

Using Pesticides Safely Around the Home and Garden

Pet owners washing their dogs with flea and tick shampoo; custodians scrubbing bathroom fixtures with disinfectant; lawn enthusiasts applying granular crabgrass preventative. What do all of these people have in common? They all are using pesticides.

The Environmental Protection Agency considers a pesticide to be any substance or mixture of substances used to prevent, destroy, repel or mitigate pests. Pests are living organisms that occur where they are not wanted or that cause damage to desirable plants, humans or other animals. They include not only insects but also weeds, disease organisms such as fungi and bacteria, certain animals, and other organisms.

All pesticides are poison to a certain extent and must be handled with proper care. Used properly, pesticides can improve our lives by protecting our food supply, improving our landscapes and keeping our living spaces clean. When used carelessly, however, they can pose a danger. According to the American Association of Poison Control Centers, more than 100,000 calls are made annually to poison control centers because of pesticide poisoning. Although 90 percent of the cases are minor, some do require medical attention. What is most alarming is that about a third of these cases involve children under the age of 6. These statistics cover only those cases that are reported; undoubtedly, countless others are not brought to the attention of medical professionals. Note that these statistics cover only reported cases and don't include the countless cases that are not brought to the attention of medical professionals.

This guide discusses considerations for the safe use of pesticides in and around the home and garden (Figure 1).

Pesticide selection

Pesticides should not necessarily be considered the first line of defense against a pest outbreak. They are only one of a large number of pest control methods. Often, nonchemical control methods will do an effective job in managing or preventing a pest problem.

Given that hundreds of pesticides are sold through lawn and garden centers and other retail outlets, how does



Figure 1. Effective pest control around homes and gardens depends on accurate identification of the problem, selection of an appropriate control agent, and safe use of the chosen pesticide.

a person decide which one to use? Many pesticides are designed specifically to target only certain types of pests, so identification of the problem is the critical first step in deciding which pesticide to use. Only after the pest is properly identified can an appropriate pesticide be selected.

The place to start when selecting a pesticide is the label (Figure 2). Read it carefully to ensure it is approved for home use on the pest and the plants involved. The importance of reading the pesticide label cannot be overemphasized because “the label is the law.” It is unlawful to use a pesticide in a manner or for a purpose not listed on its label. For example, if the control of aphids on roses is the objective, make certain the product lists aphids under insects controlled and roses under plants on which it can be applied. In many instances, more than one product may be available to control the pest in question. If so, selection should not be made on the basis of cost alone. Instead, consider toxicity of the product to humans, possible affects to the environment and, perhaps, ease of use.

When handling pesticides, keep in mind that they are poisonous and pose a risk, at least to some degree. Most products intended for use in and around the home are formulated in low concentrations; many are sold ready-to-use and are already diluted. Some of the same active ingredients that are found in home and garden products may also be available in more concentrated formulations sold under different brand names for agricultural and industrial use. Generally, these concentrated products are

Revised by
David H. Trinklein, Horticulture State Specialist, Division of Plant Sciences



Figure 2. Labeling on a pesticide package is the definitive source of information about which pests the product will control, on which plants it may be applied, and how to use it safely.



Figure 3. Professional pest control applicators are trained, certified and licensed to use pesticides that may be unavailable to homeowners.

not listed as approved for home use; thus, it is unlawful to use them in the home environment.

Other pesticides are termed “restricted use” and available only to licensed pest control professionals (Figure 3). Most of these cannot be purchased by the general public because of their toxicity or the danger they pose to the environment if not used properly. If a very serious pest problem occurs that requires a restricted-use pesticide, consult a professional. Professional pesticide applicators have the proper training, certification and equipment needed to handle such jobs.

Applying the correct amount

Many people are tempted to believe that if a little is good, then a lot is better. Avoid this temptation when mixing and applying pesticides because applying more than necessary can have negative consequences. Overdosing can cause harm to the environment, including runoff into surface and groundwater, buildup of long-term residues, and damage to desirable plants and beneficial organisms. Applying pesticides at higher rates than the label states is also considered to be a misuse of that product and unlawful. Finally, pesticides are not cheap; unnecessarily high application rates for any product are costly.

