use.

Cultural control is another form of weed control. Cultural controls typically involve altering environmental factors such as light, temperature, available nutrients, and/or soil compaction. Mulch is another form of cultural control which utilizes these environmental factors. The primary function of mulch is to exclude light from weed seeds and undesirable plants. If applied correctly, mulch can have several desirable traits some of which include: reduction in water use, decrease in soil temperatures, and improvement of soil nutrients. If applying a mulch for weed control depths should range from one to three inches for finer materials, such as sawdust or

grass clippings, and three to six inches for coarse materials, such as bark, straw, or shredded plant material.

Mechanical control is a form of weed control which is considered very effective even against the most persistent weeds. Techniques used typically involve hoeing/cultivating, hand pulling, rototilling/discing, and mowing/chopping. Most of these methods are considered nonpolluting to the environment and do not require elaborate equipment or a special applicator's license. In order for a mechanical technique to be effective, the time of the year and condition of the weed should be considered. If done during the right time of the year, mechanical operations can disrupt and greatly reduce production of new seeds.

# Integrated Pest Management

## Designing an IPM plan

- Identify the Pest
  - What are the pests that pose an economic concern for your crop
  - Identify the resources to aid in identification, PCA's, UCCE, Ag commissioner's office.
- Establishing monitoring guidelines
  - Identify the sample unit (leaf, plant, fruit, twig, soil) where will you find a pest for identification
  - Define the sampling universe; i.e. the entire field, a certain block or a pest's preferred habitat.
  - Establish the number and size of samples needed
  - How often will sampling take place
  - When will sampling begin during the growing cycle and when will it end.
- Establish injury levels and action thresholds for each pest.
  - How much damage can you or the crop tolerate?
  - How many pests present initiate treating for the pest?
- Determine those critical life plant stages when monitoring is needed
  - Prediction of these important stages helps to identify monitoring patterns.
- Identify the environmental factors that must be monitored.
  - Temperature highs and lows, amount of rainfall level of wind, these are factors that can contribute to pest life cycles being active or interrupted.
- Streamline the monitoring for efficiencies
  - Find the hot spots in the field that are first to be infested, to insure that these areas are watched carefully.
  - Understand what parts of a sample are the point to be examined to speed up monitoring.
- Keep good records
  - These will help you identify patterns of infestation in certain parts of a field
  - They will also make it easy to report pesticide applications to the county.

**Pesticide Best Management Checklist**

# Integrated Pest Management

To help you help us keep the water clean, and to help us help you keep your costs down, we have included a checklist of pesticide management practices. This Checklist delineates a number of practices which would reduce pollution.

- Perform an in-field evaluation of each pest problem. *Do you have mites? Thrips? White flies?* ___
- Evaluate economic impacts on each pest problem on the growing/planned crop. *Will this pest be a serious financial burden or does it have the potential to become your financial burden?* ___

- Consider mechanical control alternatives, especially for weed problems. *Can you hoe instead of spray?* ___

- Consider use of IPM strategies and biological controls including beneficial insects and use of pheromones. ___
- Base decision to use pesticides on an economic threshold for that crop. *Will the pesticide cost you more than the crop is worth?* ___

- Avoid or reduce use of pesticides identified as Target Pesticides for Water Quality. *See the following list.* ___

- Recalibrate spray equipment each crop season and recheck application rate in the field when changing to a new rate. ___
- When the combination of soil and pesticide characteristics (runoff potential, leaching potential) result in high or medium pesticide loss potential rating for a field, select the lowest risk, suitable pesticide. Select pesticide formulation and placement that will minimize evaporation and the droplets drifting away in the wind. ___
- Use anti-back flow devices on hoses and pipes used for filling tank mixes and between water source and irrigation systems; perform tank mixing operations at least 100 feet away from well heads and. ___
- Use lower pesticide application rates than those called for on the label *when you find that less can do the job just as well as more.* ___
- Consider using band applications of pesticides to reduce total amounts applied. ___
- Consider climatic conditions and potential effect on pesticide transport prior to application (rain, fog, irrigation). ___
- Properly rinse spray equipment and use closed mixing systems to facilitate a “triple rinse” of the empty pesticide container and safely apply the rinse water to the target field. This way, all of the pesticides are used up. ___
- Properly dispose of pesticide containers. ___