UC Marin Master Gardeners
Telephone: 415/473-4204
Website: *http://www.marinmg.org*

Advice to Grow By … Ask Us!

PESTICIDES

By Nanette Londeree, Marin Master Gardener

You've heard it before – "There's no good bug but a dead bug" or so the manufacturers of pest control products might have you believe. For just about every pest, there is an available product to eliminate or control it with pesticides. Using one though, is not the first thing that should come to mind when coping with a pest; utilizing an integrated pest management approach may negate the need for a pesticide altogether. But if you've gone through your arsenal of physical, mechanical and biological control methods with no success, your next step may be to use a pesticide. And contrary to popular thinking, they're not all bad. You probably use them regularly without hesitation – household bleach comes to mind (kills just about anything it touches) or baking soda (used to prevent powdery mildew). They can be a benefit to the gardener when used appropriately. Understanding the myriad of terms and concepts related to them can help you make a decision on what pesticide to use.

The term pesticide was coined in 1939 from the English word pest and -cide, from the Latin cidium "a killing," and caedere, "to cut down, kill." Many people associate pesticides with chemicals, but a pesticide is any material used to control, prevent, kill, suppress or repel pests. The U.S. Environmental Protection Agency (EPA) and individual states register or license pesticides for use in the United States under the authority of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). States are authorized under both FIFRA and state pesticide laws and may place more restrictive requirements on pesticides than the EPA.

There are many different types of pesticides, each focused on the group of pests they are designed to control. Some of the most common include:

- **Algicide:** Controls algae in swimming pools, lakes, canals, and water used industrially or stored
- **Avicide:** Kills birds
- **Biocide:** Kills microorganisms
- **Fungicide:** Kills fungi that may infect and cause diseases in plants, animals, and people
- **Herbicide:** Kills weeds and other plants that grow where they are not wanted
- **Insecticide:** Kills insects and other "bugs"
- **Miticide:** Also called acaricides, kills mites that feed on plants and animals
- **Molluscicide:** Kills snails and slugs
- **Nematicide:** Kills nematodes (microscopic, wormlike organisms that feed on plant roots)
- **Piscicide:** Kills fish
- **Ovicide:** Kills eggs of insects and mites
- **Rodenticide:** Control mice and other rodent pests

Every pesticide will have a specific "mode of action"- how the pesticide works on the targeted pest. A **contact** pesticide kills when it touches the target organism while a **systemic** is carried through the blood of treated animals or tissues of treated plants. **Selective** products kill only a few closely related organisms versus a **non-selective** or **broad spectrum** one that kills a range of pests and also non- target organisms. The herbicide *Round-up* would be considered a non-selective herbicide as it will kill any green plant tissue it contacts. *Sluggo* would be representative of a selective, systemic pesticide (molluscicide); it kills the targeted pest, snails and slugs, after they ingest it and it circulates through their system. Spraying a product like *Raid Ant Killer* would kill the ants on contact.

The origin of a pesticide may be natural or man-made, and produced from organic (carbon containing) materials or inorganic (do not contain carbon) materials like arsenic, copper or sulfur. Natural and organic do not automatically mean that the material is safe; some are as toxic, or even more toxic, than synthetic chemical pesticides.

Pesticides are available in many different forms. They are generally mixtures of an active ingredient (the component in the product that kills or otherwise controls the target pest) and other inert materials resulting in the pesticide formulation. The formulation determines how the product will be applied or mixed before application. Some of the more common formulations are:

- **Solutions (S):** Liquids in a ready to use or concentrated form
- **Emulsifiable concentrates (EC or E):** An active ingredient mixed with an oil base that is diluted with water before application; it must be continually agitated to keep it in solution
- **Aerosols (A):** Low concentration solutions that are applied as a fine spray
- **Soluble powders (SP):** Powders dissolved in water before application
- **Wettable powders (WP or W):** An active ingredient combined with a fine powder that is mixed with water before application
- **Baits (B):** An active ingredient mixed with an edible or attractive substance
- **Granules (G):** An active ingredient mixed with coarse particles of inert material that are applied directly
- **Dusts (D):** An active ingredient added to a fine inert clay or talc that is applied directly

Commercially available pesticides all have some level of toxicity as defined by the EPA. Toxicity is a measure of how poisonous a material is. In order to provide a rapid identification of the dangers of a chemical, there are warnings on all product labels - a numeric category and a signal word used to describe the toxicity level. The category and signal word for all pesticides is listed below along with a general indication of the probable oral lethal dose of a pesticide for a 150-pound person:

I **Danger Poison** – highly toxic, taste to 1 teaspoonful
I **Danger** - highly hazardous; pesticide specific (see label)
II **Warning** – moderately toxic or hazardous; a teaspoon to an ounce
III **Caution** – low toxicity; more than an ounce, less than a pint
IV **Caution** – low toxicity; over a pint

A skull and crossbones on the label indicates a highly toxic pesticide. DANGER without a skull and crossbones symbol shows the pesticide is a potent skin or eye irritant.

Pesticides carry three different names: their product, trade or brand name - the name on the container you purchase; the common or active ingredient name and the proper chemical name. *Round-up* is the brand name for glyphosate (the common name of the active ingredient); its proper chemical name is N-(phosphonomethyl) glycine. Common names are generally easier to identify than chemical names. Several companies may sell the same pesticides using different brand names, but the labels will have the same common or chemical name.

Before using any pesticide it's important to read the label. Federal law strictly defines what information manufacturers must put on pesticide labels. The label is a legal document required for every pesticide registered in the United States and is the main source of information on how to use the product correctly, safely, and legally. Information contained on the label includes the trade name or brand name, active ingredients and their percentage by weight, types of plants or sites where pesticide may be used, pests targeted, how much to use and how and when to apply, required protective clothing and equipment, signal words, precautionary statements defining hazards to people, domestic animals, or the environment, emergency and first aid measures to take if someone has been exposed and proper storage and disposal of the pesticide and empty containers

Before you purchase or use a pesticide, learn all you can about the pest you want to control and make sure the pesticide is registered for use on the particular type of plant or site you plan to treat as pesticides can seriously damage some plants. Be sure to carefully read the entire product label and follow all label precautions and directions, including requirements for protective equipment.