As mentioned previously, many pesticides formulated for homeowner use require no additional mixing. However, if mixing a concentrate with water is required, the pesticide label will state the desired concentration that should be achieved before application. Some pesticides may list application rates as an amount to apply per unit area, whereas others simply list dilution recommendation (for example, ounces of product per gallon of water). For most lawn-care products, this information will be given in terms of product per 1,000 square feet. Therefore, it is important to have accurate dimensions of the area to be treated to ensure correct mixing of the pesticide in application equipment.

Many of the labels for granular pesticides formulated for use on lawns include a table listing the correct setting

for popular brands of lawn spreaders for accurate delivery of the product to the site. These settings vary depending on granule size and weight, which affect flow rate and distribution. Read label for proper settings.

Personal safety

The risk involved with pesticide use follows the formula

$$\text{Hazard} = \text{Exposure} \times \text{Toxicity}$$

This formula states that the *risk or hazard* of using any pesticide is equal to *exposure* to the pesticide times its *human toxicity*.

- Hazard can be thought of as the risk of injury from applying a pesticide.
- Toxicity is a function of how poisonous the pesticide might be.
- Exposure is how the pesticide enters the body.

There are four primary means by which pesticides may enter the human body: dermal (skin), oral (ingestion), respiratory (breathing) and ocular (eyes). Entrance by exposure to the skin is by far the most common of these four. Because of the risk of absorbing pesticides through the skin, many pesticide labels place special emphasis on how to protect the user from skin exposure.

A pesticide label clearly states the minimum personal protection equipment (PPE) that must be worn when using that product (Figure 4). Many products that are used in and around the home will state that water- or chemical-proof gloves should be worn when mixing and applying. *Cloth or leather gloves are not water- or chemical-proof and should not be worn while handling pesticides* because they absorb pesticides and will be in constant contact with the skin. Proper gloves are essential when mentioned on the label because the majority of pesticide exposures occur through contact with the skin.

If coveralls are required as PPE, disposable one-piece suits made from water-repellent materials such as Tyvek are available. Eye protection may also be necessary when using some products, particularly during the mixing process.

If this is a requirement, face shields, protective goggles and safety glasses are all available. Regular eyeglasses for corrective vision will *not* provide adequate protection.

When the pesticide application task has been completed, wash PPE with soapy water. Clothing that has been worn while handling pesticides should be washed separately from other laundry, then line-dried. Sunlight can help break down any remaining pesticide residues. Finally, bathe thoroughly and change into clean clothing.

Unfortunately, accidental exposure to pesticides occurs. Symptoms of skin exposure include itching, blistering or rash. Symptoms of oral exposure or ingestion include burned mouth, sore throat or upset stomach. Inhalation symptoms include pain or tightness in chest whereas those for ocular exposure are eye irritation, or temporary or permanent blindness

If you or someone else displays any of these symptoms after coming in contact with a pesticide, take action right away. Do not take any chances; contact a medical professional and take the pesticide label with you if a visit to the emergency room is recommended. The label will include specific information that the medical professional can follow to provide remedial treatment.

Missouri Poison Center 800-222-1222

All Missouri Poison Centers are coordinated through SSM Cardinal Glennon Children's Medical Center in St. Louis. This facility has a 24-hour Poison Help Line staffed by professionals. The expert taking your call will refer you to the closest poison center for treatment.

In case of accidental poisoning involving a pesticide, follow the first-aid directions printed on the label of the container and consult your physician immediately. Additional information concerning treatment and course of action can be obtained from your nearest poison center.

Additional safety considerations

For safety's sake, keep the following points in mind when using pesticides in a situation where children, pets or wildlife also are present:

- Remove children's toys.
- Remove or cover pet food and water dishes.
- Never place pesticide baits where children, pets or wildlife will contact them.
- Store all pesticides in their original containers and out of reach of children. Remember, children explore their world through taste as well as sight. Pesticides improperly stored in food or soft drink containers can lead to an accidental poisoning because children associate the container with something sweet and not with something poisonous.



Figure 4. When handling pesticides, always wear the personal protection equipment mentioned on the label. (Source: U.S. Department of Agriculture)

Environmental concerns

Sometimes, even when precautions have been taken, pesticide use can cause harm to environmentally sensitive areas. Off-site movement of pesticides is of special concern on windy days or when heavy rainfall occurs right after an application. Unintentional pesticide exposure poses risks in areas around water sources, playgrounds, beehives and sensitive nontarget vegetation, such as food crops and ornamental plants. To decrease the chances of damage caused by pesticide movement, avoid applying pesticides when it's windy or the current forecast calls for significant rainfall.

If pesticide applications are to be made to vegetable or other food crops, check the product's label for its preharvest interval (PHI). The PHI is the amount of time that must elapse between pesticide application and harvesting the particular crop for consumption, freezing or canning.

Storage and disposal

The best storage practice for pesticides is to buy only the amount needed to do the current job. Unfortunately, this guideline often is impractical because of the amount of the product contained in even the smallest size available. Home-use products that come in ready-to-use formulations can generally be used up in a shorter time than concentrates that must be diluted. Consider buying ready-to-use formulations whenever possible. When pesticides must be stored, place them in a locked cabinet out of the reach of children. Most pesticides should be stored at room temperature. Follow storage instructions on the label.

The pesticide label usually does not give exact disposal directions because laws vary from state to state. Once mixed and applied, unused pesticide in application equipment such as a hand-pump sprayer is considered a hazardous waste and must be disposed of properly. The best practice is to mix only what is needed to treat a particular area or problem. Never store unused pesticide in application equipment, planning to use it at a later time.

Do not pour or flush pesticides down drains, toilets or sewers. Also, never place unused pesticides in the trash. Many communities sponsor pesticide disposal days when unwanted or outdated pesticides can be brought to a local collection point to be disposed of by the city or county.

Pesticide storage and disposal do's and don'ts

Do's

- Always read and follow label directions.
- Mix only the amount of pesticide needed at the time.
- Store pesticides according to label directions.
- Store pesticides in their original, labelled container.
- Thoroughly clean out empty pesticide containers before disposing of them.
- Properly dispose of unused pesticides.

Don'ts

- Don't store unused pesticide in application equipment.
 - Don't pour or flush pesticides down drains, toilets or sewers.
 - Don't rinse pesticide containers or application equipment in a household sink.
 - Don't put unused pesticides in the trash.
 - Don't burn pesticide containers.
 - Don't store any substance other than the labeled product in a pesticide container.
-

Once a pesticide container is empty, clean it out thoroughly. The best way to dispose of residues of liquid formulations is to triple-rinse the container into a bucket, pour the rinse water back into the sprayer, and reuse it according to the pesticide label directions. Do not rinse containers in a household sink, and do not pour rinse water down a drain. For dry formulations, thoroughly shake the bag or container directly onto the site or into the spreader. The cleaned container can be put in your regular trash. In most states, including Missouri, burning a pesticide container is illegal and should not be considered a disposal option. Never reuse a pesticide container for storage of any other substance.

Additional information

American Association of Poison Control Centers:

<http://www.aapcc.org>

Missouri Department of Agriculture:

<http://agriculture.mo.gov>

Missouri Department of Natural Resources:

<http://dnr.mo.gov>

MU Extension Pesticide Applicator Training:

<http://pat.missouri.edu>

MU Extension Plant Diagnostic Clinic:

<http://plantclinic.missouri.edu>

National Pesticide Information Center:

<http://npic.orst.edu>

U.S. Environmental Protection Agency:

<http://epa.gov>

ALSO FROM MU EXTENSION PUBLICATIONS

- G1914 *Laundering Pesticide-Contaminated Clothing*
- G1917 *Personal Protective Equipment for Working With Pesticides*
- G7501 *Selecting a Professional Pest Control Service*

extension.missouri.edu | 800-292-0969